CHILDREN'S EDUCATION SOCIETY (Regd.)
THE OXFORD COLLEGE OF ENGINEERING
(Recognised by the Govt. of Karnataka, Affiliated to Visvesvaraya Technological University, Belagavi.
Approved by A.I.C.T.E. New Delhi
Recognised by UGC Under Section 2(f) I
Bommanahalli, Hosur Road, Bangalore - 560 068.
Ph: 080-61754601/602, Fax 080 - 25730551
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2.6.1

Vision,Misson,Programme outcomes, Course outcomes,Program specific outcomes for all Programmes offered by the institution are stated and displayed on website and communicated to teachers and students.

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2.6.1. Programme outcomes, Programme specific outcomes and course outcomes for all Programme offered by the institution are stated and displayed on website and communicated to teachers and students.

The College has well defined Course Outcomes for all courses, which are statements to describe the competencies students gain during the course. The main purpose of the outcome-based-education (OBE) is in achieving outcomes through an organised system and aligning to one or more POs.

The Heads of department and faculty discuss POs, COs and PSOs of the programs and implement appropriate pedagogic strategies. The Course outcomes are designed as per the affiliating university prescribed syllabus and by employing Bloom's taxonomy verbs and levels. All the Courses have around five to six course outcomes and these are correlated to the Program Outcomes (POs). The Course Outcomes are framed and stated in such a way that they can be actually measured. For example the course of fifth semester 'Data base management system' of CSE department has the following course outcomes.

"Provide a strong foundation in database concepts, technology, and practice. Practice SQL programming through a variety of database problems. Demonstrate the use of concurrency and transactions in database. Design and build database applications for real world problems".

The college displays POs, COs and PSOs on the website, notice boards, hand books and also inform students during the orientation Programme at the beginning of every semester. Alumni interactions also provide an opportunity to get feedback and helps in improvement in the same.

The faculty deploys different learning processes on a continuous basis to achieve the desired outcomes by adopting relevant pedagogical strategies and continuous monitoring. The add-on courses fill the gaps if any in the Course.

Normally, assessment is made in two methods, direct and indirect. The direct method, considers the performance of the student in 3 internal assesmement tests (CIE), University exams (SEE), seminars, project work and laboratory tests. It focuses on attainment of course outcomes. Seminars and Project work evaluation provides extra measures to evaluate the outcomes.

Indirect assessment is based on feedback received from students at the end of each semester and Course. The exit survey data and feedback helps to review and incorporate modifications for proper outcomes of the course.

The college helps students to succeed in State, National, and International competitive exams such as GATE and Engineering Services etc, by providing the necessary Academic and Infrastructural support. The faculty

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is allowed to participate in workshops, conducted by subject experts so as to enable them achieve the desired outcome of the course.

POs ensure competencies, expertise and attainment of PEOs in graduate after completion of the program. Program-Educational-Objectives are statements that describe the career and professional achievement, the program allows the graduates to achieve. The PEOs are framed on the basis of feedback from all the stakeholders and reviewed to ensure continuing suitability, adequacy and effectiveness. The students are hired during the final year by reputed organizations. It enables them to grow up the ladder and blossom into a professional.

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Academic Year-2016-17

Department Of Automobile Engineering

Vision of the Institute

To be a respected and most sought after engineering educational institutions engaged in equipping individuals capable of building learning organizations in the new millennium.

Mission of the Institute

To develop competent students with good value systems and face challenges of the continuously changing world.

Vision of the Department

To establish the department as a renowned centre of excellence in the area of scientific education, research with industrial guidance and exploration of the latest advances in the rapidly changing field of Automobile Engineering.

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Mission of the Department

Mission 1. The Department will serve its students, industry and society by fulfilling the mission of learning, and engagement through the creation, dissemination and application of engineering methods

Mission 2. Encourage students to continuously challenge the existing methods in Automobile Engineering with an intention to align the students towards research.

Mission 3. Impart knowledge on practical aspects and professional standards relevant to the practice of Automobile Engineering in the many aspects of modern life where it plays a vital role.

Program Educational Objectives

Mission 1. Graduates shall display technical knowledge in basic Mechanical and Automobile Engineering subject areas enabling them to find career opportunities in relevant government agencies, reputed private firms.

Mission 2. Graduates shall gain practical knowledge in the working of Automobile Systems, capable of working on indigenous projects, ventures related to automotive discipline.

Mission 3. Graduates shall be well versed with the academic learning material of the course syllabus and ready to take up further learning through higher education and scientific research.

Mission 4. Graduates shall be well equipped with the requirements of the current industries to obtain job opportunities in Mechanical and Automotive sectors in the design, Manufacturing, Analysis domains.

Program Specific Objectives

PSO1. Graduate will demonstrate the knowledge to design, develop, implement and use same into various domains to identify cause and hence provide solutions in the automotive field.

PSO2. Graduate to work in interdisciplinary environment to design systems withthe future emission norms and safety standards in automobile sector.

PSO3. Graduate will be able to pursue of lifelong learning and professional development to face the challenging and emerging needs of our society.

Program Outcomes

1. Engineering knowledge: Apply the knowledge of mathematics, science, engineering fundamentals, and an engineering specialization to the solution of complex engineering problems.

2. Problem analysis: Identify, formulate, review research literature, and analyze complex engineering problems reaching substantiated conclusions using first principles of mathematics, natural sciences, and engineering sciences.

3. Design/development of solutions: Design solutions for complex engineering problems and design system components or processes that meet the specified needs with appropriate consideration for the public health and safety, and the cultural, societal, and environmental considerations.

4. Conduct investigations of complex problems: Use research-based knowledge and research methods including design of experiments, analysis and interpretation of data, and synthesis of the information to provide valid conclusions.

5. Modern tool usage: Create, select, and apply appropriate techniques, resources, and modern engineering and IT tools including prediction and modelling to complex engineering activities with an understanding of the limitations.

6. The engineer and society: Apply reasoning informed by the contextual knowledge to assess societal, health, safety, legal and cultural issues and the consequent responsibilities relevant to the professional engineering practice.

7. Environment and sustainability: Understand the impact of the professional engineering solutions in societal and environmental contexts, and demonstrate the knowledge of, and need for sustainable development.

8. Ethics: Apply ethical principles and commit to professional ethics and responsibilities and norms of the engineering practice.

9. Individual and team work: Function effectively as an individual, and as a member or leader in diverse teams, and in multidisciplinary settings.

10. Communication: Communicate effectively on complex engineering activities with the engineering community and with society at large, such as, being able to comprehend and write effective reports and design documentation, make effective presentations, and give and receive clear instructions.

11. Project management and finance: Demonstrate knowledge and understanding of the engineering and management principles and apply these to one's own work, as a member and leader in a team, to manage projects and in multidisciplinary environments.

12. Life-long learning: Recognize the need for, and have the preparation and ability to engage in independent and life-long learning in the broadest context of technological change.

Course: Material Science and Metallurgy-15AU32

CO-1	Explain different types of material crystal structures and arrangement of atoms. Describe various mechanical properties of materials
CO-2	Describe about different types of fractures and their importance in engineering applications
CO-3	Explain the concept of equilibrium diagram. Plot cooling curves and phase diagrams for pure metals and alloys
CO-4	Identify various ferrous metals and alloys based on composition and properties for prescribed application
CO-5	Select various nonferrous metals and alloys based on composition and properties for given application
CO-6	Describe about different types of composite materials and their production and application in engineering field

Course: Engineering Thermodynamics-15AU33

CO-1	Define and explain fundamental thermodynamic laws and concepts, work, various types of work and heat and its applications, entropy and its relations
CO-2	Explain Zeroth, First & Second law of thermodynamics and its applications
CO-3	Calculate load and IHP, BHP of IC engines
CO-4	Calculate efficiency and MEP of various gas power & vapor power cycles
CO-5	Calculate efficiency and MEP of various gas power & vapor power cycles
CO-6	Design cost effective thermodynamic systems

Course: Mechanics of Materials-15AU34

CO-1	Explain the concepts of stress, strain; material properties. Explain the behavior of materials under different loading conditions such as tensile, compression, shear, bending etc.
CO-2	Calculate bending moment (BM) and shear forces (SF) and draw the BM and SF diagrams types of beams carrying different types loads such as point load, UDL,UVL and extend the same to real life situations
CO-3	Calculate principal stresses using analytical and graphical methods; estimate the stresses in thick and thin cylinders
CO-4	Evaluate Stresses & angle of twist induced in the shaft due to twisting

CO-5	Explain the concepts of torque and calculate the diameter of hollow and solid shafts subjected to twisting moment
CO-6	Calculate Critical load for different types columns using Euler's, Rankin's equations &limitations of these equations and explain the applications

Course: Mechanical Measurement &Metrology-15AU35

CO-1	Explain the significance of mechanical measurements and components of a generalized Measurement system
CO-2	Classify and explain principles of various types of transducers, modifying devices and terminating devices
CO-3	Explain the working principle of instruments used for measurement of Force, Torque, Pressure, Temperature, Strain and Vibration
CO-4	Explain the objectives of metrology and explain various standards of length such as line and end standards
CO-5	Demonstrate the skills of interpreting various types of limits, fits and tolerances, Classify the comparators and explain their working principles
CO-6	Explain the usage of instruments used for the measurement of screw thread and gear parameters.

Course: Manufacturing Process -15AU36

CO-1	Define various terminologies used in casting process
CO-2	Explain basic concepts used in construction of various moulds
CO-3	Analyze the working of various moulding machines
CO-4	Select the appropriate moulding machine and moulding process depending on the type of raw material required to produce the desired product
CO-5	Select the appropriate joining process depending on the type of joint required to produce the desired product
CO-6	Realize the significance of Non-Destructive Testing's (NDT's)

Course: Design of Machine Elements 1-10AU52

CO-1	Explain the importance of Standards in Design, Selection of materials as per CODES &STANDARDS
CO-2	Analyze the various modes of failure of machine components under different static load conditions and use appropriate theories of failures to design machine components
CO-3	Analyze Impact stresses for machine components, Fatigue stress analysis
CO-4	Compute the dimensions of simple machine components

CO-5	Design shafts for transmission of power under various conditions
CO-6	Design of welded joints, riveted joints and power screws

Course: Automotive Engine And components-10AU53

CO-1	Calculate major dimensions of engine components like cylinder, piston, connecting rod, crankshaft, valve and valve operating mechanisms
CO-2	Select suitable scavenging process for two stroke engine
CO-3	Calculate amount coolant required and select suitable cooling system for given engine
CO-4	Select suitable lubricant and lubrication system for given engine
CO-5	Analyze working of two stroke engine
CO-6	Explain need for supercharger and modifications required in engine for supercharging

Course: Dynamics of Machine-10AU54

CO-1	Calculate static forces at various points in different types of mechanism
CO-2	Calculate fluctuation of energy in flywheel and dimensions of flywheel
CO-3	Balance rotating masses and of reciprocating masses in internal combustion engine, V engine, radial engine and to solve analytically and graphically to balance the systems
CO-4	Describe gyroscopic couple and to understand effect of gyroscopic couple
CO-5	Calculate gyroscopic effect on stability of vehicles, ship, aircraft etc.
CO-6	Analyze effect of profile of cam on motion of followers

Course: Auxiliary Systems Of Automotive Engines- 10AU55

CO-1	Explain the constructional details of SI and CI engines and classify engines
CO-2	Explain the construction and working of carburetors and fuel injection pumps
CO-3	Suggest an efficient cooling system for IC engines
CO-4	Suggest a proper lubricant to be used in an automobile used in various environmental conditions
CO-5	Explain need for supercharger and modifications required in engine for supercharging

CO-6	Analyze working of two stroke engine

Course: Automotive Fuels & Combustion-10AU56

CO-1	Introduce understanding about available energy sources for ICE
CO-2	Distinguish between properties of difference fuels
CO-3	Determine the A/F ratio for complete combustion
CO-4	Explain and differentiate between multi fuel and duel fuel engines
CO-5	Design SI& CI engine combustion chambers
CO-6	Explain stages of combustion in S.I. & C.I. engines

Course: Operation Research-10AU71

CO-1	Formulate and solve mathematical model (linear programming problem) for a physical situations like production, distribution of goods and economics.
CO-2	Apply the concept of simplex method and its extensions to dual simplex algorithm.
CO-3	Solve the problem of transporting the products from origins to destinations with least transportation cost.
CO-4	Understand the usage of game theory and Simulation for Solving Business Problems
CO-5	Analyzing different queuing situations and find the optimal solutions using models for different situations.
CO-6	Identify the resources required for a project and generate a plan and work schedule using CPM and PERT techniques.

Course: VBE-10AU72

CO-1	Classify the vehicles and define basic terms.
CO-2	Calculate various aerodynamic forces and moments acting on vehicle.
CO-3	Calculate load distribution in vehicle body
CO-4	Explain the ergonomics, stability the vehicle
CO-5	Identify various sources of noise and methods of noise separation
CO-6	Identify the various safety aspects in a given vehicle.

Course: Mechanical Vibrations-10AU73

CO-1	Classify different types of vibration / damping associated with systems and vibration Measuring instruments
CO-2	Calculate natural frequency, damping, logarithmic decrement and other parameters of single degree of freedom un-damped
CO-3	Compute the response of single degree of freedom damped vibrating systems to different excitation forces
CO-4	Compare the natural frequencies modes of multi-degree of freedom free vibrating systems using numerical methods
CO-5	Explain the natural frequencies / modes of multi-degree of freedom free vibrating systems using numerical methods
CO-6	Solve free damped vibrating systems problems

Course:Air Pollution and Control-10AU74

CO-1	Explain air pollution and pollutants, sources & their effects
CO-2	Describe different parameters responsible for pollutant formation
CO-3	Choose instruments for pollution measurements
CO-4	Analyze measurement of pollutants
CO-5	Understand mechanism of pollutant formation
CO-6	Understand various regulations governing Air pollution

Course: TTW-10AU752

CO-1	Gain the knowledge of different types of two and three wheeled vehicle
CO-2	Describe construction and working of different type of internal combustion engines for two and three wheeled vehicles.
CO-3	Lay down wiring diagram for two wheeler and three wheeled vehicles.
CO-4	Describe types of frames, brakes and tires used for two and three wheeled vehicles.
CO-5	Explain types of clutches, transmission and final drives used for two and three wheeled vehicles.
CO-6	Understand various ignition and lubrications systems in TTW vehicle

Course: Fluid Mechanics-15AU42

CO-1	Define fluid properties, describe Pascal's law, Hydrostatic law, and solve static fluid problems
CO-2	Explain Buoyancy and Stability concepts of floating objects
CO-3	Explain the different methods of measurement of flows
CO-4	Analyze various forces acting on submerged bodies in engineering flow problems
CO-5	Explain the concepts of laminar flow, viscous flow through pipes and plates
CO-6	Analyze various forces acting on submerged bodies

Course: Kinematics of Machines-15AU43

CO-1	Identify degrees of freedom, mechanism, structure, mobility of various mechanisms. Analyze mechanisms using Grubler's criterion, Classify mechanisms in to continuous and Intermittent motion mechanisms
CO-2	Ability to calculate the velocity and acceleration of Planar Mechanisms
CO-3	Determine the path of contact, arc of contact, contact ratio of a Spur gear
CO-4	Design the epicyclic gear trains to find the speed and number of teeth in a gear train
CO-5	Construct the various types of follower motions and design cams and followers for specified motion profiles

Course: Automotive Engines-15AU44

CO-1	Explain the constructional details of SI and CI engines and classify engines
CO-2	Explain the construction and working of carburetors and fuel injection pumps
CO-3	Explain the combustion process in SI and CI engines
CO-4	Suggest an efficient cooling system for IC engines
CO-5	Suggest a proper lubricant to be used in an automobile used in various environmental conditions

Course: Computer Aided Machine Drawing-15AU45

CO-1	Use the Solid Edge software for drawing and solid modeling, Sketch the solutions of the sections of solids, determine the inclination of the cutting plane when true shape of section of an object is given

CO-2	Sketch and draw the orthographic views of simple machine parts (top view, front view, side view) using first angle projection
CO-3	Sketch and draw the sectional views of simple machine parts, sketch and draw ISO metric threads, Square, ACME & BSW forms of threads using conventional representation
CO-4	Distinguish between temporary and permanent joints and sketch and draw the different types of key, Sketch and draw two views of different types of riveted joints
CO-5	Sketch and draw two views of different automotive components, couplings and joints, Create solid models of different parts and assemble them and draw their sectional views using Solid Edge software
CO-6	Prepare assembly drawings along with their bill of material

Course: Manufacturing Process 2-15AU46

CO-1	Define various terminologies used in production technology
CO-2	Explain basic concepts used in construction of various machine tools
CO-3	Analyze the various mechanisms underlying the working of various machine tools
CO-4	Select the appropriate machining process depending on the properties of the raw materialrequired to produce the desired product
CO-5	Realize the significance of non-traditional machining
CO-6	Realize the significance of technological advances in the field of automating manufacturing engineering activities

Course: Auomotive Chassis and Suspension-10AU61

CO-1	Explain different chassis layouts and frames solve for stability and weight distribution and suitability of frames
CO-2	Describe, about various Front Axles, factors of wheel alignment Steering Systems and Calculate dimensions of Front Axle
CO-3	Discuss about various types Propeller Shaft, Differential And Rear Axles and to solve numerical
CO-4	Compare various types of Brakes and components of braking system
CO-5	Understand various steering mechanisms
CO-6	Solve vehicle stability problems

Course: Automotive Transmission-10AU62

CO-1	Explain the constructional and working principle of different types of fluid flywheel, torque converter and one way clutches

CO-2	Explain the constructional and working principle of different types of gear box
CO-3	Determine the gear ratio, speed of vehicle and number of teeth on driving and driven gears
CO-4	Explain the necessity, advantages, constructional and principle of operation of different types of automatic transmissions and hydraulic control
CO-5	Understand different gear selector mechanisms
CO-6	Understand various mechanical factors of vehicle movement

Course: Design of Machine Elements II-10AU63

CO-1	Students able to understand design of curved beams and cylinder, cylinder heads
CO-2	Illustrate the design procedure for springs and its types
CO-3	Learn the types of brakes and clutches and its design
CO-4	Understand and design about Gears and its terminologies
CO-5	Demonstrate the suitability of a type and class of lubricant for a specific application
CO-6	Analyze the stresses in the critical section of a belts, ropes and chains

Course: Automotive Electrical And Electronics System-10AU64

CO-1	Explain the construction of battery used in automotive vehicles
CO-2	Describe the construction and working of D.C. generator, alternator, cranking motor, ignition systems along with trouble shooting
CO-3	Discuss the faults arising in automotive wiring and lighting system
CO-4	Understand various aspects of electrical and Hybrid vehicles
CO-5	Explain various chassis electrical systems
CO-6	Explain various aspects of electrical and Hybrid vehicles

Course: Earth Moving equipments and Tractors-10AU81

CO-1	Classify the different types of earth moving equipments and its applications
CO-2	Understand the engine and undercarriage components and suspension systems

CO-3	List the transmission system and types of reduction of final drives
CO-4	Outline the overall hydraulic system and its applications
CO-5	Understand the steering and breaking of earth moving equipment and maintenance and safety procedure

Course: Autotronics-10AU82

CO-1	Identify the type of control system, their applications, Evolution of Mechatronics
CO-2	To Understand evolution of microprocessors, organization of microcomputers
CO-3	Analyze the micro processor programs and develop advanced mechatronics system
CO-4	Understand various automotive applications
CO-5	Explain organization and programming of Micro processor
CO-6	Explain Application of mechatronics with respect to Automotive field

Course: Alternative Energy Sources For Automobiles-10AU834

CO-1	Describe need for alternative fuels for Internal combustion engine and alternative drive systems for automobiles
CO-2	Describe principle of solar energy collection, construction of photo voltaic cells
CO-3	Explain various properties, methods of production of Bio gas, methanol, ethanol, SVO, Bio diesel
CO-4	Explain use of hydrogen for internal combustion engine application
CO-5	Describe use of various gaseous fuels for internal combustion engine application
CO-6	Understand various aspects of electrical and Hybrid vehicles

Course: Hybrid Vehicles-10AU841

CO-1	To understand an automobile engine components and Hybrid system, construction, operation, applications relative to automotives
CO-2	To improve performance of Hybrid Architecture engine by super charger, turbo charger & ignition system.
CO-3	Develop the concept of different gear system and power transmission system to rear wheel and of the I Cengine.

CO-4	To control emission levels in the atmosphere as well as to bring environment friendly vehicles
CO-5	Explain the sizing of Drive system , Sizing power electronics
CO-6	Characteristics of Fuel Cell types and Alkaline fuel cell and hydrogen storage systems

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Department of Biotechnology

Vision of the Institute

Mission of the Institute

To develop competent students with good value systems and face challenges of the continuously changing world.

Vision of the Department

Aspiring to be recognized as a premier source of outstanding graduates, who in turn will help their enterprise attain and sustain industrial and societal competitiveness.

Mission of the Department

To create and disseminate knowledge by being accountable for developing and motivating our pupils to attain academic excellence and industrial competency. With our focus on teaching, learning & research, we engage in helping our students to face challenges in the field of Biotechnology

Detailed Mission

M1	To embrace and disseminate fundamental and applied knowledge of Biotechnology Engineering to attain academic excellence and industrial competency
M2	To empower the students for enhanced performance through continuous learning and research capabilities in multidisciplinary domains
M3	To create awareness about professional conduct and socio-ethical implications of potentials of biotechnology
M4	To equip the students to interchelate biotechnological solutions for present day

	challenges

Program Specific Objectives (PSOs)

1: Graduates will gain and apply knowledge of Science, Biotechnology and Engineering concepts in order to design and perform the experiments followed by validating the data to solve complex problems in the multidisciplinary research fields of Biotechnology.

2: Graduates will be able to analyze, appraise and develop technologies to address the Biotechnology Engineering problems while keeping in mind safety & ethical factors to

Program Educational Objectives (PEOs)

1. To endow students with basics of mathematics, life sciences and engineering necessary to analyze and solve scientific problems.
2. To provide students with the necessary instructions and relevant practical experience combined with exposure to and adequate training to face basic challenges in Biotechnology.
3. To inculcate scientific temperament in students to pursue and engage in research projects related to health, food and environment.
4. To prepare students with efficient communication skills, team spirit and leadership qualities and awareness of professional conduct and mould them into responsible and competent engineers.
5. To empower students to work in scientific environment with ethical values and social responsibilities.

Program Outcomes

1. Engineering knowledge: Apply the knowledge of mathematics, science, engineering fundamentals, and an engineering specialization to the solution of complex engineering problems.

2. Problem analysis: Identify, formulate, review research literature, and analyze complex engineering problems reaching substantiated conclusions using first principles of mathematics, natural sciences, and engineering sciences.

3. Design/development of solutions: Design solutions for complex engineering problems and design system components or processes that meet the specified needs with appropriate consideration for the public health and safety, and the cultural, societal, and environmental considerations.

4. Conduct investigations of complex problems: Use research-based knowledge and research methods including design of experiments, analysis and interpretation of data, and synthesis of the information to provide valid conclusions.

5. Modern tool usage: Create, select, and apply appropriate techniques, resources, and modern engineering and IT tools including prediction and modelling to complex engineering activities with an understanding of the limitations.

6. The engineer and society: Apply reasoning informed by the contextual knowledge to assess societal, health, safety, legal and cultural issues and the consequent responsibilities relevant to the professional engineering practice.

7. Environment and sustainability: Understand the impact of the professional engineering solutions in societal and environmental contexts, and demonstrate the knowledge of, and need for sustainable development.

8. Ethics: Apply ethical principles and commit to professional ethics and responsibilities and norms of the engineering practice.

9. Individual and team work: Function effectively as an individual, and as a member or leader in diverse teams, and in multidisciplinary settings.

10. Communication: Communicate effectively on complex engineering activities with the engineering community and with society at large, such as, being able to comprehend and write effective reports and design documentation, make effective presentations, and give and receive clear instructions.

11. Project management and finance: Demonstrate knowledge and understanding of the engineering and management principles and apply these to one's own work, as a member and leader in a team, to manage projects and in multidisciplinary environments.

12. Life-long learning: Recognize the need for, and have the preparation and ability to engage in independent and life-long learning in the broadest context of technological change.

Course Name: C202 (Unit Operations -15BT32)

C202.1	State and describe the nature and properties of the fluids
C202.2	Classify fluid systems and understand its behavior and derive equations governing fluid flow
C202.3	Study the different flow measuring instruments and demonstrate applications of Bernoulli's theorem in venturimeter, orifice meter and pumps.
C202.4	Illustrate the working of size reduction, sedimentation and mixing equipments.
C202.5	Understand the working of mass transfer operations and distinguish them
C202.6	Design and operate the heat exchange equipment

Course Name: C203 (Biochemistry -15BT33)

C203.1	Able to understand the basic concepts of biochemical reaction mechanisms, pH, buffer systems and stereochemistry
C203.2	Able to describe the structural and functional properties of biomolecules, their three dimensional organization and structure function relationships
C203.3	Able to comprehend the importance of cell membranes, transport mechanisms and the principles of molecular recognition and communication
C203.4	Able to interpret principles of bioenergetics of high energy compounds and the principles of photosynthetic machinery.
C203.5	Able to outline metabolic pathways of various biomolecules
C203.6	Able to evaluate the importance of the enzymes responsible for the homeostasis of biochemical reactions

Course Name: C204 (Microbiology -15BT34)

C204.1	Describe the structure and function of typical prokaryotic and eukaryotic cell structure like bacteria, algae, yeast & molds, protozoa, viruses, etc.
C204.2	lity to isolate, grow, identify the microorganisms.
C204.3	Study of equipments like LAF, hot air oven, autoclave microscope etc.. and their role in sterilization and understanding the mechanism of chemical based sterilization
C204.4	Learning to disinfect the microbes and to work in sterile environment.

C204.5	Define the role of microorganisms towards environmental protection, industrial applications and infectious diseases their diagnosis and control of the spread of the disease.
C204.6	Out-line industrial fermentation processes leading to the production of antibiotics, organic acids, enzymes, vitamins and therapeutic products.

Course Name: C205 (Cell Biology and Genetics -15BT35)

C205.1	Able to summarize and recollect the concepts of cell biology and understand the cell organelles and functions
C205.2	To analyze the knowledge of cell division and importance of cell cycle regulation and cell locomotion
C205.3	Explain the concepts of hematology and Growth factors
C205.4	understand the structure of genetic material, classical experiments and Mendelian laws of Inheritance
C205.5	Illustrate the gene interactions, linkage, mapping and the structure of chromosome.
C205.6	To interpret the knowledge of population genetics in brief &apply the fundamental aspects of genetics in biotechnology

Course Name: C206 (Basics of Computer Applications -15BT36)

C206.1	Gain knowledge on implementation of programming languages to develop biological software tools.
C206.2	Able to develop their own web pages, databases and data mining.
C206.3	Students will be able to implement SQL and HTML in biological databases
C206.4	Graduates will be able to design Biological databases using ontology terms
C206.5	Students will be able to apply programming skills using MATLAB and excel in biological problems.
C206.6	Students will be designing programming protocols using C .C++ for Biological and Health care problems.

Course Name: C207 (Unit Operations Laboratory -15BTL37)

C207.1	Arrive at required results based on experimental observations recorded systematically.
C207.2	Study and illustrate the working of different flow measuring instruments

C207.3	Understand and estimate the shape and size of irregular particles by sieve analysis
C207.4	Demonstrate the experimental procedure for mass transfer operation though distillation and diffusion studies.
C207.5	Study heat transfer operation in double pipe heat exchanger and compare flow patterns of double pipe heat exchanger
C207.6	Understand operation of centrifugal and reciprocating pumps by varying flow rates

Course Name: C208 (Microbiology Laboratory-15BTL38)

C208.1	To use different laboratory equipment and instruments such as Microscope, Laminar Air Flow Station, Autoclave, oven, incubators
C208.2	Prepare the media and use for the cultivation of the microorganisms.
C208.3	Perform laboratory experiments for the isolation, identification and characterization of microorganisms
C208.4	Carry-out experiments for the enumeration, staining and control.
C208.5	Understanding the biochemical characterization of microbes to establish taxonomic classification.
C208.6	Ability to interpret the growth pattern and mechanism and correlation w.r.t industrial microbiology

Course Name: C209 (Biostatistics and Biomodeling -15BT41)

C209.1	The students will be able to explain the concepts of data collection, presentation of charts, graphs & data
C209.2	The students will be able to describe different laws of probability
C209.3	The students will be able to apply concepts of analysis of variance in inferring the statistical data
C209.4	The students will be able to analyze different methods in design of experiments
C209.5	The students will be able o evaluate the case studies of lung cancer, endangered plants species
C209.6	The students will be able to recognize how data illuminate ethical, political, scientific, economic and overall public health issues

Course Name: C210 (Biochemical Thermodynamics -15BT42)

C210.1	State & describe the concepts of system, surrounding, process, laws of thermodynamics & entropy
C210.2	Explain the PVT behavior of pure fluids and derive equations of state for real gases
C210.3	Distinguish between various equations of state & their applications and analyze the thermodynamic diagrams
C210.4	Determine the importance of partial molar properties, activity co-efficient of solution & the concepts of phase equilibrium.
C210.5	Summarize vapor liquid equilibrium data for ideal solutions
C210.6	Illustrate the phase rule for reacting systems and effect of temperature, pressure on equilibrium constants

Course Name: C211 (Molecular Biology -15BT43)

C211.1	Explain replication, transcription and translation processes with underlying differences in prokaryotic and eukaryotic systems
C211.2	Recognize and explain the role of enzymes and factors involved in replication, transcription and translation
C211.3	Describe the regulation of gene expression in prokaryotes and eukaryotes and interpret its importance
C211.4	Elaborate importance of genetic recombination with special reference to bacterial system
C211.5	Categorize DNA damage occurring in living system and outline repair mechanisms
C211.6	Apply the knowledge of molecular biology in biotechnological applications

Course Name: C212 (Bioprocess Principles & Calculations -15BT44)

C212.1	To understand the concept of unit conversions and basic chemical calculations
C212.2	To understand and calculate material balances around steady- state multi-unit processes with and without chemical reactions
C212.3	To understand and solve energy balances around multi-unit processes with and without chemical reactions
C212.4	To explain the various unit operations involved in bioprocess engineering
C212.5	To apply the calculations involving fuels and combustion

C212.6	To implement Stochiometric requirements of reactants and products in biochemical reactions

Course Name: C213 (Bioprocess Principles & Calculations -15BT45)

C213.1	Apply the principles of macromolecular structure and function
C213.2	Identify the development of recent methods available for molecular function
C213.3	Ability to analyze the structural difference & similarity in bimolecular structure
C213.4	Ability to understand the concept of biomolecules identification technique or method
C213.5	Evaluate theoretical and computational skills of biophysical aspects in structure activity studies.
C213.6	Formulate complete and logical plan for data analysis of structure activity studies in drug design, molecular docking and other applications

Course Name: C214 (Clinical Biochemistry -15BT46)

C214.1	Able to discuss the biochemistry and pathophysiology associated with various disorders of cellular metabolism and inborn errors of metabolism.
C214.2	Able to describe the structure and function of metabolic pathways for carbohydrates, amino acids and lipids and their corresponding clinical conditions.
C214.3	Able to analyze the medical problems associated with abnormal lipoprotein and enzyme levels and therapeutic agents used to treat such disorders.
C214.4	Able to assess the clinical manifestations of renal, hepatic, pancreatic, gastric and intestinal functions.
C214.5	Able to understand and outline the significance of hormonal systems and their corresponding disturbances.
C214.6	Able to evaluate the biochemical and clinical aspects of hematology including measurement of coagulation and thrombosis.

Course Name: C215 (Cell & Molecular Biology Laboratory -15BTL47)

C215.1	Acquire knowledge about cell division & identify the stages of mitosis & meiosis
C215.2	Analyze and select a suitable method for DNA, RNA & protoplast related experiments
C215.3	Perform gene transformation using the appropriate method

C215.4	Understand and apply method of competent cells, protoplast preparation and protoplast fusion for biotechnological applications
C215.5	Analyze and select a suitable method for separation of DNA by electrophoretic method
C215.6	Understand and analyze the principle of thermal cycler

Course Name: C216 (Clinical Biochemistry Laboratory -15BTL48)

C216.1	Able to understand and use many of the techniques and tools of biochemistry
C216.2	Able to explain the basic concepts of pH, buffers and colorimeter
C216.3	Able to comprehend fundamental principles of biochemical research and conduct qualitative and quantitative analysis of biological samples for constituents like glucose, urea, phosphate, iron & cholesterol
C216.4	Able to evaluate the properties of important biomolecules like carbohydrates, amino acids, proteins & lipids
C216.5	Able to implement experimental protocols, and adapt them to plan and carry out simple clinical investigations to identify biomolecules based on their color reactions
C216.6	Able to develop basic laboratory skills and use apparatus to obtain reproducible data from biochemical experiments and analyze, interpret, and report the results of clinical investigations.

Course Name: C301 (Management and Entrepreneurship -10BT51)

C301.1	Describe the basic principles and concepts of management.
C301.2	Distinguish different plans and list steps in planning
C301.3	Interpret the concepts of directing and controlling.
C301.4	Discuss the concepts of organizing and staffing.
C301.5	Demonstrate the meaning, functions, types and roles of an entrepreneur and describe various institutional support.
C301.6	Explain in detail about the small scale industries and prepare the project report.

Course Name: C302 (Biokinetics & Bioreaction Engg-10BT52)

C302.1	Understand the theories of chemical reaction and analyze experimental reaction kinetics data

C302.2	Solve engineering problems on equilibrium data of biochemical reaction kinetics
C302.3	Distinguish ideal reactor systems and develop performance/design equations for conversion and space velocity
C302.4	Understand the non-ideal behavior of reactor systems and residence time distribution of reactants
C302.5	Compare media and sterilization techniques for industrial fermentation process and understand kinetics of microbial growth
C302.6	Define concepts of involved in enzyme-catalyzed reaction and develop equations for enzyme substrate reaction and describe regulatory enzymes

Course Name: C303 (Bioinstrumentation & Biosensors-10BT53)

C303.1	Able to understand basic concepts of biomedical signals.
C303.2	Able to know bioinstrumentation techniques and interpret the signaling mechanism.
C303.3	Able to understand the patient monitoring and recording systems.
C303.4	Capability of developing robotic systems for remote monitoring of patients
C303.5	Capacity to develop LOC for painless diagnosis of medical conditions.
C303.6	Design cost effective sensors with application in the fields of environment, pharmaceutical and bioprocess industry

Course Name: C304 (Immunotechnology-10BT54)

C304.1	Classify the immune system and summarize their functions
C304.2	Outline the molecular and cellular mechanisms involved in the development of the immune response
C304.3	Explain the regulatory mechanism involved in development of immune response
C304.4	Describe the cause, challenges and treatment for Immune System Pathologies
C304.5	Describe the cause, challenges and treatment for Immune System Dysfunctions
C304.6	Apply the major immunological laboratory techniques and their application to both clinical analysis and experimental research

Course Name: C305 (Genetic engg. & Applications -10BT55)

C305.1	Able to explain the basic concepts of gene cloning and of applications recombinant DNA technology

C305.2	Able to categorize vectors, enzymes and nucleic acid purification strategies important for transgenic technology, gene manipulation concepts and transgenic methods.
C305.3	Able to outline and assess specific techniques like PCR, hybridization & construction of libraries used in genetic engineering
C305.4	Able to appraise the different gene/DNA transfer techniques to produce transgenic organisms
C305.5	Able to comprehend various methods of producing transgenic plants and animals and engineering microbes for the production of useful products like enzymes and antibiotics
C305.6	Able to formulate specific applications of genetic engineering for the welfare of mankind & society.

Course Name: C306 (Bioinformatics-10BT56)

C306.1	Students will use basic biological concepts, grounded in foundational theories, to interpret relationships among living things and to analyze and solve biological problems.
C306.2	To know the relevant online resources, databases and software tools
C306.3	To understand the underlying concepts of Bioinformatics in disease understanding
C306.4	To be able to design for engineering proteins and genetic engineering.
C306.5	Analyse biological data using modeling, predictive and drug design methods
C306.6	The students will be familiar with tools and techniques of bioinformatics and they can apply these techniques to Health care and pharmacy industry.

Course Name: C307 (Genetic engg. &Immuno tech. Lab-10BT57)

C307.1	Categorize the blood group and analyze the sample for diagnosis of typhoid
307.2	Measure the concentration of antigen or antibody present in the sample by selecting the appropriate immunochemical technique and infer the results
C307.3	Choose a suitable experimental method to isolate, quantify & measure the concentration of DNA& RNA
C307.4	Demonstrate the use of PCR and prepare amplified DNA using thermal cycler
C307.5	Perform gene transformation using the appropriate method
C307.6	Analyze and identify the DNA & protein by suitable technique

Course Name: C308 (Bioinformatics Lab-10BT58)

C308.1	The students will be gaining expertise on practical data analytics, Data mining, machine learning.
C308.2	Utilize the biological information from public databases for given particular problem in biotechnology, medicine or biology.
C308.3	To gain foundational knowledge about molecular evolution, protein structure and gene expression using computational tools.
C308.4	Ability to write computer programs in various programming techniques to analyze bioinformatics data
C308.5	To apply the tools to address important problems of biotechnology and to verify the capability in handling a research project.
C308.6	The students will be able to visualize data and will apply this knowledge towards analysis of data related to graphical interfaces in the fields of systems biology ,functional genomics, and biomedicine

Course Name: C309 (Bioprocess Control and Automation - 10BT61)

C309.1	Able to describe the Instrumentation of flow, pressure, temperature
C309.2	Able to solve problems of response of first order systems for different types of input
C309.3	Able to determine the transient response and to derive the transfer functions of first and second order systems
C309.4	To Understand the parameters to be measured and controlled in the bioreactor(L2),5
C309.5	Able to apply the design aspects for block diagrams and use the concept of stability for solving the problems
C309.6	Able to analyze online data and understand the dynamics and control of bioreactors

Course Name: C310 (Clinical Biotechnology - 10BT62)

C310.1	Acquire the basics of drug manufacturing process and Understand concept of formulation
C310.2	Explore the methods and tests for evaluating physicochemical properties of various drugs
C310.3	Understand, Connect and Interpret pharmacokinetics and pharmacodynamics of drug
C310.4	Appreciate pharmacotherapy and Biotherapeutics incommon ailments
C310.5	Understand and Interpret invitro/invivotesting,animal and human pharmacology and Safety testing of drugs

C310.6	Understand, design and analyze data generated during clinical research

Course Name: C311 (Enzyme Technology & Biotransformation - 10BT63)

C311.1	Classify and identify the enzymes based on the biochemical reaction catalyzed by them
C311.2	Compare enzymes and catalyst, and explain the mechanism of enzyme catalysis
C311.3	Recognize & Interpret the importance of enzymes in medicine
C311.4	Explain the methods involved in study of enzyme kinetics , standardization and optimization of enzyme catalyzed reactions
C311.5	Compare immobilized enzymes over conventional enzymes, apply the knowledge of immobilized enzymes in bioprocess industry
C311.6	Summarize the applications of enzymes in medicine and industry

Course Name: C312 (Genomics and Proteomics - 10BT64)

C312.1	The students will be able to apply DNA/genome sequencing techniques to various genome projects.
C312.2	The students will be able to analyze genomes of various organisms and genome annotation importance.
C312.3	The students will be able to correlate the relationship between genome, transcriptome, proteome and metabolome.
C312.4	To engineer proteins for therapeutic and clinical applications.
C312.5	The students will be able to apply the knowledge of the major web-resources and the notion about how the methods are applied in real-life scientific research.
C312.6	The students will be able to understand how to perform simple analysis of this data, and remember examples of how the research tools are applied in published investigations.

Course Name: C313 (Bioprocess Equipment Design & CAED - 10BT65)

C313.1	To define the notations and terminology for welding and pipe joints.
C313.2	To draw various values and joints.
C313.3	To calculate the no of tubes, diameter and different parameter of double pipe heat exchanger.
C313.4	To calculate the dimensions of shell and tube heat exchangers.
C313.5	To apply the design aspects by solving the problems.
C313.6	To evaluate the no of plates & height of packing in distillation column and To design the fermenter .

Course Name: C314 (Animal BT - 10BT661)

C314.1	Understand, classify & distinguish the various parameters and concepts involved in animal cell culture and media formulation.
C314.2	Execute the experimental aspects by utilizing high end equipments
C314.3	Interpret knowledge of the recent advances in animal breeding
C314.4	Explain basic principles & techniques in genetic engineering, gene transfer technologies for animal cell lines
C314.5	Explain the contribution 'functional genomics' is making & is likely to make in animal biotechnology now & in the future
C314.6	Appraise the role of biotechnology in animal sciences for sustainable eco-system & human welfare

Course Name: C316 (PERL Programming - 10BT664)

C316.1	The students will be able to explain the advantages of using Perl for a scripting tool
C316.2	The students can demonstrate the proper use of Perl syntax, including control structures and expressions
C316.3	The students will be able to assess the proper use Perl regular expressions
C316.4	The students will be able to describe the use of built-in Perl functions
C316.5	The students will be able to apply the knowledge to write Perl scripts for data-processing, system administration, and other applications
C316.6	The students can formulate the use of the various types of Input and Output.

Course Name: C317 (Bioprocess Control and Automation Lab - 10BTL67)

C317.1	To understand the characteristics of transducers of temperature, pressure & flow
C317.2	To understand determine the oxygen demand required for biological degradation of pollutant
C317.3	To analyze the response of first order systems for step and impulse input
C317.4	To interpret the response of first order systems.
C317.5	describe the principles of controllers
C317.6	To explain the concept of control of DO& agitation

Course Name: C318 (Biokinetics and Enzyme Technology - 10BTL68)

C318.1	Able to apply principles of protein chemistry and enzymology for analysis and study of enzymes as biocatalysts
C318.2	Able to investigate various methods available for isolation, purification and characterization of enzymes
C318.3	Able to apply the principles and methods of immobilization of enzymes useful in a diverse range of industries
C318.4	Able to assess biokinetics parameters using different reactors
C318.5	Able to implement experimental protocols, and adapt them to plan and carry out investigations to relate experimental data with fundamental theories of enzyme kinetics
C318.6	Able to use basic laboratory skills and apparatus to obtain reproducible data from biochemical experiments and analyse, interpret, and report the results.

Course Name: C401 (Economics and Plant Design - 10BT71)

C401.1	Acquire knowledge in the design of process of a chemical plant
C401.2	The students will be able to develop step by step procedure for plant design considering all the types of design procedure
C401.3	Able to evaluate the capital investments, manufacturing cost required for the process plant
C401.4	The students will be capable of analyzing the cost and time value of money
C401.5	Understand the concept of depreciation, Profitability and taxes
C401.6	Generate the reports and statements needed for the economic evaluation

Course Name: C402 (Upstream Process Technology - 10BT72)

C402.1	Understand concept of in-vitro plant cell and tissue culture and design protocol for mass propagation of plants and for production of beneficial therapeutic metabolite
C402.2	Develop knowledge and applications of in-vitro animal cell culturing
C402.3	Appreciate the concept of hybridoma technology for custom made MAB and protein production through in-vitro animal cell culture
C402.4	To study the microbial cell culture techniques
C402.5	Specify, formulate and analyze fermentation technology to efficiently generate biotech products for the domains related to food, health and environment
C402.6	Specify, select and formulate Biotechnology based solutions, for sustainable development conceiving ethical and social issues.

Course Name: C403 (Downstream Process Technology - 10BT73)

C403.1	Understand and explain the importance of downstream processing in biochemical processes
C403.2	To design and implement protocol in Downstream processing of different types of biochemical products
C403.3	Apply the knowledge in design, economics, validation, optimization and scale-up of biochemical product recovery
C403.4	Compare the uses of conventional unit operations, as well as new concepts and emerging technologies in DSP
C403.5	Anlyze and compare various parameters that has to be considered during scale up of chromatographic process
C403.6	Summarize the role of QC, QA, GMP & GLP in bioprocess industry

Course Name: C404 (Food Biotechnology - 10BT74)

C404.1	Strong knowledge in present trends in Food Processing and strategies so that they can analyse the self life and nutritional qualities to cater the need of society.
C404.2	In depth knowledge to carry out the association between the scientific and technological principles underlying the major elements of Food Technology and Chemical Engineering.

C404.3	Efficiently apply the instrumentation knowledge in Food processing, Food formulation which can be appropriately applied in food processing industry.
C404.4	With knowledge of processing and preservation can undertake research project or case study to assess food product for local consumption.
C404.5	After the detailed study can explore the field of food processing industry and food technological research work
C404.6	Knowledge and understanding of different tools used, production of recombinant proteins and additives to use in food technology, and ethics and safety of food biotechnology.

Course Name: C405 (FORENSIC SCIENCE - 10BT753)

C405.1	Understand the history, legal procedures, application of forensic science.
C405.2	Employ scientific crime detection techniques for collecting and categorizing crime scene data & different types of crime detection units.
C405.3	Demonstrate the ability to conduct interviews and interrogations, develop and investigative plans, follow up investigative leads, and document their findings
C405.4	Carry out detection tests in the area of laboratory forensic biology, Serology & toxicology
C405.5	Demonstrate problem-solving skills and the ability to interpret the statistical data and to develop algorithms for solving problems
C405.6	Evaluate the professional codes of ethics outlined by various professional forensic science organizations

Course Name: C406 (Biochips and Microarray Technology - 10BT761)

C406.1	Able to understand basic concepts of gene expression
C406.2	Able to know mechanism of MA construction & different types like Protein chip, tissue chip.
C406.3	To apply to concepts of programming and statistics in data analysis
C406.4	Able to understand concepts of MA in drug discovery
C406.5	Capability of analysis of data and finding biomarkers in cancer studies
C406.6	Capacity to develop target validation test by microarray.

Course Name: C407 (Upstream Process Bioprocessing Lab - 10BTL77)

C407.1	Acquire the basics of media preparation, inoculation techniques of plant cell culture
C407.2	Understand process of suspension culture development and induction of Secondary metabolite
C407.3	Demonstrate and practice the Estimation of Lycopene from fruits and Anthocyanin from leaf /callus tissue
C407.4	Acquire the knowledge of. EstimatinDNA and Protein from biological samples
C407.5	Understand and analyse the process of inoculum development and Shake flask studies in bioprocess
C407.6	Demonstrate fermentor operation

Course Name: C408 (Downstream Process Bioprocessing Lab - 10BTL78)

C408.1	Analyze and select appropriate unit operations for isolation and purification of bio molecules.
C408.2	Evaluate the bio-product using appropriate qualitative and quantitative analysis methods depending upon the chemical nature of analyte
C408.3	Analyze, compare and select a technique for concentrating biological products like extraction, precipitation, membrane separation
C408.4	Acquire the basic principles and techniques of chromatography to purify the biological products
C408.5	Enhance product quality by appropriate method of purification operation
C408.6	Analyze the proteins by SDS-PAGE and Western blotting techniques

Course Name: C409 (Project Management & IPR - 10BT81)

C409.1	Able to understand and utilize the knowledge of IP to get patent on their inventions
C409.2	This will help student in future to file the patent and processing of patent
C409.3	They can obtain patent in different fields of biotechnology.
C409.4	Students will develop capabilities for planning, executing, controlling and evaluating projects,
C409.5	Students will develop the skill of risk management and managing project lifecycles, resources, schedules and budgets.
C409.6	Students will understand the major principles and practices of project management applied to product contexts in the biotechnology industry.

Course Name: C410 (Bioethics & Biosafety - 10BT82)

C410.1	The students are able to interpret the ethical issues of biotechnology
C410.2	The students will build the knowledge of biosafety principles followed in BT research
C410.3	The students can categorize the transgenic research on the basis of biosafety principles, apply biosafety regulations & principles in transgenic research
C410.4	The students will have the knowledge about safety release of GMOs into environment & PBR
C410.5	The students will be able to devise business strategies by taking account of IPRs
C410.6	The students will be able to assists in technology up gradation and enhancing competitiveness.

Course Name: C411 (Lab to Industrial Scaling - 10BT832)

411.1	Analyze the various parameters for bioreactor design.
C411.2	Identify appropriate qualitative and quantitative analysis methods depending upon the chemical nature of analyze.
C411.3	Enhance product output by selection of appropriate method of enrichment operation
C411.4	Enhance product quality by appropriate method of purification operation
C411.5	Analyze industrial problems in fermentation process and solving.
C411.6	Designing Bioreactors using computer programming skills

Course Name: C412 (Lab to Industrial Scaling - 10BT841)

C412.1	Explain the importance of microbial diversity in environmental system and process
C412.2	Distinguish between different pollutants and identify the appropriate treatment to relevant problem
C412.3	Understand and explain the importance of molecular approachs in environmental microbiology and biotechnology
C412.4	Explain the relevance of biotechnology in producing alternative fuels
C412.5	Describe existing and emerging technologies that are important in area of environmental biotechnology
C412.6	Describe biotechnological solutions to address environmental issues including pollution, mineral resources, renewable energy and water recycling

Course Name: C414 (Project Work - 10BT85)

C414.1	Identify a topic in relevant areas of Biotechnology
C414.2	Illustrate literature review to identify gaps and define objectives & scope of the work.
C414.3	Formulate the problem to meet the objectives of the proposed work
C414.4	Develop a prototypes/models, fabrication, experimental set-up/software systems necessary to meet the objectives
C414.5	Develop the work with a concern for society, environment and ethics

Course Name: C415 (Seminar - 10BT86)

C415.1	Enables to update with present technologies and trends in real world
C415.2	Enables to improve ability of data collection and presentation
C415.3	Enables to overcome stage fear and improve communication skills
C415.4	Enables to face spontaneous queries
C415.5	Prepare and write the report as per recommended format.
C415.6	Help to develop vocabulary & demonstrate efforts put in comprehensive analysis & interpretation of data

Department Of Chemistry

Vision of the Institute

To be a respected and most sought after engineering educational institution engaged in equipping individuals capable of building learning organizations in the new millennium

Mission of the Institute

To develop competent students with good value systems and face challenges of the continuously changing world.

Vision of the Department

Our vision is to give our students an in-depth exposure to the latest developments in Chemistry made by reputed scientists and experts in this field. To equip individuals capable of earning in the new millennium.

Mission of the Department

Our mission is to provide a contemporary foundation for addressing problems in Chemistry. Also to develop competent engineers with good values and to equip them to face the challenges of the continuously changing world.

Program Educational Objectives

PEO 1. Mater the basic knowledge of Engineering Chemistry for building technical Competence in industries, research and development.

PEO 2. To develop knowledge in the fields of use of free energy in chemical Equilibrium, electrochemistry and energy storage systems, corrosion and metal finishing.

PEO 3. To understand the importance of the energy systems, environmental pollution, waste management, water chemistry, Instrumental methods of analysis and nano-materials.

Program Specific Objectives

PSO 1: Understand the principles of electrochemistry & battery technology

PSO 2: Apply the knowledge of Corrosion and metal finishing in solving environmental issues.

PSO 3: Utilize the knowledge of fuels and solar energy for various Engineering applications

PSO 4: Utilize the knowledge of water technology for various engineering applications as well as in daily life

PSO 5: Develop solutions for problems associated with Nano technology

Course Name: 15CHE12/22 (Engineering Chemistry)

CO1	Understand the principles of electrochemistry & battery technology in our day -today life.
CO2	Apply the knowledge of Corrosion and metal finishing in solving environmental issues.
CO3	Utilize the knowledge of fuels and solar energy for various Engineering applications
CO4	Apply the knowledge of polymer chemistry in replacement of conventional materials by polymers for various applications

CO5	Utilize the knowledge of water technology for various engineering applications
CO6	Develop solutions for problems associated with nano technology.

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Department of Computer Science

Vision of the Institute

To be a respected and most sought after engineering educational institution engaged in equipping individuals capable of building learning organizations in the new millennium. To produce technocrats with creative technical knowledge and intellectual skills to sustain and excel in the highly demanding world with confidence.

Mission of the Institute

To develop competent students with good value systems and face challenges of the continuously changing world.

Vision of the Department

To produce technocrats with creative technical knowledge and intellectual skills to sustain and excel in the highly demanding world with confidence.

Mission of the Department

Mission 1.The department's aim is to develop the best computer science professionals who work creatively, communicate effectively & become technologically competent, and also to mould them into good citizens by inculcating sense of ethical values in them.

Mission 2. To Encourage the students to built self-help, Power of initiative, courage to change and create new things.

Mission 3.To inculcates the spirit of cooperation and capacity for organization with special emphasis on their self-reliance and sustainability tomeet ever changing requirements of local and global industries.

Program Educational Objectives

PEO To create graduates equipped with life-long learning skills and have a successful professional career in IT industry.

PEO To prepare graduates to pursue higher education and get inclined towards research & development in computer science engineering.

PEO 3. To provide adequate training and opportunities, with exposure to emerging cutting edge technologies and to work in teams on multidisciplinary projects with effective communication skills and leadership qualities.

Program Specific Objectives

PSO 1 : To design efficient algorithms and develop effective code for real-time computations.

PSO 2: To apply software engineering principles in developing optimal software solutions.

Program Outcomes

1. Engineering knowledge: Apply the knowledge of mathematics, science, engineering fundamentals, and an engineering specialization to the solution of complex engineering problems.

2. Problem analysis: Identify, formulate, review research literature, and analyze complex engineering problems reaching substantiated conclusions using first principles of mathematics, natural sciences, and engineering sciences.

3. Design/development of solutions: Design solutions for complex engineering problems and design system components or processes that meet the specified needs with appropriate consideration for the public health and safety, and the cultural, societal, and environmental considerations.

4. Conduct investigations of complex problems: Use research-based knowledge and research methods including design of experiments, analysis and interpretation of data, and synthesis of the information to provide valid conclusions.

5. Modern tool usage: Create, select, and apply appropriate techniques, resources, and modern engineering and IT tools including prediction and modeling to complex engineering activities with an understanding of the limitations.

6. The engineer and society: Apply reasoning informed by the contextual knowledge to assess societal, health, safety, legal and cultural issues and the consequent responsibilities relevant to the professional engineering practice.

7. Environment and sustainability: Understand the impact of the professional engineering solutions in societal and environmental contexts, and demonstrate the knowledge of, and need for sustainable development.

8. Ethics: Apply ethical principles and commit to professional ethics and responsibilities and norms of the engineering practice.

9. Individual and team work: Function effectively as an individual, and as a member or leader indiverse teams, and in multidisciplinary settings.

10. Communication: Communicate effectively on complex engineering activities with the engineering community and with society at large, such as, being able to comprehend and write effective reports and design documentation, make effective presentations, and give and receive clear instructions.

11. Project management and finance: Demonstrate knowledge and understanding of the engineering and management principles and apply these to one's own work, as a member and leader in a team, to manage projects and in multidisciplinary environments.

12. Life-long learning: Recognize the need for, and have the preparation and ability to engage in independent and life-long learning in the broadest context of technological change.

Course Name: C231 (ENGINEERING MATHEMATICS-III -15CS31)

C231.1	Apply the concept of Fourier series and Fourier transform and their application in system communication and digital signal processing.
C231.2	Analyze the z-transform discrete function arising in the field of antennas and propagation of signals and systems
C231.3	Explore numerical linear algebra and numerical integration to solve the problem encountered in network analysis, image and speech processing.

C231.4	Study the vector integral to use in the study of Green's, Stoke's and Divergence theorem arising in various application in the field of electromagnetic and fluid flow problems

Course Name: C232(ANALOG AND DIGITAL ELECTRONICS)

C232.1	Apply the working principles of Field Effect Transistors (FETs) & Operational Amplifiers (OPAMPs).
C232.2	Apply simplification methods for Boolean functions and design the
	logical circuits.
C232.3	Analyze data processing circuits, flip flops, and counters.
C232.4	Analyze HDL programs for combinational logic circuits.

Course Name: C233 (DATA STRUCTURE IN C -15CS33)

C233.1	Use different types of data structures, algorithms and their operations.
C233.2	Analyze the performance of non-primitive data structures.
C233.3	Implement the applications of Data structures in a high-level languageC.
C233.4	Design and apply appropriate data structures for solving computing problems.

Course Name:C234 (COMPUTER ORGANIZATION -15CS34)

C234.1	Understand the basics of organizational and architectural applicability issues of a digital computer.
C234.2	Analyze the design of arithmetic and logical units and instruction execution concept
C234.3	Analyze the memory system ,speed, size and cost
C234.4	Apply the concepts of computer organization in the design of various embedded systems examples.

Course Name: C235 (UNIX AND SHELL PROGRAMMING-15CS35)

C235.1	Apply the knowledge of Unix Architecture and File systems.
C235.2	Analyze the working of built in commands and user defined commands in Unix.
C235.3	Analyze Simple Filters and Regular expression to perform pattern matching.
C235.4	Implement given problems using shell programming language and Perl script.

Course Name:C236(DISCRETE MATHEMATICALSTRUCTURES-15CS41)

C241.1	Acquire the knowledge of single step and multi-step numerical methods for ordinary differential equation arising in engineering fields
C241.2	Understand the series solution of Bessel's and Legendre's differential equation explore their precise utility in engineering applications.
C241.3	Explore the concept of potential fields through complex potential arising in the problem of fluid flow and electromagnetic theory
C241.4	Apply the problem associated with probability of sampling theory and Markov chain models arising in information theory and coding.

Course Name:C242 (ENGINEERING MATHEMATICS-IV-15CS42)

C242.1	Understand various software development process models and their suitability
C242.2	Assess professional and ethical responsibility
C242.3	Evaluate the Function on multi-disciplinary teams
C242.4	Develop the skills to manage the techniques, skills, and modern engineering tools necessary for engineering practice

Course Name:C243 (DESIGN AND ANALYSIS OF ALGORITHM -15CS43)

C243.1	Understanding and applying computational solution to well-known problems
C243.2	Analyze the computational complexity of different algorithms
C243.3	Design an algorithm using appropriate design strategies for problem solving.
C243.4	Develop an algorithm for given problem

Course Name:C244 (MICROPROCESSOR AND MICRO DESIGN -15CS44)

C243.1	Understand thearchitecture of 8086 microprocessor, fundamentals of ARM processorand apply the instruction set to process data.
C243.2	Apply assembly language code to solve problems.
C243.3	Analyze interrupt routines and interfaces to interface various devices withx 86 families.
C243.4	Differentiate microprocessors & microcontrollers and analyze design philosophy and of ARM processor for computation of data.

Course Name:C245 (OBJECT ORIENTED CONCEPTS -15CS45)

C245.1	Understand and apply the concept of object oriented programming, features of java and its structure to solve real world scenarios.
C245.2	Analyze java programs using classes, inheritance and exception handling techniques.
C245.3	Design the application programs using applet and event handling mechanisms.
C245.4	Develop GUI interface to interact with users, and to understand the event-based GUI handling principles using applets and swings.

Course Name:C246 (DATA COMMUNICATION -15CS46)

C246.1	Understand and apply the basic concepts of Data Communication
C246.2	Analyze the different types of Data link control protocols
C246.3	Solve the problems on line coding, Multiplexing, Error detection, MAC protocols and IP
C246.4	Evaluate Network layer Protocols

Course Name:C351 (SOFTWARE ENGINEERING -15IS51)

C351.1	Understand and apply the concept of software engineering lifecycle.
C351.2	Apply various testing methods for performance evaluation of software products
C351.3	Analysis the requirements engineering process and system models
C351.4	Evaluate simple real time applications.

Course Name:C352 (SYSTEM SOFTWARE -15CS52)

C352.1	Understand the architectural applicability for working principle of system software.
C352.2	Analyze the working of Assembler, loader, linker for Assembly Language programming.
C352.3	Apply basic knowledge about the working of text editors and debuggers in system software.
C352.4	Design the compiler tools LEX and YACC programs in C.

Course Name:C353 (OPERATING SYSTEM -15CS53)

C353.1	Understand Process concept and Process scheduling and apply scheduling to solve problems.
C353.2	Analyze Scheduling algorithms and formulate solutions for critical section problem
C353.3	Describe System model for deadlock, Methods for handling deadlocks and memory management strategies
C353.4	Define File ,directory and learn various Access methods and its implementation

Course Name:C354 (DATABASE MANAGEMENT SYSTEM -15CS54)

C354.1	Understand the concepts of fundamentals of database and apply in Database Design
C354.2	Apply database programming skills in SQL.
C354.3	Analyze the concepts of Normalization and design database, which possess no anomalies.
C354.4	Design a Real Time application by considering the issues like concurrency control, recovery and security.

Course Name:C355 (COMPUTER NETWORKS 1 -15CS55)

C355.1	Understand and apply the basics of transmission techniques in computer networks.
C255.2	Analyze the various types of computer networks.
C255.3	Exemplify TCP/IP protocol suite and switching criteria.
C255.4	Demonstrate Medium Access Control protocols for reliable and noisy channels

Course Name:C356 (FORMAL LANGUAGE AND AUTOMATA THEORY-15CS56)

C356.1	Apply the fundamental concept of formal languages for interpreting the abstract machine.
C356.2	Analyze how to translate between different models of computation.
C356.3	Apply a solution model based on proofs of theorems.
C356.4	Designs grammars and automata for different language classes and become knowledgeable about restricted models of computation.

Course Name:C362 (File Structures -15CS56)

C362.1	Identify the appropriate concept of file structure design and secondary storage devices.
C362.2	Apply appropriate file structure design for storage and data manipulation using object oriented programming.
C362.3	Analyze the suitable indexing and hashing techniques for file structure problem.
C362.4	Interpret a solution module and implement an object oriented application.

Course Name:C363 (SOFTWARE TESTING -15CS56)

C363.1	Understand the concepts of testing and apply to derive different test cases
C363.2	Analyze and compare the different testing techniques
C363.3	Apply the appropriate testing techniques in classifying the problem
C363.4	Create appropriate document for the software artifact

Course Name:C364 (OPERATING SYSTEMS -15CS64)

C364.1	Understand fundamentals of operating systems and applying CPU scheduling algorithms for given problem.
C364.2	Analyze process scheduling and process synchronization
C364.3	Apply suitable techniques for management of different resources.
C364.4	Demonstrate various operating system platforms through casestudies.

Course Name:C365 (SYSTEM SOFTWARE -15IS652)

C365.1	Understand the architecture and apply working principle of system software.
C365.2	Build machine code for the given Assembly language programming.
C365.3	Analyze tokens by designing finite automata.
C365.4	Evaluate different parsers using Semantic rules.

Course Name:C471 (OBJECT ORIENTED MODELING AND DESIGN -15CS66)

C471.1	Apply the knowledge of Object oriented concepts in software analysis
C471.2	Analyze object oriented models using UML appropriate notations

C471.3	Apply and analyze application domain models for different use cases
C471.4	Design a model using concepts of pattern orientation

Course Name:C471 (OBJECT ORIENTED MODELING AND DESIGN -10CS71)

C471.1	Apply the knowledge of Object oriented concepts in software analysis
C471.2	Analyze object oriented models using UML appropriate notations
C471.3	Apply and analyze application domain models for different use cases
C471.4	Design a model using concepts of pattern orientation

Course Name:C472 (INFORMATION SYSTEMS -10IS72)

C472.1	Apply the basic concepts of Information Systems.
C472.2	Apply the applications of IT and IS, and their effects on health.
C472.3	Analyze the enterprise business and e-commerce systems in global market place.
C472.4	Analyze the skills to manage Customer Relationship Management (CRM), Supply Chain Management (SCM), and Decision Support System (DSS).

Course Name:C473 (WEB PROGRAMMING -10CS73)

C473.1	Understand and apply the basic concepts of World Wide Web and web programming tool box.
C473.2	Analyze and create web pages using scripting language by applying style sheets.
C473.3	Analyze and Implement interactive user interface for dynamic functionality.
C473.4	Create a document using web programming tools and to demonstrate client server communication.

Course Name:C474 (Data Warehousing And Mining-10CS74)

C474.1	Understand basics of data warehousing and apply data, web mining concepts to process data.
C474.2	Differentiate clustering techniques and assess association techniques.
C474.3	Analyze various classification and web mining mechanism.

C474.4	Apply data mining concepts to demonstrate the working of OLTP and OLAP models.

Course Name:C475 (JAVA AND J2EE -10CS75)

C475.1	Understand the object oriented concepts and apply in problem solving
C475.2	Design and implement Applet and event handling mechanism in application program
C475.3	Implement graphical interactive application using swings and database transaction using JDBC
C475.4	Develop distributed application and web application

Course Name:C476 (STORAGE AREA NETWORK -10CS76)

C476.1	Apply the knowledge of Storage area network.
C476.2	Apply the techniques used for data maintenance in an intelligent storage System.
C476.3	Analyze different techniques and their role in providing disaster recovery and business continuity capabilities.
C476.4	Differentiate different storage networking techniques.

Course Name:C481 (SOFTWARE ARCHITECTURE -10CS81)

C481.1	Apply the knowledge of software architecture, architectural styles and case studies to address known queries.
C481.2	Describe a software architecture by applying document approaches and views
C481.3	Analyze the quality attribute of a system at the architectural level
C481.4	Design and model architectural pattern and design pattern

Course Name:C482 (SYSTEM MODELING AND SIMULATION -10CS82)

C482.1	Use the basic concept of discrete event simulation and apply it to
	modeling paradigm.
C482.2	Analyze the real world system simulation for modeling.
C482.3	Develop the simulation skills to solve real world problems on systems.
C482.4	Apply the results to resolve issues in a real world environment.

Course Name:C483 (INFORMATION AND NETWORK SECURITY -10CS83)

C483.1	Apply the knowledge of different types of threats to computing system and its associated attacks to address known queries.
C483.2	Analyze the mechanism of key distribution and management.
C483.3	Design security solutions for the vulnerabilities in any computing system.
C483.4	Develop the skills to solve the real time problem.

Course Name:C484 (STORAGE AREA NETWORK -10CS841)

C484.1	Understand and apply the issues of ad-hoc wireless network.
C484.2	Analyze the challenges in designing protocols for wireless ad-hoc network
C484.3	Apply wireless communication protocols using real-life sensors.
C484.4	Use wireless security policies and Algorithms to evaluate an Ad-hoc network

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Department Of Civil Engineering

Vision of the Institute

To be a respected and most sought after engineering educational institution engaged in equipping individuals capable of building learning organizations in the new millennium.

Mission of the Institute

To develop competent students with good value systems and face challenges of the continuously changing world.

Vision of the Department

To impart very high quality education to the students to make them do innovative sustainable engineering relevant to industry and people at large.

Mission of the Department

Mission 1. To emphasize on basics of engineering as well as their applications relevant to the industry

Mission 2. To serve the society with due consideration of economy, ecology and ethical issues of nation.

Mission 3.To sensitize the students and faculty to take up research and consultancy to be on par with international standards.

Program Educational Objectives

Apply fundamental concepts of civil engineering in developing economically viable and sustainable sound solutions.

To work collaboratively on multidisciplinary problems

To achieve their professional aims keeping good ethics

Program Specific Objectives

PSO 1: Graduates will be able to apply technical skills and modern engineering tools for civil engineering day to day practice.

PSO 2: Graduates will be able to participate in critical thinking and problem solving of civiL engineering field that requires analytical and design requirements

PSO 3: Graduates will be able to participate in critical thinking and problem solving of civil engineering field that requires analytical and design requirements.

Program Outcomes

1. Engineering knowledge: Apply the knowledge of mathematics, science, engineering fundamentals, and an engineering specialization to the solution of complex engineering problems.

2. Problem analysis: Identify, formulate, review research literature, and analyze complex engineering problems reaching substantiated conclusions using first principles of mathematics, natural sciences, and engineering sciences.

3. Design/development of solutions: Design solutions for complex engineering problems and design system components or processes that meet the specified needs with appropriate consideration for the public health and safety, and the cultural, societal, and environmental considerations.

4. Conduct investigations of complex problems: Use research-based knowledge and research

methods including design of experiments, analysis and interpretation of data, and synthesis of the information to provide valid conclusions.

5. Modern tool usage: Create, select, and apply appropriate techniques, resources, and modern engineering and IT tools including prediction and modeling to complex engineering activities with an understanding of the limitations.

6. The engineer and society: Apply reasoning informed by the contextual knowledge to assess societal, health, safety, legal and cultural issues and the consequent responsibilities relevant to the professional engineering practice.

7. Environment and sustainability: Understand the impact of the professional engineering solutions in societal and environmental contexts, and demonstrate the knowledge of, and need for sustainable development.

8. Ethics: Apply ethical principles and commit to professional ethics and responsibilities and norms of the engineering practice.

9. Individual and team work: Function effectively as an individual, and as a member or leader indiverse teams, and in multidisciplinary settings.

10. Communication: Communicate effectively on complex engineering activities with the engineering community and with society at large, such as, being able to comprehend and write effective reports and design documentation, make effective presentations, and give and receive clear instructions.

11. Project management and finance: Demonstrate knowledge and understanding of the engineering and management principles and apply these to one's own work, as a member and leader in a team, to manage projects and in multidisciplinary environments.

12. Life-long learning: Recognize the need for, and have the preparation and ability to engage in independent and life-long learning in the broadest context of technological change.

Course Name:232.1 (Strength of Materials-15CV32)

C232.1	To understand the basic material properties of structural materials such as steel, aluminum, wood and also their combinations under axial tension and compression.
C232.2	To learn methods of stress analysis after determining the internal forces under axial tension and compression, bending, shear and torsion.
C232.3	To evaluate the behavior and strength of structural elements under the action of compound stresses and thus understand failure criteria.
C232.4	To understand the methods of analyses of design of structural frames such as pin jointed trusses and portal frames both determinate and indeterminate.
C232.5	To understand the basic concept of instability analyses of structural elements such as columns and struts.

C232.6	To understand the basic concepts of torsion developed in circular shaft.

Course Name: 233.1 (FLUIDS MECHANICS-15CV32)

C233.1	Possess a sound knowledge of fundamental properties of fluids and fluid continuum
C233.2	Compute and solve problems on hydrostatics, including practical
	applications
C233.3	Apply principles of mathematics to represent kinematic concepts related to fluid flow
C233.4	Apply fundamental laws of fluid mechanics and the Bernoulli's principle for practical applications
C233.5	Compute the discharge through pipes and over notches and weirs

Course Name:234.1 (BASIC SURVEYING -15CV34)

C234.1	Posses a sound knowledge of fundamental principles Geodetics[L1][PO1]
C234.2	Measurement of vertical and horizontal plane, linear and angular dimensions to arrive at solutions to basic surveying problems.[
C234.3	Capture geodetic data to process and perform analysis for survey problems
C234.4	Analyse the obtained spatial data and compute areas and volumes. Represent 3D data on plane figures as contours

Course Name: 235.1 (ENGINEERING GEOLOGY -15CV35)

C235.1	Students will able to apply the knowledge of geology and its role in Civil Engineering
C235.2	Students will effectively utilize earth's materials such as mineral, rocks and water in civil engineering practices.
C235.3	Analyze the natural disasters and their mitigation.
C235.4	Assess various structural features and geological tools in ground water exploration,Natural resource estimation and solving civil engineering problems
C235.5	Apply and asses use of building materials in construction and asses their properties

Course Name:236.1 (Building Materials and Construction-15CV36)

C236.1	Select suitable materials for buildings and adopt suitable construction techniques.

C236.2	Adopt suitable repair and maintenance work to enhance durability of buildings.

Course Name: C242 (Analysis of Determinate Structures(15CV42)

C242.1	To evaluate the forces in determinate trusses by method of joints and sections.
C242.2	To evaluate the deflection of cantilever, simply supported and overhanging beams by different methods
C242.3	To understand the energy principles and energy theorems and their applications to determine the deflections of trusses and bent frames.
C242.4	To determine the stress resultants in arches and cables.
C242.5	To understand the concept of influence lines and construct the ILD diagram for the moving loads loads.
C242.6	To know the comparison between moment area and conjugate beam method.

Course Name: C243(applied hydraulics 15CV43)

C243.1	Apply dimensional analysis to develop mathematical modeling and compute the parametric values in prototype by analyzing the corresponding model parameters
C213.2	Design the open channels of various cross sections including economical channel sections
C213.3	Apply Energy concepts to flow in open channel sections, Calculate Energy dissipation,
C213.4	Compute water surface profiles at different conditions
C213.5	Design turbines for the given data, and to know their operation characteristics under different operating conditions
C213.6	The working principles of the hydraulic machines for the given data and analyzing the performance of Turbines for various design data.

Course Name:C244 (concrete technology15CV44)

C244.1	Relate material characteristics and their influence on microstructure of concrete.
C244.2	Distinguish concrete behaviour based on its fresh and hardened properties
C244.3	Illustrate proportioning of different types of concrete mixes for required fresh and hardened properties using professional codes.
C244.4	Adopt suitable concreting methods to place the concrete based on requirement.

C244.5	Select a suitable type of concrete based on specific application.
C244.6	Describe the physical & mechanical properties of aggregates

Course Name: C245 (Applied geotechnical Engg 15CV45)

C245.1	Will acquire an understanding of the procedures to determine index properties of any type of soil, classify the soil based on its index properties
C245.2	Will be able to determine compaction characteristics of soil and apply that knowledge to assess field compaction procedures
C245.3	Will be able to determine permeability property of soils and acquires conceptual knowledge about stresses due to seepage and effective stress; Also acquire ability to estimate seepage losses across hydraulic structure
C245.4	Will be able to estimate shear strength parameters of different types of soils using the data of different shear tests and comprehend Mohr-Coulomb failure theory.
C245.5	Ability to solve practical problems related to estimation of consolidation settlement of s deposits also time required for the same.
C245.6	To implement the knowledge attained in solving civil engineering problems of making roads, townships etc.

Course Name: C246 (Advanced Surveying 15CV46)

C246.1	Apply the knowledge of geometric principles to arrive at surveying problems
C246.2	Use modern instruments to obtain geo-spatial data and analyze the same to appropriate engineering problems.
C246.3	Capture geodetic data to process and perform analysis for survey problems with the use of electronic instruments;
C246.4	Design and implement the different types of curves for deviating type of alignments.
C246.5	To apply basic principles in analyzing position of celestial bodies
C246.6	To implement the knowledge attained in solving civil engineering problems of making roads, townships etc.

Course Name: C351 (Design of RCC Structural Elements-(10CV52)

C252.1	Determine the moment in indeterminate beams and frames having variable moment of inertia and subsidence using slope defection method
C252.2	Determine the moment in indeterminate beams and frames of no sway and sway using moment distribution method.
C252.3	Construct the bending moment diagram for beams and frames by Kani's method.
C252.4	Construct the bending moment diagram for beams and frames using flexibility method

C252.5	Analyze the beams and indeterminate frames by system stiffness method

Course Name: C253:Structural Analysis II-(10CV53)

C253.1	To evaluate the forces in determinate trusses by method of joints and sections.
C253.2	To evaluate the deflection of cantilever, simply supported and overhanging beams by different methods
C253.3	To understand the energy principles and energy theorems and their applications to determine the deflections of trusses and bent frames.
C253.4	To determine the stress resultants in arches and cables.
C253.5	To understand the concept of influence lines and construct the ILD diagram for the moving loads loads.

Course Name: C254 (: Geotechnical Engineering I-(10CV54)

C254.1	Ability to plan and execute geotechnical site investigation program for different civil engineering projects
C254.2	Understanding of stress distribution and resulting settlement beneath the loaded footings on sand and clayey soils
C254.3	Ability to estimate factor of safety against failure of slopes and to compute lateral pressure distribution behind earth retaining structures
C254.4	Ability to determine bearing capacity of soil and achieve proficiency in proportioning shallow isolated and combined footings for uniform bearing pressure
	Capable of estimating load carrying capacity of single and group of piles

Course Name: C355(: Hydrology and Irrigation Engineering (10CV551)

C355.1	1. Identify the major sources of air pollution and understand their effects on health and environment.
C355.2	2. Evaluate the dispersion of air pollutants in the atmosphere and to develop air quality models.
C355.3	3. Ascertain and evaluate sampling techniques for atmospheric and stack pollutants.
C355.4	4. Choose and design control techniques for particulate and gaseous emissions.

Course Name: C356(Traffic Engineering-(10CV561)

C356.1	1. Understand the human factors and vehicular factors in traffic engineering design.
C356.2	2. Conduct different types of traffic surveys and analysis of collected data using statistical concepts.

C356.3	3. Use an appropriate traffic flow theory and to comprehend the capacity & signalized intersection analysis.
C356.4	4. Understand the basic knowledge of Intelligent Transportation System.

Course Name: C361 (Theory of Elasticity10CV661)

C361.1	Understand the construction management process.
C361.2	Understand and solve variety of issues that are encountered by every professional in discharging professional duties.
C361.3	Fulfill the professional obligations effectively with global outlook
C361.4	Create a construction project and safety plan
C361.5	Apply construction management skills as a member of a multi disciplinary team.
C361.6	To make them understand the concept of project management for planning and execution.

Course Name: C262 (Alternative Building Materials and Technologies 10CV662)

C362.1	Possess knowledge of Steel Structures Advantages and Disadvantages of Steel structures, steel code provisions.
C362.2	Possess knowledge of Plastic behavior of structural steel.
C362.3	Understand the Concept of Bolted and Welded connections,
C362.4	Understand the Concept of Design of compression members, built-up columns and columns splices.
C362.5	Understand the Concept of Design of tension members, simple slab base and gusseted base.
C362.6	Understand the Concept of Design of laterally supported and un-supported steel beams.

Course Name:C263 (Ground Improvement Techniques10CV663)

C363.1	Acquire knowledge of different modes of transportation systems, history, development of highways and the organizations associated with research and development of the same in INDIA.
C363.2	Acquire the capability of proposing a new alignment or re-alignment of existing roads, conduct necessary field investigation for generation of required data.
C363.3	Evaluate the engineering properties of the materials and suggest the suitability of the same for pavement construction.

C363.4	Design road geometrics, structural components of pavement
C363.5	Design of highway drainage structural elements
C363.6	Evaluate the highway economics by few select methods and also will have a basic knowledge of various highway financing concepts.

Course Name: C264 (Advanced Surveying 10CV664)

C364.1	Estimate average and peak water demand for a community.
C364.2	Evaluate available sources of water, quantitatively and qualitatively and make appropriate choice for a community.
C364.3	Evaluate water quality and environmental significance of various parameters and plan suitable treatment system.
C364.4	Design a comprehensive water treatment and distribution system to purify and distribute water to the required quality standards.
C364.5	Study drinking water quality standards and to illustrate qualitative analysis of water
C364.6	Design physical, chemical and biological treatment methods to ensure safe and potable water Supply. Revise

Course Name:C265 (Ground Water Hydrology 10CV665)

C365.1	Analyse existing solid waste management system and to identify their drawbacks
C365.2	Evaluate different elements of solid waste management system.
C365.3	Suggest suitable scientific methods for solid waste management elements.
C365.4	Design suitable processing system and evaluate disposal sites.
C365.5	Analyze different processing technologies and to study conversion of municipal solid waste to compost or biogas.
C365.6	Evaluate landfill site and to study the sanitary landfill reactions.

Course Name:C261 (Rural Water Supply and Sanitation10CV666)

C3661.1	Assess the potential of groundwater and surface water resources.
C3661.2	Address the issues related to planning and management of water resources.
C3661.3	Know how to implement IWRM in different regions.
C3661.4	Understand the legal issues of water policy.
C3661.5	Select the method for water harvesting based on the area.
C3661.6	Understand the importance of water and manage the water resources effectively.

Course Name:C261 (Traffic Engineering10CV667)

C3661.1	Assess the potential of groundwater and surface water resources.
C3661.2	Address the issues related to planning and management of water resources.
C3661.3	Know how to implement IWRM in different regions.
C3661.4	Understand the legal issues of water policy.
C3661.5	Select the method for water harvesting based on the area.
C3661.6	Understand the importance of water and manage the water resources effectively.

Course Name: C471 (Environmental Engineering II-(10CV71)

C471.1	1. Acquires capability to design sewer and Sewerage treatment plant.
C471.2	2. Evaluate degree of treatment and type of treatment for disposal, reuse and recycle.
C471.3	3. Identify waste streams and design the industrial waste water treatment plant.
C471.4	4. Manage sewage and industrial effluent issues.

Course Name: C472(Design of Steel Structures (10CV72)

C472.1	1. Understand the importance of hydrology and its components.
C472.2	2. Measure precipitation and analyze the data and analyze the losses in precipitation.
C472.3	3. Estimate runoff and develop unit hydrographs.
C472.4	4. Find the benefits and ill-effects of irrigation.
C472..5	5. Find the quantity of irrigation water and frequency of irrigation for various
	crops. loads.
C472.6	6. Find the canal capacity, design the canal and compute the reservoir capacity.

Course Name: C473 (Estimation and Valuation (10CV73)

C473.1	1. Understand the importance of hydrology and its components.
C473.2	2. Measure precipitation and analyze the data and analyze the losses in precipitation.
C473.3	3. Estimate runoff and develop unit hydrographs.
C473.4	4. Find the benefits and ill-effects of irrigation.

C473.5	5. Find the quantity of irrigation water and frequency of irrigation for various crops. loads.
C473.6	6. Find the canal capacity, design the canal and compute the reservoir capacity.

Course Name:C474Design of Pre Stressed Concrete Structures(10CV74)

C474.1	Find the characteristics of aquifers.
C474.2	Estimate the quantity of ground water by various methods.
C474.3	Locate the zones of ground water resources.
C474.4	Select particular type of well and augment the ground water storage.

Course Name:475 (Highway Geometric Design-10CV755)

C475.1	1. Design, conduct and administer surveys to provide the data required for transportation planning.
C475.2	2. Supervise the process of data collection about travel behavior and analyze the data for use intransport planning.
C475.3	3. Develop and calibrate modal split, trip generation rates for specific types of land use developments.
C475.4	4. Adopt the steps that are necessary to complete a long-term transportation plan.

Course Name:476 (Pavement Materials and Construction-10CV763)

C476.1	Design, conduct and administer surveys to provide the data required for transportation planning.
C476 .2	Supervise the process of data collection about travel behavior and analyze the data for use intransport planning.
C476.3	Develop and calibrate modal split, trip generation rates for specific types of land use developments.
C476.4	Adopt the steps that are necessary to complete a long-term transportation plan.

Course Name:C481(Advanced Concrete Technology10CV81)

C481.1	Prepare detailed and abstract estimates for roads and building.
C481.2	Prepare valuation reports of buildings
C481.3	Interpret Contract document's of domestic and international construction works
C481.4	Estimate the quantities of work, develop the bill of quantities and arrive at the Cost of civil engineering Project
C481.5	Understand and apply the concept of Valuation for Properties
C481.6	Understand, Apply and Create the Tender and Contract document

Course Name:C482Design and Drawing of Steel Structures10CV82)

C482.1	Understand the requirement of PSC members for present scenario
C482.2	Analyse the stresses encountered in PSC element during transfer and at working
C482.3	Understand the effectiveness of the design of PSC after studying losses
C482.4	Capable of analyzing the PSC element and finding its efficiency.
C482.5	Design PSC beam for different requirements
C482.6	learn Design of Pre Stressed Concrete Element

Course Name: C483 (Pavement Design 10CV833)

C483.1	Gain knowledge about the process of collecting data required for design, factors affecting pavement design, and maintenance of pavement.
C483.2	Systematically generate and compile required data's for design of pavement (Highway & Airfield).
C483.3	Analyse stress, strain and deflection by boussinesq's, burmister's and westergaard's theory.
C483.4	Design rigid pavement and flexible pavement conforming to IRC58-2002 and IRC37-2001.
C483.5	Understand the requirements of various types of joints in pavements,which are provided to take care of climatic variations.
C483.6	Evaluate the performance of the pavement and also develops maintenance statement based on site specific requirements.

Course Name: C483 (Finite Element Analysis10CV841)

C484.1	Gain knowledge about the process of collecting data required for design, factors affecting pavement design, and maintenance of pavement.
C484.2	Systematically generate and compile required data's for design of pavement (Highway & Airfield).
C484.3	Analyse stress, strain and deflection by boussinesq's, burmister's and westergaard's theory.
C484.4	Design rigid pavement and flexible pavement conforming to IRC58-2002 and IRC37-2001.
C484.5	Understand the requirements of various types of joints in pavements,which are provided to take care of climatic variations.

C484.6	Evaluate the performance of the pavement and also develops maintenance statement based on site specific requirements.

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Department of Electronics and Communication

Vision of the Institute

To be a respected and most sought after engineering educational institution engaged in equipping individuals capable of building learning organizations in the new millennium.

Mission of the Institute

To develop competent students with good value systems and face challenges of the continuously changing world.

Vision of the Department

To impart technical education par excellence and prepare leaders to serve the industries and society.

Mission of the Department

Mission 1. To Provide the world with a highly committed and quality conscious engineering workforce.

Mission 2. To Encourage the students to built self-help, Power of initiative, courage to change and create new things.

Mission 3.To inculcate the spirit of cooperation and capacity for organization with special emphasis on their self-reliance and sustainability to meet ever changing requirements of local and global industries.

Program Educational Objectives

Graduates apply their knowledge of mathematics and science to identify, analyze and solve problems in the field of Electronics & communication to develop sophisticated communication systems.

Graduates to design and buildup interdisciplinary systems by solving core engineering problems in communication systems which are technically sound, economically feasible and socially acceptable.

Graduates exhibit desire for life-long learning which directs them to obtain thorough knowledge in their chosen fields and motivate them for higher studies/research.

Program Specific Objectives

PSO 1 : An ability to understand the basic core courses of Electronics & Communication Engineering and to relate them to various areas of application like Communication Systems, control system, Signal processing, VLSI and Embedded systems.

PSO 2:Should have capability to apply modern tools to analyze and solve complex designs with optimal solutions for various real-world applications

PSO 3:Excellent adaptability to changing work environment with good leadership qualities and zeal for social and environmental well-being.

Program Outcomes

1. Engineering knowledge: Apply the knowledge of mathematics, science, engineering fundamentals, and an engineering specialization to the solution of complex engineering problems.

2. Problem analysis: Identify, formulate, review research literature, and analyze complex engineering problems reaching substantiated conclusions using first principles of mathematics, natural sciences, and engineering sciences.

3. Design/development of solutions: Design solutions for complex engineering problems and design system components or processes that meet the specified needs with appropriate consideration for the public health and safety, and the cultural, societal, and environmental considerations.

4. Conduct investigations of complex problems: Use research-based knowledge and research methods including design of experiments, analysis and interpretation of data, and synthesis of the information to provide valid conclusions.

5. Modern tool usage: Create, select, and apply appropriate techniques, resources, and modern engineering and IT tools including prediction and modelling to complex engineering activities with an understanding of the limitations.

6. The engineer and society: Apply reasoning informed by the contextual knowledge to assess societal, health, safety, legal and cultural issues and the consequent responsibilities relevant to the professional engineering practice.

7. Environment and sustainability: Understand the impact of the professional engineering solutions in societal and environmental contexts, and demonstrate the knowledge of, and need for sustainable development.

8. Ethics: Apply ethical principles and commit to professional ethics and responsibilities and norms of the engineering practice.

9. Individual and team work: Function effectively as an individual, and as a member or leader indiverse teams, and in multidisciplinary settings.

10. Communication: Communicate effectively on complex engineering activities with the engineering community and with society at large, such as, being able to comprehend and write effective reports and design documentation, make effective presentations, and give and receive clear instructions.

11. Project management and finance: Demonstrate knowledge and understanding of the engineering and management principles and apply these to one's own work, as a member and leader in a team, to manage projects and in multidisciplinary environments.

12. Life-long learning: Recognize the need for, and have the preparation and ability to engage in independent and life-long learning in the broadest context of technological change.

Course Name: C202 (Analog Electronics-15EC32)

C202.1	To acquire the knowledge of BJT Amplifier, Hybrid Equivalent and Hybrid Models
C202.2	To explain construction, operation and characteristics of JFETs and MOSFETs
C202.3	To design and analyze various types of FET biasing, and Demonstrate the use of FET amplifiers.
C202.4	To design and analyze the frequency response of BJT and FET amplifiers at various frequencies.
C202.5	To demonstrate and apply Feedback and Oscillator circuits using FET.
C202.6	To define, demonstrate and analyze Power amplifier circuits in different modes of operation

Course Name: C203 (Digital Electronics-15EC33)

C203.1	Acquire knowledge of combinational logic and simplification techniques
C203.2	Analyse the performance of synchronous sequential circuits
C203.3	Design and develop Mealy and moore models for digital circuits
C203.4	Apply knowledge gained in the design of Counters and registers
C203.5	Students can design and analyze state machines.
C203.6	Define and describe decoders,encoders,latches,flip flops and comparators

Course Name:C204(Network Analysis -15EC34)

C215.1	Acquire knowledge for solving problems related to series and parallel combination for passive components, source transformation and source shifting.
C215.2	Ability to apply the knowledge of mathematics, science in solving complex circuits
C215.3	Analyze the performance of various types of networks using different concepts and principles.
C215.4	Use Laplace transforms to understand the initial and final boundary conditions
C215.5	Apply theorems like thevenins,nortons superposition, power transfer etc. to reduce circuit complexities and arrive at feasible solutions
C215.6	Apply various parameters like z,y,t,h for the analysis of complex networks

Course Name: C205 (Electronic Instrumentation-15EC35)

C205.1	Understand different measurement parameters like accuracy and precision, the types of measurement errors and their statistical and probability analysis.

C205.2	Understand basic functional concepts of various analog measuring instruments like ammeter, voltmeter, multimeter and wattmeter.
C205.3	Analyze the working of digital measuring instruments and different methods of time and frequency measurement.
C205.4	Analyze basic concepts of microprocessor based instruments.
C205.5	Design various types of oscilloscopes and signal generators, AC and DC bridges.
C205.6	Design and implementvarious types of transducers.

Course Name:C206 (Engineering Electromagnetics-15EC36)

C206.1	Build an understanding of fundamental concepts Communication.
C206.2	Familiarize the student with basic concept of Maxwell equations.
C206.3	Introduce the student to apply knowledge of boundary condition for metal-dielctric interface, and metal-metal interface.
C206.4	Allow the student to understand the Concept of Electromagnetism.
C206.5	Make Students to understand the wave propagation in Dielectric medium and Conduc medium.
C206.6	Develop the basic concept of Standing Wave Ratio between two different types of medi

Course Name: C212 (Microprocessors-15EC42)

C212.1	Recall the basic concepts of Digital Electronics and basics of programming.
C212.2	Classify different addressing modes and timing diagram for executing program efficiently.
C212.3	Implement the basic instructions of assembly language programming of 8086 processor.
C212.4	Develop assembly language programs using strings instructions and differentiate Procedure /Macros for various applications and demonstrate various DOS commands. Implement various instructions in assembly language programming.
C212.5	Select proper interfacing techniques 8086 microprocessor with 8255 Programmable pe interface and writing Assembly language programs Interface peripheral devices with 8086 microprocessor.
C212.6	Investigate and understand the need and architecture of numeric coprocessor and diff Pentium processors.

Course Name: C213 (Control Systems-15EC43)

C213.1	List the basic features, configurations of control systems and determine the time domain and frequency domain response for the first order and second order system.

C213.2	To understand the basics of system modeling such as electric, mechanical, electromechanical systems using differential equations, transfer functions, block diagrams and construct the various models.
C213.3	Able to apply root locus technique to analyze and develop Control systems.
C213.4	To analyze the characteristics of closed-loop control systems, State variable analysis, including steady-state and transient response
213.5	Select the Frequency domain specifications, find its values from the graphical methods and determine the stability analysis of a control system.
C213.6	Designing of different control system methods, including root locus diagrams and frequency response techniques

Course Name: C214 (Signals and Systems-15EC44)

C214.1	To describe continuous and discrete time signals and systems mathematically.
C214.2	To understand elementary signals and classify signals into different categories based on their properties. To Understand the classification of systems, learn their properties and apply to real world problems.
C214.3	Analyze the signals in time domain using convolution difference/differential equations and analyse complex signals.
C214.4	Implement Linear Time Invariant (LTI) systems in time and transform domains.
C214.5	Evaluate the applications of Convolution, Transforms in real world examples.
C214.6	Develop the basics for understanding of courses such as signal processing, control systems and other engineering systems.

Course Name: C215 (Principles of Communication s/m-15EC45)

C215.1	Memorize the basic underlying key building blocks of communication
C215.2	Describe the concepts of probability,random process and impact of noise in communication systems
C215.3	Analyze the time domain and frequency domain representations of AM,DSBSC,SSBSC
C215.4	Examine the angle modulation and phase locked loop
C215.5	Analyze the noise performance of different modulation techniques
C215.6	Develope the various transmission circuits using both analog and digital domain and evaluate its performance limits in the presence of noise

Course Name: C216 (Linear Integrated Circuits-15EC46)

C216.1	To describe the op-amp's basic construction, characteristics, parameter limitations, various configurations and countless applications of op-amp.
C216.2	To understand the various linear and non-linear applications of op-amp
C216.3	To Analyse Op-amp based AC amplifiers with voltage followers, inverting, non-inverting , Summing And difference Amplifiers
C216.4	To implement circuits for voltage sources/current sources, current sinks , Instrumentation and Presicion Amplifiers.
C216.5	To construct the circuits for Op-amp based linear and non-linear circuits comprising of Limiting Circuits, clamping circuits , sample and hold circuit , differentiator/Integrator circuit,Oscillators, crossing detectors, log amplifiers, multiplier and divider.
C216.6	Able to Design first and second order filters: LP, HP, BP and Band reject filters. DAC, ADC converters, VCO, Study of 555 timer in Astable&Monostable mode

Course Name:C301 (Management & Entrepreneurship-10AL51)

C301.1	Basic principles and concepts of management.
C301.2	Distinguish different plans and list steps in planning.
C301.3	The concepts of organizing and staffing.
C301.4	Interpret the concepts of directing and controlling.
C301.5	Demonstrate the meaning, functions, types and roles of an entrepreneur and describe various institutional supports.
C301.6	The small scale industries and prepare the project report.

Course: C302(Digital Signal Processing -10EC52)

C302.1	Recall discrete-time signals analytically and visualize them in the time domain.
C302.2	Describe the meaning and implications of the properties of systems and signals.
C302.3	Explain the Transform domain and its significance and problems related to computational complexity
C302.4	Solve time domain systems in Z-Transform and realization of discrete time systems
C302.5	Differentiate different Digital filter structures.
C302.6	Design the Digital filters for the given specifications.

Course Name:C303(Analog Communication-10EC53)

C303.1	Understand the concepts of random process

C303.2	Design and develop simple systems for generating and demodulating AM signals, DSB,SSB & VSB signals
C303.3	Understand the concepts in Angle modulation for the design of communication systems
C303.4	Design and develop simple systems for generating and demodulating frequency modulated signals
C303.5	Understand the concepts of various types of noise
C303.6	Evaluate the performance of the designed communication system in presence of noise and nonlinear models

Course Name:C304(MWR-10EC54)

C304.1	The course gives the detailed description of Transmission lines and the equations related to it.
C304.2	The course also describes many microwave Components & devices and their application.
C304.3	The course also deals with the basic of Radar its application and importance of Doppler Effect in Aircraft.
C304.4	The course gives the brief introduction of S-matrix and its applications.
C304.5	The course explains the details of different components of microwave devices.
C304.6	Build basics for understanding of courses such building microwave circuits

Course Name:C305 (Information Theory & Coding-10EC55)

C304.1	Formulate equations for entropy mutual information and channel capacity for all types of channels
C304.2	Distinguish between different types error correcting codes based on probability of error and bit Energy to noise ratio.
C304.3	Design a digital communication system by selecting an appropriate error correcting codes for a particular application.
C304.4	Explain various methods of generating and detecting different types of error correcting codes
C304.5	Examine the basic equations of linear block codes.
C304.6	Compare the performance of digital communication system by evaluating the probability of error for different error correcting codes

Course Name: C306 (Fundamentals of CMOS VLSI-10EC56)

C306.1	Students will be aware of Basic MOS concepts & Designing Analog/Digital hardware

C306.2	Students will be able to Communicate design objectives to SoC and embedded system Engineers.
C306.3	Students will be proficient about Scaling , Design Issues, Testing & Verification of VLSI Circuits.
C306.4	Use typical design techniques for combinational circuits, asynchronous and synchronous machines
C306.5	Design and analyze complex digital systems like arithmetic units and state machines.

Course Name:C311 (Digital Communication-10EC61)

C311.1	Define Sampling theorem and explain the various aspects of sampling theorem. Aliasing signal distortion. Explain quadrature sampling of band pass signals.
C311.2	Design and implement the techniques used for waveform coding . Pulse Amplitude Modulation (PAM) and Pulse Code Modulation (PCM).
C311.3	Describe various types of error introduced in the processes like sampling, quantizing, Describe Inter Symbol Interference (ISI), adaptive equalization techniques.
C311.4	Describe different digital modulation schemes, and compare advantages/ Disadvantages of each as applied to baseband signal.
C311.5	Identify the presence of error bits signal, and calculate unknown phase of noise in the received signal.
C311.6	Describe spread spectrum and pseudo noise sequence

Course Name: C312 (Microprocessors-10EC62)

C312.1	To state and define the fundamental concepts of microprocessor and mathematics in assembly language programming
C312.2	To identify and report the extensive knowledge of microprocessor based systems and interfacing techniques
C312.3	To demonstrate solid foundation on interfacing the external devices to the processor according to the requirements to create specific needs with appropriate considerations for novel products and solutions for real time problems
C312.4	To differentiate types of architecture in different microprocessors and instruction set of Intel microprocessor .
C312.5	To support embedded system applications.
C312.6	To design coprocessor for upcoming technologies and other CPU architecture

Course Name:C313(Microelectronics Circuits -10EC63)

C313.1	Discuss MOSFET basics and explain its biasing and small signal operations.
C313.2	Explain the amplifier operation of MOSFET configurations for small signals and high
C313.3	Demonstrating Frequency responses with and without active loads.
C313.4	Describe the MOS differential pair and various Multistage amplifiers. Describe feedback design for analog circuits related to MOSFET's.
C313.5	Examine operational amplifier theory and design taking MOSFET's characteristics
C313.6	Comparing Digital CMOS circuits, CMOS inverter and other digital logic families.

Course Name: C314 (Antennas & Propagation- 10EC64)

C314.1	To review the fundamentals of antenna theory and to understand the basic theory of electromagnetic waves travelling from transmitter to receiver.
C314.2	To impart the basic concepts of radiating structures and antenna parameters
C314.3	To give understanding about analysis and design of arrays and different types.
C314.4	To design metrics of various antennas in wide spectrum of frequencies, with primary emphasis on VHF, UHF, and microwave regions.
C314.5	To introduce students to the various types and models of Radio wave propagation and their applications.
C314.6	To implement the concepts and basics of antenna theory in radio waves.

Course Name: C315 (Operating system-10EC65)

C315.1	Understand the goals and operation of operating system.
C315.2	Learn the different classes of operating systems, memory management, I/O
	management, scheduling etc
C315.3	Analyzing the layered design and architecture of operating system.
C315.4	Analyze the differences between process- thread, allocation-deallocation of memory, resources etc.
C315.5	Apply the concepts of O.S for process management and memory management.
C315.6	Implementing the concept of virtual memory, scheduling techniques etc.

Course Name:C316(Satellite communication-10EC662)

C316.1	Learn Basics of Kepler's laws, earth environments, space related definitions,orbital elements and details of geostationary orbits with related mathematical numerical.

C316.2	Problematic analysis and depth understanding of space technology, Interference and Satellite access schemes.
C316.3	To gain knowledge of multiple access techniques, learn aspects of both space segment and earth segment including monitoring power systems and development of antenna subsystem.
C316.4	Able to design antennas to provide Uplink and Downlink Frequency Reception with more accuracy and precision.
C316.5	Applications of satellite in various applications like communication, remote sensing and meteorology, GPS.
C316.6	Able to design Satellite for more real time applications and geo stationary satellites.

Course Name:C401(CCN-10EC71)

C401.1	Develop an ability to independently understand basic computer network models.
C401.2	Ability to apply knowledge of communication channels to transmit packets using different communication protocols.
C401.3	Comparing the different types of network topologies and protocols.
C401.4	Understand and building the skills of subnetting and routing mechanisms.
C401.5	Relate the various types of Internet adress for version 4 and version 6
C401.6	Analyze different concepts like DNS (Domain Name Systems) and TCP,UDP.

Course Name:C402(Optical Fibre Communiction-10EC72)

C402.1	Recall the basic elements of optical fiber transmission link, fiber modes configurations and structures.
C402.2	Discuss the different kind of losses, signal distortion in optical wave guides and other signal degradation factors
C402.3	Implement the operation of optical receiver to evaluate its performance by calculating the probability of error.
C402.4	Differentiate the various optical source materials, LED structures, quantum efficiency, Laser diodes.
C402.5	Select the fiber optical receivers such as PIN APD diodes and evaluate their noise performance in photo detector, receiver operation and configuration.
C402.6	Design the fiber optical network components, variety of networking aspects, SONET/SDH and operational principles WDM.

Course Name: C403 (Power Electronics-10EC73)

C403.1	Students are able to define fundamental Gate firing circuits.
C403.2	Students able to classify and recognize Converter and locate harmonics.

C403.3	Students can demonstrate the techniques, skills and modern engineering tools necessary for engineering practice.
C403.4	Students are able to relate and differentiate Rectifier, Chopper, Inverter and AC Voltage Controller.
C403.5	Students can able to judge result of engineering problems with simulation
C403.6	Students are able to design basic circuits for power electronics based on design application

Course: C404(Embedded System Design -10EC74)

C404.1	Design the embedded hardware and software design life cycle and development process.
C404.2	Classify different types number, instruction registers and Finite State Machine Model.
C404.3	Understand the memory subsystem architecture and dynamic memory allocation.
C404.4	Organize the concept of RTOS, Kernel and Embedded Hardware peripherals.
C404.5	Discuss embedded system design process and prototyping the Project.
C404.6	Analyze complexity and measure the performance and optimization of the Embedded System.

Course Name: C405 (DSP AA-10EC751)

C405.1	Describe the specific architecture of the DSP processorTMS320C54xx
C405.2	Understand the architecture of similar commercially produced DSP processors.
C405.3	Discuss the various issues that need to be addressed when implementing DSP algorithms in real hardware with finite resources such as processing speed, memory, and bit resolution.
C405.4	Better understand the relationship between academic course work
C405.5	Better understand the problems that might be encountered in a research or commercial environment.

Course Name: C406 (Real Time systems-10EC762)

C406.1	Acquired knowledge about the concepts of real time Computer control systems
C406.2	Implementation of Operating systems is adhered with the real time controls
C406.3	Automation of control systems is described with respect to process control applications
C406.4	Understanding with the process control applications and importance of Human computer interface

C406.5	Various control system methods is studied through Process control based applications
C406.6	Provides a adequate knowledge in Embedded computer systems

Course Name: C411(Wireless Communications-10EC81)

C411.1	Apply the cellular concepts to evaluate the signal reception performance in cellular networks
C411.2	Apply the traffic signal analysis to design cellular network with given quality of service constraints
C411.3	Analyze and design receiver and transmitter diversify techniques
C411.4	Determine the appropriate transreceiver design of multi antenna systems and evaluate the data rate performance
C411.5	Design wireless communication systems with 3g and 4g technologies
C411.6	Describe and differentiate 4 generations of wireless standards' for cellular networks

Course Name: C412(Digital Switching Systems-10EC82)

C412.5	The students will learn about the hierarchy of telecommunication network and also calculate the power levels of each network
C412.5	The subject also deals with different types of Multiplexing technique used to combining signals in real applications
C412.5	The basics of telecommunication network also can be known and the metrics of telecommunication is defined here
C412.5	The course also gives the brief explanation of different terms used in different parts of the world to suit particular area
C412.5	Different types of solutions were also learnt to solve problems in telecommunication
C412.5	The telecommunication company ensures the safety of individual calls my having different encoding schemes

Course Name: C413(HPCN -10EC834)

C413.1	Solve the challenges of High Speed Networks and its related performance
C413.2	Communicate effectively the principles used in High Performance computing.
C413.3	Explain the major techniques involved, and networks & systems issues for the design and implementation of High Speed networks.
C413.4	Describe the key components and technologies involved and to gain hands-on experiences in building state- of art network design applications.
C415.5	Analyze the cause of congestion, traffic slow down and related factors for Quality of Service

C415.6	Identify, qualitatively and quantitatively characterize and formulate problems, evaluate them to find the best performance.

Course Name:C414 (Multimedia Communication-10EC841)

C414.1	Identify switching systems
C414.2	Discuss architecture and performance of telecom networks
C414.3	Explain satellite communication system
C414.4	Characterize the types of multimedia contents
C414.5	Identify different standards for multimedia communication.
C414.6	Implement required networks for multimedia communication.

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Department of Electrical and Electronics

Vision of the Institute

To be a respected and most sought after engineering educational institution engaged in equipping individuals capable of building learning organizations in the new millennium.

Mission of the Institute

To develop competent students with good value systems and face challenges of the continuously changing world.

Vision of the Department

To meet the educational and research needs of the student community and staff through collaboration with other academic and technical institutions, industry and government agencies and make the students to face problems of the country and society as a whole.

Mission of the Department

M1 - To develop and train competent Electrical and Electronics Engineers with adequate practical skills.

M2 - To provide state-of-the-art resources that contribute to achieve excellence in teaching-learning, research and development activities.

M3 - To inculcate, ethics, leadership, moral values and social activities.

Program Educational Objectives

PEO	Be able to apply the fundamental knowledge of mathematics, science, electrical and electronics engineering to analyze and solve the complex problem in electrical, electronics and allied interdisciplinary areas.
PEO	Possess good leadership skills, function ethically in multidisciplinary areas to develop sustainable solutions for global, environmental and social issues.
PEO	Be able to inculcate lifelong learning to maintain and enhance professional skills.

Program Specific Objectives

PSO 1: Apply fundamental knowledge to identify, formulate, design and investigate various problems of electrical and electronic circuits, power electronics, control systems and power systems.

PSO 2: Apply modern software tools for design, simulation and analysis of electrical systems to engage in life- long learning and to successfully adapt in multi-disciplinary environments.

PSO 3: Solve ethically and professionally various Electrical Engineering problems in societal and environmental context and communicate effectively by applying project management techniques to complex engineering problems.

Program Outcomes

1. Engineering knowledge: Apply the knowledge of mathematics, science, engineering fundamentals, and an engineering specialization to the solution of complex engineering problems.

2. Problem analysis: Identify, formulate, review research literature, and analyze complex engineering problems reaching substantiated conclusions using first principles of mathematics, natural sciences, and engineering sciences.

3. Design/development of solutions: Design solutions for complex engineering problems and design system components or processes that meet the specified needs with appropriate consideration for the public health and safety, and the cultural, societal, and environmental considerations.

4. Conduct investigations of complex problems: Use research-based knowledge and research methods including design of experiments, analysis and interpretation of data, and synthesis of the information to provide valid conclusions.

5. Modern tool usage: Create, select, and apply appropriate techniques, resources, and modern engineering and IT tools including prediction and modelling to complex engineering activities with an understanding of the limitations.

6. The engineer and society: Apply reasoning informed by the contextual knowledge to assess societal, health, safety, legal and cultural issues and the consequent responsibilities relevant to the professional engineering practice.

7. Environment and sustainability: Understand the impact of the professional engineering solutions in societal and environmental contexts, and demonstrate the knowledge of, and need for sustainable development.

8. Ethics: Apply ethical principles and commit to professional ethics and responsibilities and norms of the engineering practice.

9. Individual and team work: Function effectively as an individual, and as a member or leader indiverse teams, and in multidisciplinary settings.

10. Communication: Communicate effectively on complex engineering activities with the engineering community and with society at large, such as, being able to comprehend and write effective reports and design documentation, make effective presentations, and give and receive clear instructions.

11. Project management and finance: Demonstrate knowledge and understanding of the engineering and management principles and apply these to one's own work, as a member and leader in a team, to manage projects and in multidisciplinary environments.

12. Life-long learning: Recognize the need for, and have the preparation and ability to engage in independent and life-long learning in the broadest context of technological change.

Subject Name/ Subject Code: 15EE32/Electric Circuit Analysis

C232.1	Apply knowledge of mathematics, science, and engineering to the analysis and design of electrical circuits.
C232.2	Identify, formulate, and solve engineering problems in the area circuits and systems.
C232.3	Solve complex electric circuits using superposition , Thevenin's and Nortons
	theorems
C232.4	Solve complex electric circuits using Reciprocity , Millman's and Maximum power transfer theorems
C232.5	Synthesize typical waveforms using Laplace transforms
C232.6	Analyze the solution and infer the authenticity of it.

Subject Name/ Subject Code: 15EE33 / Transformers and Generators

C233.1 -	Understand the construction and operation of 1-phase, 3-Phase transformers and Autotransformer.
C233.2 -	Explain different connections for the three phase operations, their advantages and applications.
C233.3 -	Explain the construction and operation of Synchronous machines and evaluate the regulation of synchronous machines by different methods.
C233.4 -	Analyze the performance of the AC Generators on infinite bus and parallel operation.
C233.5 -	Determine the regulation of AC Generator by Slip test, EMF, MMF, and ZPF Methods.
C233.6-	Analyze the operation of the synchronous machine connected to infinite machine.

Subject Name/ Subject Code: 15EE34 / Analog Electronic Circuits

C234.1	Utilize the characteristics of transistor for different applications.
C234.2	Design and analyze biasing circuits for transistor.
C234.3	Observe the effect of negative feedback, different types of negative feedback topologies.
C234.4	Design and analyze and test transistor circuitry as amplifiers and oscillators.
C234.5	Design, analyze and test transistor circuitry as amplifiers and oscillators.
C234.6	Develop the ability to understand the design and working of FET amplifiers.

Subject Name/ Subject Code: 15EE35 / Digital System Design

C235.1	Design and analyze combinational & sequential circuits
C235.2	Develop simplified switching equation using QuineMcClusky techniques and Design of Adder circuits

C235.3	Design Multiplexer, Encoder, Decoder, Subtractors and Comparator as digital combinational control circuits.
C235.4	Design flip flops, counters, shift registers as sequential control circuits
C235.5	Understand counters and sequence generators.
C235.6	Develop Mealy/Moore Models and state diagrams for the given clocked sequential circuits and Explain the functioning of Read only and Read/Write Memories, Programmable ROM, EPROM and Flash memory

SUBJECT CODE / SUBJECT NAME: 15EE36 - Electrical &Electronics Measurements

C236.1	Measure resistance, inductance and capacitance using bridges and determine earth resistance.
C236.2	Construction and operation of single-phase and three phase Electrodynamometer P.Fmeter, Weston frequency meter and Phase sequence indicator
C236.3	Explain the working of various meters used for measurement of Power, Energy & understand the adjustments, calibration & errors in energy meters.
C236.4	Understand methods of extending the range of instruments & instrument transformers
C236..5	Explain the working of different electronic instruments
C236.6	Explain the working of different display and recording devices

SUBJECT CODE / SUBJECT NAME: 15EEL37–Electrical Machines Lab

C237.1	Evaluate the performance of transformers from the test data obtained.
C237.2	Connect and operate two single phase transformers of different KVA rating in parallel.
C237.3	Connect single phase transformers for three phase operation and phase conversion.
C237.4	Compute the voltage regulation of synchronous generator using the test data obtained in the laboratory.
C237.5	Evaluate the performance of synchronous generators from the test data and assess the performance of synchronous generator connected to infinite bus.
C237.6	Evaluate the performance of transformers from the test data obtained.

SUBJECT CODE / SUBJECT NAME: 15EEL38–Electronics Lab

C238.1	Design and test rectifier circuits with and without capacitor filters
C238.2	Determine h-parameter models of transistor for all modes
C238.3	Design and test BJT and FET amplifier and oscillator circuits..
C238.4	Realize Boolean expressions using gates
C238.5	Realize adders and subtractors using gates
C238.6	Design a sequential Circuits using gates

SUBJECT CODE / SUBJECT NAME: 15EE42 – Power Generation and Economics

C242.1	Explain factors of site selection, arrangement of hydroelectric plant.
C242.2	Working of hydroelectric plant and major equipment of plant.
C242.3	Stem diesel and gas power plant operation.
C242.4	Nuclear power plants and site operation, components, factors of site selection.
C242.5	Substation components need, grounding methods.
C242.6	Economic aspects of power system operation and PF improvement

Subject Name/ Subject Code: Transmission and Distribution / 15EE43

C243.1	Understand the concepts of various methods of generation of power.
C243.2	Parameters associated with transmission line.
C243.3	Design and analyze the overhead transmission line for different configuration.
C243.4	Calculate the parameters of transmission line for different configuration.
C243.5	Understand the use of underground cable.
C243.6	Evaluate different types of distributors.

Subject Name/ Subject Code: Electric Motors / 15EE44

C244.1	Explain the constructional features of motors and drive for specific applications.
C244.2	Analysis the performance characteristic of DC motors.
C244.3	Explain the constructional features of 3-phase and single phase induction motors.
C244.4	Control the speed of induction motor by suitable method
C244.5	Explain the operation of synchronous motor and special motors.
C244.6	Control the speed of motor by suitable method.

Subject Name/ Subject Code: Field theory / 15EE45

C245.1	To study different coordinate systems for understanding the concept of gradient, divergence and curl of a vector.
C245.2	To study, apply coulomb's law and gauss laws for electric field produced by different charge configuration.
C245.3	To evaluate the energy and potential due to a system of charges.
C245.4	To study the behavior of electric field across a boundary between a conductor and dielectric and between two different dielectrics.
C245.5	To study the magnetic fields and magnetic materials.
C245.6	To study the time varying fields and propagation of wave of different media.

Subject Name/ Subject Code: Opamp / 15EE46

C246.1	Explain the representation, characteristics and equivalent circuit and application.
C246.2	Designing of first, second order filters, voltage regulators using OPAMP.
C246.3	Use of OPAMP in signal generation, comparator and converter circuits.
C246.4	Use of OPAMP in signal processing, A/D and D /A converter circuits.
C246.5	Discussion of PLL, its components and performance factors.
C246.6	Discussion of 555 timers an its application in signal generation.

Subject Name/ Subject Code: Electrical Machines Lab – 2 / 15EEL47

C247.1	Test dc machines to determine their characteristics
C247.2	Control the speed of dc motor

C247.3	Pre-determine the performance characteristics of dc machines by conducting suitable tests.
C247.4	Perform load test on single phase and three phase induction motor to assess its performance
C247.5	Conduct test on induction motor to pre-determine the performance characteristics
C247.6	Conduct test on synchronous motor to draw the performance curves.

Subject Name/ Subject Code: Opamp& LIC Laboratory / 15EEL48

COURSE CODE	DESCRIPTION
C247.1	To conduct experiment to determine the characteristic parameters of OP-Amp
C247.2	To design test the OP-Amp as Amplifier, adder, subtractor, differentiator and integrator
C247.3	To design test the OP-Amp as oscillators and filters.
C247.4	Design and study of Linear IC's as multivibrator power supplies.
C247.5	Use of OPAMP in signal generation, comparator and converter circuits.
C247.6	Use of OPAMP in signal processing, A/D and D /A converter circuits.

SUBJECT CODE / SUBJECT NAME: 10AL51 - MANAGEMENT & ENTREPRENEURSHIP

C351.1	Able to discuss Management & Administration with Early, Modern approaches and demonstrate the planning process & decision making
C351.2	Able to explain organizational concept & recruitment process and illustrate leadership, motivational theories & team work
C351.3	Able to describe and choose concepts of Entrepreneurship, small scale industry in economic development of a nation.
C351.4	Able to identify the institutional(financial and technical) supports agencies and prepare project report

SUBJECT CODE / SUBJECT NAME: 10EE52 – Signals and Systems

C352.1	Basic operations on signals and properties of system.
C352.2	Provide block diagram representation of linear time invariant systems.
C352.3	Evaluate response of given Linear time invariant system.
C352.4	Use convolution in C.T and D.T for the given impulse response.
C352.5	Represent C.T.F.T and D.T.F.T for linear time invariant system.
C352.6	Represent Z-transform for the analysis of D.T system.

Subject Name/ Subject Code: Transmission and Distribution / 10EE53

C353.1	Understand the concepts of various methods of generation of power.
C353.2	Parameters associated with transmission line.

C353.3	Design and analyze the overhead transmission line for different configuration.
C353.4	Calculate the parameters of transmission line for different configuration.
C353.5	Understand the use of underground cable.
C353.6	Evaluate different types of distributors.

SUBJECT CODE / SUBJECT NAME: 10EE54–Dc Machines & Synchronous Machines

C354.1	Analysis the performance characteristic of DC motors
C354.2	Explain different connections for the three phase operations, their advantages and applications.
C354.3	Explain the construction and operation of Synchronous machines and evaluate the regulation of synchronous machines by different methods.
C354.4	Analyze the performance of the AC Generators on infinite bus and parallel operation.
C354.5	Determine the regulation of AC Generator by Slip test, EMF, MMF, and ZPF Methods.
C354.6	Analyze the operation of the synchronous machine connected to infinite machine.

SUBJECT CODE / SUBJECT NAME: 10EE55–Modern Control Theory

C355.1	State Space Representation models for electrical & Mechanical Systems
C355.2	Transfer Function Model for Various Systems
C355.3	Eigen Values, Eigen Vectors Concepts for the Various Systems
C355.4	State Equation formation for different Systems
C355.5	Controllability and Observability of the systems
C355.6	Liapnouv Stability, Pole Placement techniques to analyse the stability of the system

Subject Name/ Subject Code: Opamp / 10EE56

C356.1	Explain the representation, characteristics and equivalent circuit and application.
C356.2	Designing of first, second order filters, voltage regulators using OPAMP.
C356.3	Use of OPAMP in signal generation, comparator and converter circuits.
C356.4	Use of OPAMP in signal processing, A/D and D /A converter circuits.
C356.5	Discussion of PLL, its components and performance factors.
C356.6	Discussion of 555 timers an its application in signal generation.

SUBJECT CODE / SUBJECT NAME: 10EEL57 – Measurements and Circuits Simulation Lab

C357.1	Measure resistance, inductance and capacitance using bridges and determine earth resistance.
C357.2	Construction and operation of single-phase and three phase Electrodynamometer P.Fmeter, Weston frequency meter and Phase sequence indicator
C357.3	Measurement of Power, Energy & understand the adjustments, calibration & errors in energy meters.
C357.4	Signal Generation using Pspice
C357.5	Clipping, Clamping & Bridge Rectifier Designs using Pspice
C357.6	Design of RC coupled Amplifier circuits

SUBJECT CODE / SUBJECT NAME: 10EEL58–Transformers & Induction Machines Lab

C358.1	Evaluate the performance of transformers from the test data obtained. •
C358.2	Connect and operate two single phase transformers of different KVA rating in parallel.
C358.3	Connect single phase transformers for three phase operation and phase conversion.
C358.4	Perform load test on single phase and three phase induction motor to assess its performance
C358.5	Conduct test on induction motor to pre-determine the performance characteristics
C358.6	Conduct speed test on induction motor to pre-determine the performance characteristics

Subject Name/ Subject Code: Power System Analysis & Stability / 10EE61

C361.1	Can Explain Per unit, one line diagram.
C361.2	Can Perform short circuit analysis of Machines and Power systems.
C361.3	Can evaluate symmetrical components of voltages and currents.
C361.4	Can analyze sequence impedance and networks.
C361.5	Can analyze the dynamics of synchronous machines and stability.
C361.6	Can show the analysis of equal area criterion.

SUBJECT CODE / SUBJECT NAME: 10EE62 – Switch Gear & Protection

C362.1	To discuss the performance of protective relays, components of protection scheme and relay terminology and to explain relay construction and operating principles
C362.2	To explain overcurrent protection using electromagnetic and static relays and overcurrent protective schemes
C362.3	To discuss types of electromagnetic and static distance relays, effect of arc resistance, power swings, line length and source impedance on performance of various differential relays for differential protection.

C362.4	To discuss pilot protection, wire pilot relaying and carrier pilot relaying, and also to discuss construction, operating principles and performance of various differential relays for differential protection.
C362.5	To discuss protection of generators, motors, transformer and bus zone protection
C362.6	To explain the principle of circuit interruption and different types of circuit breakers and to describe the construction and operating principle of different types of fuses and to give the definitions of different terminologies related to a fuse

Subject Name/ Subject Code: Electrical Machine Design / 10EE63

C363.1	To know the properties of electrical and magnetic materials.
C363.2	To design the machines as in modern trend.
C363.3	Selection of loading for various machines
C363.4	To discuss the main dimensions of machines.
C363.5	To discuss design of AC and DC machines.
C363.6	To know the short circuit ration and performance.

Subject Name/ Subject Code: Digital Signal Processing / 10EE64

C364.1	Compute the DFT of various signals using its properties.
C364.2	Use the DFT to compute the linear and circular convolution and linear filters of long sequence.
C364.3	Apply fat and efficient algorithm for computing DFT and IDFT.
C364.4	Design of IIR Butterworth digital filters using impulse invariant/BT.
C364.5	Design of IIR digital filter using Impulse invariant/Bilinear transformation.
C364.6	Design of FIR filters using wind functions and frequency sampling method and realization of IIR and FIR filters

Subject Name/ Subject Code: Computer Aided Electrical Drawing / 10EE65

C365.1	Discuss the terminology and types of DC and AC armature windings.
C365.2	Develop armature winding diagram for AC and DC machines.
C365.3	Develop layout of substation using standard symbols.
C365.4	Draw sectional views of transformer using design data.
C365.5	Draw sectional views of assembled DC machine or its parts.
C365.6	Draw sectional views of assembled alternator or its parts.

Subject Name/ Subject Code: Computer Aided Electrical Drawing / 10EE665

C366.1	Basic Concepts of Embedded System and design
C366.2	Interfacing ADC , DAC & Signal Conditioning Systems
C366.3	Design Issues and Challenges in Embedded Systems

C366.4	Programming using Interrupts
C366.5	External Interfacing of Memory units
C366.6	Various Controllers interfacing

Subject Name/ Subject Code: DC Machines & Synchronous Machines Lab / 10EEL67

C367.1	Test dc machines to determine their characteristics
C367.2	Control the speed of dc motor
C367.3	Pre-determine the performance characteristics of dc machines by conducting suitable tests.
C367.4	Compute the voltage regulation of synchronous generator using the test data obtained in the laboratory.
C367.5	Evaluate the performance of synchronous generators from the test data and assess the performance of synchronous generator connected to infinite bus.
C367.6	Control the speed of synchronous motor

Subject Name/ Subject Code: Control Systems Lab / 10EEL68

C368.1	Use software package or discrete components in assessing the time and frequency domain reposes of a given second order system
C368.2	Design and analyze Lead, Lag and Lag – Lead compensators for given specifications.
C368.3	Determine the performance characteristics of ac and dc servomotors and synchro-transmitter receiver pair used in control systems
C368.4	Simulate the DC position and feedback control system to study the effect of P, PI, PD and PID controller and Lead compensator on the step response of the system
C368.5	Write a script files to plot root locus, bode plot, Nyquist plots to study the stability of the system using a software package
C368.6	Work with a small team to carryout experiments and prepare reports that present lab work.

SUBJECT CODE / SUBJECT NAME: 10EE71 – Computer Technique in Power Systems

C471.1	Formulate network matrices and models for solving load problems
C471.2	Perform steady state power flow analysis of power systems using numerical iterative methods
C471.3	Suggest a method to control voltage profile
C471.4	Show knowledge of optimal operation on busbar, optimal UC, optimal scheduling for hydro thermal
C471.5	Analyse short circuit faults in power system networks using zbus matrix.
C471.6	Perform numerical solution of swing equation for multi machine stability.

SUBJECT CODE / SUBJECT NAME: 10EE72 – Electrical Power Utilization

C472.1	Discuss electric heating, air-conditioning and electric welding.
C472.2	Explain laws of electrolysis, extraction and refining of metals and electro deposition.
C472.3	Design interior and exterior lighting systems- illumination levels for factory lighting- flood lightingstreet lighting.
C472.4	Discuss systems of electric traction, speed time curves and mechanics of train movement.
C472.5	Explain the motors used for electric traction and their control and Discuss braking of electric motors, traction systems and power supply and other traction systems.
C472.6	Explain the working of electric and hybrid electric vehicles.

SUBJECT CODE / SUBJECT NAME: 10EE73 – HIGH VOLTAGE ENGG

C473.1	Explain conduction and breakdown phenomenon in gases, liquid dielectrics.
C473.2	Explain breakdown phenomenon in solid dielectrics.
C473.3	Explain generation of high voltages and currents
C473.4	Discuss measurement techniques for high voltages and currents.
C473.5	Discuss overvoltage phenomenon and insulation coordination in electric power systems.
C473.6	Discuss non-destructive testing of materials and electric apparatus andhigh-voltage testing of electric apparatus

Subject Name/ Subject Code: Industrial Drives & Its Applications / 10EE74

C474.1	Explain the advantages and choice of electric drive.
C474.2	Explain dynamics and different modes of operation of electric drives.
C474.3	Analyze the performance of induction motor drives under different conditions.
C474.4	Control induction motor, synchronous motor and stepper motor drives.
C474.5	Suggest a motor for a drive and control of dc motor using controlled rectifiers
C474.6	Suggest a suitable electrical drive for specific application in the industry

Subject Name/ Subject Code: High Voltage DC Transmission Systems / 10EE751

C475.1	General Concepts of High Voltage DC & AC Transmission Systems
C475.2	Analyse the Operation and working of various Converters used for HVDC transmission
C475.3	Grid Converters , its operation & Characteristics
C475.4	Stability of Various converters
C475.5	Various Protection Circuits – operation & working

C475.6	Power Reversal concepts and its uses

Subject Name/ Subject Code: VLSI Circuits & Designs / 10EE764

C476.1	Demonstrate understanding of MOS transistor theory, CMOS fabrication flow and technology scaling
C476.2	Draw the basic gates using the stick and layout diagrams with the knowledge of physical design aspects
C476.3	Interpret Memory elements along with timing considerations
C476.4	Demonstrate knowledge of FPGA based system design
C476.5	Interpret testing and testability issues in VLSI Design
C476.6	Analyze CMOS subsystems and architectural issues with the design constraints

SUBJECT CODE / SUBJECT NAME: 10EEL77-High Voltage &Relay Lab

C477.1	Experimentally verify the characteristics of over current, over voltage, under voltage and negative sequence relays both electromagnetic and static type
C477.2	Experimentally verify the characteristics of microprocessor based over current, over voltage, under voltage relays and distance relay. Show knowledge of protecting
C477.3	Analyze the spark over characteristics for both uniform and non-uniform configurations using High AC and DC voltages.
C477.4	Measure high AC and DC voltages and breakdown strength of transformer oil.
C477.5	Draw electric field and measure the capacitance of different electrode configuration models.
C477.6	Show knowledge of generating standard lightning impulse voltage to determine efficiency, energy of impulse generator and 50% probability flashover voltage for air insulation.

SUBJECT CODE / SUBJECT NAME: 10EEL78-Power System Simulation Lab

C478.1	Develop a program in MATLAB to assess the performance of medium and long transmission lines.
C478.2	Develop a program in MATLAB to obtain the power angle characteristics of salient and non-salient pole alternator and assess the transient stability under
	three phase fault at different locations in a of radial power systems.
C478.3	Develop programs in MATLAB to formulate bus admittance and bus impedance matrices of interconnected power systems.
C478.4	Use Mi-Power package to solve power flow problem for simple power systems.
C478.5	Use Mi-Power package to study unsymmetrical faults at different locations in radial power systems

C478.6	Use of Mi-Power package to study optimal generation scheduling problems for thermal power plants

SUBJECT CODE / SUBJECT NAME: 10EE81 – Electrical Design Estimation & Costing

C481.1	Explain the purpose of estimation and costing.
C481.2	Discuss AE act and IE rules.
C481.3	Discuss energy distribution in a building, wiring, cable, fuses, lightning, points, circuits, sub circuits.
C481.4	Discuss types of service mains and estimation of service mains and power circuits.
C481.5	Discuss estimation of overhead transmission and distribution system and its components.
C481.6	Discuss main components of substation, preparation of single line diagram and ear thing of a substation.

Subject Name/ Subject Code: Power System Operation and control / 10EE82

C482.1	Describe various levels of controls in power systems, the vulnerability of the system, components, architecture and configuration of SCADA and Solve unit commitment problems
C482.2	Explain issues of hydrothermal scheduling and solutions to hydro thermal problems
C482.3	Explain basic generator control loops, functions of Automatic generation control, speed governors
C482.4	Develop and analyze mathematical models of Automatic Load Frequency Control
C482.5	Explain automatic generation control, voltage and reactive power control in an interconnected power system.
C482.6	Explain reliability, security, contingency analysis, state estimation and related issues of power systems.

SUBJECT CODE / SUBJECT NAME: 10EE836 – Renewable Energy Sources

C483.1	Discuss energy scarcity, solution, availability of renewable energy.
C483.2	Explain about sun, earth relationship, types of solar collectors.
C483.3	Discuss solar cell components, characteristics, application and configuration.
C483.4	Discuss hydrogen, wind energy production, site selection, storage.
C483.5	Discuss biomass, biogas composition types, production, advantages and disadvantages.
C483.6	Discuss availability, generation, devices for tidal ,sea wave and wave and ocean thermal energy.

SUBJECT CODE / SUBJECT NAME: 10EE842 – Energy Auditing & Demand Side Management

C484.1	Discuss energy scarcity, solution & Energy Scenario in India
C484.2	Explain and analysis of economics, energy concepts
C484.3	Energy auditing - Need and different concepts
C484.4	Study of Various Optimization methods in Energy consumption
C484.5	Various Electrical equipment's used, its power factor and other details
C484.6	Benefits, Techniques and methods of Demand Side Management

Subject Name/ Subject Code: Project Work/ 10EEP85

C485.1	Present the project and be able to defend it
C485.2	Make links across different areas of knowledge and to generate, develop and evaluate ideas and information so as to apply these skills to the project task
C485.3	Habituated to critical thinking and use problem solving skills
C485.4	Communicate effectively and to present ideas clearly and coherently in both the written and oral forms
C485.5	Work in a team to achieve common goal.
C485.6	Learn on their own, reflect on their learning and take appropriate actions to improve it

Subject Name/ Subject Code: Seminar/ 10EES86

C486.1	Attain, use and develop knowledge in the field of electrical and electronics engineering and other disciplines through independent learning and collaborative study
C486.2	Identify, understand and discuss current, real-time issues
C486.3	Improve oral and written communication skills
C486.4	Explore an appreciation of the self in relation to its larger diverse social and academic contexts.
C486.5	Apply principles of ethics and respect in interaction with others
C486.6	Work in a team to achieve common goal.

CHILDREN'S EDUCATION SOCIETY (Regd.)
THE OXFORD COLLEGE OF ENGINEERING
(Recognised by the Govt. of Karnataka, Affiliated to Visvesvaraya Technological University, Belagavi.
Approved by A.I.C.T.E. New Delhi.
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Department of Information

ScienceVision of the Institute

To be a respected and most sought after engineering educational institution engaged in equipping individuals capable of building learning organizations in the new millennium.

Mission of the Institute

To develop competent students with good value systems and face challenges of the continuously changing world.

Vision of the Department

To meet the educational, research & service needs of the region through collaboration with academic, technical institutions, businesses, government agencies & cultural organizations, thereby, providing a platform that encourages students & faculty to continue their intellectual & professional growth.

Mission of the Department

To develop the best Information Science Professionals, who work creatively, communicate effectively & become technologically competent and also to mould them into good citizens by inculcating sense ethical values in them.

Program Educational Objectives

Be capable of understanding, analyzing and applying current & emerging technologies to design and develop solutions to IT/ITES/Software/Telecom related problems and acquire value and employment.

To have sound foundation in mathematical, scientific and Information science engineering fundamentals necessary to formulate, solve and analyze practical problems and to prepare students for further studies and research.

Function effectively as individuals and team members in the workplace, growing into highly technical or project management and leadership roles, in various organizations.

Create an awareness of the life-long learning process, to communicate effectively, learn necessary tools to successfully identify and adapt to ever changing technologies, by ethical means and code of professional practice.

Program Specific Objectives

Provide effective and efficient real time solutions with the application of knowledge in IT, ITES, Networking and Software domains.

Demonstrate the ability to work in a team, with professional ethics, good communication and documentation skills in designing, implementation and management of software products and services, at optimal cost.

Program Outcomes

1. Engineering knowledge: Apply the knowledge of mathematics, science, engineering fundamentals, and an engineering specialization to the solution of complex engineering problems.

2. Problem analysis: Identify, formulate, review research literature, and analyze complex engineering problems reaching substantiated conclusions using first principles of mathematics, natural sciences, and engineering sciences.

3. Design/development of solutions: Design solutions for complex engineering problems and design system components or processes that meet the specified needs with appropriate consideration for the public health and safety, and the cultural, societal, and environmental considerations.

4. Conduct investigations of complex problems: Use research-based knowledge and research methods including design of experiments, analysis and interpretation of data, and synthesis of the information to provide valid conclusions.

5. Modern tool usage: Create, select, and apply appropriate techniques, resources, and modern engineering and IT tools including prediction and modeling to complex engineering activities with an understanding of the limitations.

6. The engineer and society: Apply reasoning informed by the contextual knowledge to assess societal, health, safety, legal and cultural issues and the consequent responsibilities relevant to the professional engineering practice.

7. Environment and sustainability: Understand the impact of the professional engineering solutions in societal and environmental contexts, and demonstrate the knowledge of, and need for sustainable development.

8. Ethics: Apply ethical principles and commit to professional ethics and responsibilities and norms of the engineering practice.

9. Individual and team work: Function effectively as an individual, and as a member or leader in diverse teams, and in multidisciplinary settings.

10. Communication: Communicate effectively on complex engineering activities with the engineering community and with society at large, such as, being able to comprehend and write effective reports and design documentation, make effective presentations, and give and receive clear instructions.

11. Project management and finance: Demonstrate knowledge and understanding of the engineering and management principles and apply these to one's own work, as a member and leader in a team, to manage projects and in multidisciplinary environments.

12. Life-long learning: Recognize the need for, and have the preparation and ability to engage in independent and life-long learning in the broadest context of technological change.

13. Subject Name/ Subject Code: ENGINEERING MATHEMATICS-III / 15MAT31

C231.1	Use of periodic signals and Fourier series to analyze circuits
C231.2	Explain the general linear system theory for continuous-time signals and systems using the Fourier Transform
C231.3	Analyze discrete-time systems using convolution and the z-transform
C231.4	Use appropriate numerical methods to solve algebraic and transcendental equations and also to calculate a definite integral
C231.5	Use curl and divergence of a vector function in three dimensions, as well as apply the Green's Theorem, Divergence Theorem and Stokes' theorem in various applications
C231.6	Solve the simple problem of the calculus of variations

Subject Name/ Subject Code: Analog and Digital Electronics / 15CS32

C232.1	Knoeledge of JFETs and MOSFETs , Operational Amplifier circuits and their applications.
C232.2	Combinational Logic, Simplification Techniques using Karnaugh Maps, QuineMcClusky technique.
C232.3	Operation of Decoders, Encoders, Multiplexers, Adders and Subtractors.
C232.4	Working of Latches, Flip-Flops, Designing Registers, Counters, A/D and D/A Converters.
C232.5	Analyze the performance of o JFETs and MOSFETs , Operational Amplifier circuits
	Synchronous and Asynchronous Sequential Circuits

Subject Name/ Subject Code: DATA STRUCTURES AND APPLICATIONS /15CS33

C233.1	Implement all the applications of Data structures in a high-level language.
C233.2	Design and apply appropriate data structures for solving computing problems.
C233.3	Analyse the performance of - Stack, Queue, Lists, Trees, Graphs, Searching and Sorting techniques.
C233.4	Acquire knowledge of - Various types of data structures, operations and algorithms. - Sorting and searching operations. - File structures.

Subject Name/ Subject Code: COMPUTER ORGANIZATION / 15CS34

C234.1	Analyse and design arithmetic and logical units.
C234.2	Apply the knowledge gained in the design of Computer.
C234.3	Design and evaluate performance of memory systems

C234.4	Understand the importance of life-long learning
C234.5	The basic structure of computers & machine instructions and programs, Addressing Modes, Assembly Language, Stacks, Queues and Subroutines.
C234.6	Input/output Organization such as accessing I/O Devices, Interrupts.

Subject Name/ Subject Code: UNIX AND SHELL PROGRAMMING / 15CS35

C235.1	Explain multi user OS UNIX and its basic features
C235.2	Interpret UNIX Commands, Shell basics, and shell environments
C235.3	Design and develop shell programming, communication, System calls and terminology.
C235.4	Design and develop UNIX File I/O and UNIX Processes.
C235.5	Perl script writing

Subject Name/ Subject Code: DISCRETE MATHEMATICAL STRUCTURES / 15CS36

C236.1	Verify the correctness of an argument using propositional and predicate logic and truth tables.
C236.2	Demonstrate the ability to solve problems using counting techniques and combinatorics in the context of discrete probability.
C236.3	Solve problems involving recurrence relations and generating functions.
C236.4	Construct proofs using direct proof, proof by contraposition, proof by contradiction, proof by cases, and mathematical induction.
C236.5	Explain and differentiate graphs and trees

Subject Name/ Subject Code: ANALOG AND DIGITAL ELECTRONICS LABORATORY / 15CSL37

C237.1	Use various Electronic Devices like Cathode ray Oscilloscope, Signal generators, Digital Trainer Kit, Multimeters and components like Resistors, Capacitors, Op amp and Integrated Circuit.
C237.2	Design and demonstrate various combinational logic circuits.
C237.3	Design and demonstrate various types of counters and Registers using Flip-flops
C237.4	Use simulation package to design circuits.
C237.5	Understand the working and implementation of ALU.

Subject Name/ Subject Code: DATA STRUCTURES LABORATORY / 15CSL38

C238.1	Analyze and Compare various linear and non-linear data structures
C238.2	Code, debug and demonstrate the working nature of different types of data structures and their applications
C238.3	Implement, analyze and evaluate the searching and sorting algorithms
C238.4	Choose the appropriate data structure for solving real world problems

Subject Name/ Subject Code: ENGINEERING MATHEMATICS-IV / 15MAT41

C241.1	Use appropriate numerical methods to solve first and second order ordinary differential equations.
C241.2	Use Bessel's and Legendre's function which often arises when a problem possesses axial and spherical symmetry, such as in quantum mechanics, electromagnetic theory, hydrodynamics and heat conduction.
C241.3	State and prove Cauchy's theorem and its consequences including Cauchy's
	integral formula.
C241.4	Compute residues and apply the residue theorem to evaluate integrals.
C241.5	Analyze, interpret, and evaluate scientific hypotheses and theories using rigorous statistical methods.

Subject Name/ Subject Code: SOFTWARE ENGINEERING / 15CS42

C242.1	Design a software system, component, or process to meet desired needs within realistic constraints.
C242.2	Assess professional and ethical responsibility
C242.3	Function on multi-disciplinary teams
C242.4	Use the techniques, skills, and modern engineering tools necessary for engineering practice
C242.5	Analyze, design, implement, verify, validate, implement, apply, and maintain software systems or parts of software systems.

Subject Name/ Subject Code: DESIGN AND ANALYSIS OF ALGORITHMS / 15CS43

C243.1	Describe computational solution to well known problems like searching, sorting etc.
C243.2	Estimate the computational complexity of different algorithms.
C243.3	Devise an algorithm using appropriate design strategies for problem solving.

Subject Name/ Subject Code: MICROPROCESSORS AND MICROCONTROLLERS /15CS44

C244.1	Differentiate between microprocessors and microcontrollers
C244.2	Design and develop assembly language code to solve problems
C244.3	Gain the knowledge for interfacing various devices to x86 family and ARM processor
C244.4	Demonstrate design of interrupt routines for interfacing devices

Subject Name/ Subject Code: OBJECT ORIENTED CONCEPTS / 15CS45

C245.1	Explain the object-oriented concepts and JAVA.
C245.2	Develop computer programs to solve real world problems in Java.

C245.3	Develop simple GUI interfaces for a computer program to interact with users, and to understand the event-based GUI handling principles using Applets and swings.

Subject Name/ Subject Code: DATA COMMUNICATION / 15CS46

C246.2	Identify the different types of network topologies and protocols.
C246.3	Enumerate the layers of the OSI model and TCP/IP functions of each layer.
C246.4	Make out the different types of network devices and their functions within a network
C246.5	Demonstrate the skills of subnetting and routing mechanisms.

Subject Name/ Subject Code: DESIGN AND ANALYSIS OF ALGORITHM LABORATORY / 15CSL47

CO	DESCRIPTION
C247.1	Design algorithms using appropriate design techniques (brute-force, greedy, dynamic programming, etc.)
C247.2	Implement a variety of algorithms such assorting, graph related, combinatorial, etc., in a high level language.
C247.3	Analyze and compare the performance of algorithms using language features.
C247.4	Apply and implement learned algorithm design techniques and data structuresto solve realworld problems

Subject Name/ Subject Code: MICROPROCESSOR AND MICROCONTROLLER LABORATORY /15CSL48

C248.1	Learn 80x86 instruction sets and gins the knowledge of how assembly language works.
C248.2	Design and implement programs written in 80x86 assembly language
C248.3	Know functioning of hardware devices and interfacing them to x86 family
C248.4	Choose processors for various kinds of applications.

Subject Name/ Subject Code: MANAGEMENT AND ENTREPRENEURSHIP FOR IT INDUSTRY/10CS51

C351.1	Define management, organization, entrepreneur, planning, staffing, ERP and outlinetheir importance in entrepreneurship
C351.2	Utilize the resources available effectively through ERP
C351.3	Make us of IPRs and institutional support in entrepreneurship

Subject Name/ Subject Code: COMPUTER NETWORKS / 15CS52

CO	DESCRIPTION

C352.1	Explain principles of application layer protocols
C352.2	Recognize transport layer services and infer UDP and TCP protocols
C352.3	Classify routers, IP and Routing Algorithms in network layer
C352.4	Understand the Wireless and Mobile Networks covering IEEE 802.11 Standard
C352.5	Describe Multimedia Networking and Network Management

Subject Name/ Subject Code: DATABASE MANAGEMENT SYSTEM / 10CS53

C353.1	Identify, analyze and define database objects, enforce integrity constraints on a database using RDBMS
C353.2	Use Structured Query Language (SQL) for database manipulation.
C353.3	Design and build simple database systems
C353.4	Develop application to interact with databases.

Subject Name/ Subject Code: AUTOMATA THEORY AND COMPUTABILITY / 10CS54

C354.1	Acquire fundamental understanding of the core concepts in automata theory and
	Theory of Computation
C354.2	Learn how to translate between different models of Computation (e.g., Deterministic and Non-deterministic and Software models).
C354.3	Design Grammars and Automata (recognizers) for different language classes and become knowledgeable about restricted models of Computation (Regular, Context Free) and their relative powers.
C354.4	Develop skills in formal reasoning and reduction of a problem to a formal model, with an emphasis on semantic precision and conciseness.
C354.5	Classify a problem with respect to different models of Computation.

Subject Name/ Subject Code: ADVANCED JAVA AND J2EE / 10CS553

C355.1	Interpret the need for advanced Java concepts like enumerations and collections in developing modular and efficient programs
C355.2	Build client-server applications and TCP/IP socket programs
C355.3	Illustrate database access and details for managing information using the JDBC API
C355.4	Describe how servlets fit into Java-based web application architecture
C355.5	Develop reusable software components using Java Beans

Subject Name/ Subject Code: DOT NET FRAMEWORK FOR APPLICATION DEVELOPMENT/10CS564

C356.1	Build applications on Visual Studio .NET platform by understanding the syntax and semantics of C#
C356.2	Demonstrate Object Oriented Programming concepts in C# programming language

C356.3	Design custom interfaces for applications and leverage the available built-in interfaces in building complex applications.
C356.4	Illustrate the use of generics and collections in C#
C356.5	Compose queries to query in-memory data and define own operator behaviour

Subject Name/ Subject Code: COMPUTER NETWORK LABORATORY / 10CSL57

C355.1	Analyze and Compare various networking protocols.
C355.2	Demonstrate the working of different concepts of networking.
C355.3	Implement, analyze and evaluate networking protocols in NS2 / NS3

Subject Name/ Subject Code: DBMS LABORATORY WITH MINI PROJECT /10CSL58

C355.1	Create, Update and query on the database.
C355.2	Demonstrate the working of different concepts of DBMS
C355.3	Implement, analyze and evaluate the project developed for an application

Subject Name/ Subject Code: CRYPTOGRAPHY, NETWORK SECURITY AND CYBER LAW /10CS61

C361.1	Discuss cryptography and its need to various applications
C361.2	Design and develop simple cryptography algorithms
C361.3	Understand cyber security and need cyber Law

Subject Name/ Subject Code: FILE STRUCTURES /10IS62

C362.1	Choose appropriate file structure for storage representation.
C362.2	Identify a suitable sorting technique to arrange the data.
C362.3	Select suitable indexing and hashing techniques for better performance to a given problem.

Subject Name/ Subject Code: SOFTWARE TESTING / 10IS63

C363.1	Derive test cases for any given problem
C363.2	Compare the different testing techniques
C363.3	Classify the problem into suitable testing model
C363.4	Apply the appropriate technique for the design of flow graph.
C363.5	Create appropriate document for the software artefact.

Subject Name/ Subject Code: OPERATING SYSTEMS / 10CS64

C364.1	Demonstrate need for OS and different types of OS
C364.2	Apply suitable techniques for management of different resources
C364.3	Use processor, memory, storage and file system commands

C364.4	Realize the different concepts of OS in platform of usage through case studies

Subject Name/ Subject Code: DATA MINING AND DATA WAREHOUSING /10CS651

C365.1	Identify data mining problems and implement the data warehouse
C365.2	Write association rules for a given data pattern.
C365.3	Choose between classification and clustering solution.

Subject Name/ Subject Code: MOBILE APPLICATION DEVELOPMENT /10CS661

C366.1	Create, test and debug Android application by setting up Android development environment
C366.2	Implement adaptive, responsive user interfaces that work across a wide range of devices
C366.3	Infer long running tasks and background work in Android applications
C366.4	Demonstrate methods in storing, sharing and retrieving data in Android applications
C366.5	Analyze performance of android applications and understand the role of permissions and security
C366.6	Describe the steps involved in publishing Android application to share with the world

Subject Name/ Subject Code: SOFTWARE TESTING LABORATORY / 10ISL67

C367.1	List out the requirements for the given problem
C367.2	Design and implement the solution for given problem in any programming
	language(C,C++,JAVA)
C367.3	Derive test cases for any given problem
C367.4	Apply the appropriate technique for the design of flow graph
C367.5	Create appropriate document for the software artefact

Subject Name/ Subject Code: FILE STRUCTURES LABORATORY WITH MINI PROJECT / 10ISL68

C368.1	Implement operations related to files
C368.2	Apply the concepts of file system to produce the given application.
C368.3	Evaluate performance of various file systems on given parameters.

Subject Name/ Subject Code: WEB TECHNOLOGY AND ITS APPLICATIONS /10CS71

C371.1	Adapt HTML and CSS syntax and semantics to build web pages.
C371.2	Construct and visually format tables and forms using HTML and CSS

C371.3	Develop Client-Side Scripts using JavaScript and Server-Side Scripts using PHP to generate and display the contents dynamically
C371.4	Appraise the principles of object oriented development using PHP
C371.5	Inspect JavaScript frameworks like jQuery and Backbone which facilitates developer to focus on core features

Subject Name/ Subject Code: SOFTWARE ARCHITECTURE AND DESIGN PATTERNS /10IS72

C372.1	Design and implement codes with higher performance and lower complexity
C372.2	Be aware of code qualities needed to keep code flexible
C372.3	Experience core design principles and be able to assess the quality of a design with respect to these principles.
C372.4	Capable of applying these principles in the design of object oriented systems.
C372.5	Demonstrate an understanding of a range of design patterns. Be capable of comprehending a design presented using this vocabulary
C372.6	Be able to select and apply suitable patterns in specific contexts

Subject Name/ Subject Code: MACHINE LEARNING / 10CS73

C373.1	Identify the problems for machine learning. And select the either supervised,unsupersvised or reinforcement learning
C373.2	Explain theory of probability and statistics related to machine learning
C373.3	Investigate concept learning, ANN, Bayes classifier, k nearest neighbor, Q,

Subject Name/ Subject Code: CLOUD COMPUTING AND ITS APPLICATIONS / 10CS742

C374.2	Illustrate architecture and programming in cloud
C374.3	Describe the platforms for development of cloud applications and List the application of cloud.

Subject Name/ Subject Code: STORAGE AREA NETWORKS / 10CS754

CO	**DESCRIPTION**
C375.1	Identify key challenges in managing information and analyze different storage networking technologies and virtualization
C375.2	Explain components and the implementation of NAS
C375.3	Describe CAS architecture and types of archives and forms of virtualization
C375.4	Ilustrate the storage infrastructure and management activities

Subject Name/ Subject Code: INTERNET OF THINGS TECHNOLOGY /10CS81

C481.1	Interpret the impact and challenges posed by IoT networks leading to new architectural models.

C481.2	Compare and contrast the deployment of smart objects and the technologies to connect them to network.
C481.3	Appraise the role of IoT protocols for efficient network communication.
C481.4	Elaborate the need for Data Analytics and Security in IoT.
C481.5	Illustrate different sensor technologies for sensing real world entities and identify the applications of IoT in Industry.

Subject Name/ Subject Code: BIG DATA ANALYTICS /10CS82

C482.1	Master the concepts of HDFS and MapReduce framework
C482.2	Investigate Hadoop related tools for Big Data Analytics and perform basic Hadoop Administration
C482.3	Recognize the role of Business Intelligence, Data warehousing and Visualization in decision making
C482.4	Infer the importance of core data mining techniques for data analytics
C482.5	Compare and contrast different Text Mining Techniques

Subject Name/ Subject Code: SYSTEM MODELLING AND SIMULATION / 10CS834

C483.1	Explain the system concept and apply functional modeling method to model the activities of a static system
C483.2	To classify various simulation models and give practical examples for each category.
C483.3	Generate and test random number variates and apply them to develop simulation models.
C483.4	Analyze output data produced by a model and test validity of the model.
C483.5	Describe the behavior of a dynamic system and create an analogous model for a dynamic system;
C483.6	Simulate the operation of a dynamic system and make improvement according to the simulation results.

CHILDREN'S EDUCATION SOCIETY (Regd.)
THE OXFORD COLLEGE OF ENGINEERING
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Department Of Maths

Vision of the Institute

To be a respected and most sought after engineering educational institution engaged in equipping individuals capable of building learning organizations in the new millennium.

Mission of the Institute

To develop competent students with good value systems and face challenges of the continuously changing world.

Vision of the Department

We envision that our department will continue to grow as an intellectually stimulating environment that attracts engineers who have a knack for interdisciplinary research. We hope that the department will play a central role in bridging fundamental sciences and engineering

Mission of the Department

Our mission is educating our students to excel in their work as well as mentor the next generation of engineers. We provide engineering Mathematics with theoretical and application oriented technique and making them successful personally & professionally

Course Name: 15MAT11 (ENGINEERING MATHEMATICS-I)

CO1	Use partial derivatives to calculate rate of change of multivariate functions.
CO2	Analyse position, velocity and acceleration in two- or three-dimensions using calculus of vector valued functions
CO3	Recognize and solve first order ordinary differential equations, Newton law of cooling.

CO4	Use matrices techniques for solving system of linear equations in different areas of linear algebra.
CO5	Apply and standard computation on parametric and polar curves, demonstrate by tracing the same the properties. and understanding towards nature of curves
CO6	Understanding and Applying the real-world problem through engineering techniques.

Course Name: 15MAT31 (ENGINEERING MATHEMATICS-III)

CO1	Know the use of periodic signals and Fourier series to analyze circuits and system communications.
CO2	Explain the general linear system theory for continuous- time signals and digital signals processing using the Fourier transform.
CO3	Understand and analyze the discrete time system using convolution and Z-transforms.
CO4	Employ appropriate numerical methods to solve algebraic and transcendental equations.
CO5	Apply Green's theorem, Divergence theorem and Stokes' theorem in various applications in the field of electro-magnetic and gravitational fields and fluid flow problems.
CO6	Determine the extremals of functional and solve the simple problems of the calculus of variations.

Course Name: 15MAT21 (ENGINEERING MATHEMATICS-II)

CO1	Solve differential equations of electrical circuits, forced oscillation of mass spring and elementary heat transfer.
CO2	Solve partial differential equations fluid mechanics, electromagnetic theory and heat transfer.
CO3	Evaluate double and triple integrals to find area, volume, mass and moment of inertia of plane and solid region.
CO4	Use curl and divergence of a vector valued functions in various applications of electricity, magnetism and fluid flows.
CO5	Use Laplace transforms to determine general or complete solutions to linear ODE.
CO6	Understanding and Applying the real-world problem through engineering techniques.

Course Name: 15MAT41 (ENGINEERING MATHEMATICS-II)

CO1	Use appropriate numerical methods to solve first and second order differential equations.
CO2	Use Bessel's and Legendre's functions which often arise when a problem processes axial and spherical symmetry, such as quantum mechanics, electro-magnetic theory, hydrodynamics and heat conduction.
CO3	State and prove Cauchy's theorem and its consequences including Cauchy's integral formula.
CO4	Compute residues and apply the residue theorem to evaluate integrals
CO5	Analyze, interpret and evaluate scientific hypothesis and theories using rigorous statistical methods.
CO6	Utilize conformal transformation and complex integral arising in aerofoil theory, fluid flow visualization and image processing.

Course Name: 15CS36 (Discrete mathematical structures**)**

CO1	Verify and correctness of an argument using propositional and predicate logic and truth tables.
CO2	Demonstrate the ability to solve problems using counting techniques and combinatorics in the context of discrete probability.
CO3	Solve problems involving recurrence relations and generating functions.
CO4	Construct proofs using direct proofs, proof by contradiction, and proof by cases and mathematical induction.
CO5	Explain and differentiate graphs and trees.
CO6	Understand and analyze prefix code and design the algorithm.

Department of Mechanical Engineering

Vision of the Institute

To be a respected and most sought after engineering educational institution engaged in equipping individuals capable of building learning organizations in the new millennium.

Mission of the Institute

To develop competent students with good value systems and face challenges of the continuously changing world.

Vision of the Department

To become a center of excellence providing state of the art engineering education in mechanical engineering and making individual to be capable of building nation in the new millennium.

Mission of the Department

Mission 1: To provide an excellent teaching and learning process for the students to meet the needs and standards of the current industries and higher learning process.

Mission 2: To promote research and development activity in the recent emerging trends of the mechanical engineering department.

Mission 3: To provide the students with good communication skill, lifelong learning, team spirit and leadership qualities to face the current society.

Program Outcomes

2. Engineering knowledge: Apply the knowledge of mathematics, science, engineering fundamentals, and an engineering specialization to the solution of complex engineering problems.

3. Problem analysis: Identify, formulate, review research literature, and analyze complex engineering problems reaching substantiated conclusions using first principles of mathematics, natural sciences, and engineering sciences.

4. Design/development of solutions: Design solutions for complex engineering problems and design system components or processes that meet the specified needs with appropriate consideration for the public health and safety, and the cultural, societal, and environmental considerations.

5. Conduct investigations of complex problems: Use research-based knowledge and research methods including design of experiments, analysis and interpretation of data, and synthesis of the information to provide valid conclusions.

6. Modern tool usage: Create, select, and apply appropriate techniques, resources, and modern engineering and IT tools including prediction and modeling to complex engineering activities with an understanding of the limitations.

7. The engineer and society: Apply reasoning informed by the contextual knowledge to assess societal, health, safety, legal and cultural issues and the consequent responsibilities relevant to the professional engineering practice.

8. Environment and sustainability: Understand the impact of the professional engineering solutions in societal and environmental contexts, and demonstrate the knowledge of, and need for sustainable development.

9. Ethics: Apply ethical principles and commit to professional ethics and responsibilities and norms of the engineering practice.

10. Individual and team work: Function effectively as an individual, and as a member or leader indiverse teams, and in multidisciplinary settings.

11. Communication: Communicate effectively on complex engineering activities with the engineering community and with society at large, such as, being able to comprehend and write effective reports and design documentation, make effective presentations, and give and

receive clear instructions.

12. Project management and finance: Demonstrate knowledge and understanding of the engineering and management principles and apply these to one's own work, as a member and leader in a team, to manage projects and in multidisciplinary environments.

13. Life-long learning: Recognize the need for, and have the preparation and ability to engage in independent and life-long learning in the broadest context of technological change.

Course Name: Elements of Mechanical Engineering/15EME14/24

C104.1	Understand the concept of non renewable and renewable energy and the working principles of different types of boilers and accessories.
C104.2	Learn the basic principles of operations of steam , water and gas turbines, IC Engines
C104.3	Understand the concept of refrigeration and air conditioning systems
C104.4	Gains knowledge on material joining processes, understands the concept of lubrication and different types of bearings.
C104.5	Get exposure to machining operations on lathe , milling , drilling and grinding machines
C104.6	Understands the principle of power transmissions through belt drives and gear trains

Course Name: Workshop Practice/15WSL16/26

C108.1	Identify the fitting tools and instruments.
C108.2	Apply knowledge of fitting tools and measuring instruments for getting an object of required shape and size
C108.3	Acquire the skill required for carrying out the welding using electric arc welding process.
C108.4	Applying the skill acquired for preparing the different welding joints.
C108.5	Demonstrate the sheet metal working and joining by soldering processes.
C108.6	Understand the working of various power tools and its applications in mechanical engineering.

Course Name: Computer Aided Engineering Drawing/15CED14

C112.1	Understand the importance of engineering drawing as language of engineers.

C112.2	Able to draw the front, top and side views of points and straight lines.
C112.3	Able to draw the orthographic projections of regular plane surfaces in different orientations.
C112.4	Develops skill to imagine and draw the projections of regular solids.
C112.5	Understand the concept of the development of lateral surfaces of regular solids.
C112.6	Develop skill to generate 3D views like isometric projection of different types of solids and combination solids.

Course Name: Material Science & Metallurgy/15ME32A

C202.1	An understanding of the basic concepts of heat treatment process and its influences on properties of metal.
C202.2	An understanding of types of structures, imperfections in metals, diffusion mechanism, evaluation of mechanical properties by subjecting to various stresses and failure mechanism.
C202.3	An understanding of the basic concepts of phase transformation during solidification, phase diagrams, iron carbon equilibrium diagram, classifications of steel, iron, AL, CU and it's alloys .
C202.4	An understanding of the basic concepts of classification, fabrication and applications of composite materials.
C202.5	To understand the various processes for manufacturing of composites and obtain a knowledge of contemporary issues and an ability to use the skills and techniques in engineering practice
C202.6	An ability to use the techniques, skills and modern engineering tools necessary for engineering practice and lifelong learning.

Course Name: Basic Thermodynamics/15ME33

C203.1	Understand the fundamentals of thermodynamics.
C203.2	Demonstrate the work and heat transfer in thermodynamic systems.
C203.3	Formulate the heat, work and energy of the system for various thermodynamic processes.
C203.4	Evaluate the performance of heat engines, heat pumps and refrigerators.
C203.5	Analyze the entropy change for various thermodynamic processes and thermodynamic properties of pure substances.
C203.6	Impart the knowledge in thermodynamic relations and distinguish between ideal and real gases.

Course Name: Mechanics of Materials/15ME34

C204.1	Learn basic concepts of simple stress and strain.
C204.2	Understand importance of stresses in composite sections, principal stresses and strains.
C204.3	Analyze the stresses in thick and thin cylinders.
C204.4	Draw shears force and bending moments.
C204.5	Gain knowledge on bending and shear stresses, deflection of beams.
C204.6	Impart knowledge of torsion of circular shafts and stability of columns.

Course Name: Manufacturing Process-I/15ME35

C205.1	Understand basic concept of foundry technology and identify various types of
	patterns, binders, additives, core, molding machines.
C205.2	Analyze working principle of gating and risering systems, special molding processes
C205.3	Describe different furnaces used for melting of metals and special types of casting process.
C205.4	Demonstrate different methods of welding in the application of fabrication works, and joining of two metals/alloys.
C205.5	Apply the concept of special types of welding, brazing and soldering.
C205.6	Enhance the knowledge of metallurgical aspect in welding.

Course Name: Computer Aided Machine Drawing/15ME36A

C206.1	Student will be able to sketch sections of solids of various polyhedrons, and also visualize and draw orthographic views of simple machine parts.
C206.2	Student is able to understand and draw various thread forms, standard keys,
C206.3	Understanding of various types riveted joints and their drawings, couplings using memorable drawing
C206.4	The students are able to visualize and prepare detailed drawing of a given part and draw
C206.5	CO-5 Read and interpret a given drawing and Create 2-D and 3-D models using solid edge software with manufacturing purposes.
C206.6	Producing detailed sectional views drawing of a 3-D models using solid edge Software with parts list.

Course Name: Metallography & Material Testing Lab/15MEL37A

C207.1	Students will be able to demonstrate the knowledge and the skills required for the conduction of Tensile, Shear and Compression test.
C207.2	The students will be able to determine the torsional and bending strength of different materials.
C207.3	dents will learn Identification of metals based on Microstructures.
C207.4	students will be capable of detecting the defects like cracks, flaws in materials by using different NDT methods.
C207.5	students will know the material behaviour for impact and wear loads.
C207.6	students will be capable of determining hardness of metals using different methods.

Course Name: Foundry & Forging Lab/15MEL38A

C208.1	Demonstrate various skills of sand preparation, molding.
C208.2	Conduct tests on foundry sands to determine properties for different ingredient
	compositions.
C208.3	Apply knowledge of design and practices of mould and pattern making.
C208.4	Analyze the design of gating system.
C208.5	Demonstrate various skills of forging operations.
C208.6	Work as a team keeping up ethical principles.

Course Name: Mechanical Measurements & Metrology/15ME42B

C210.2	Students shall demonstrate the knowledge associated with Generalized Measurement system, Transducers, CRO, Oscillographs, and XY Plotters.
C210.3	Students shall demonstrate the knowledge associated with Measurement of Force, Torque, and Temperature& Strain measurement.
C210.4	Students shall demonstrate the knowledge associated with various Standards of length, Use of slip gauges, and System of limits, fits and tolerance and Design of Gauges.
C210.5	Students will be able to work in Quality control and quality assurances divisions in industries.

C210.6	Students will be able to design a sensors and transducers used for stress analysis, design measuring equipments for the measurement of temperature and flow, to maintain quality in engineering products.

Course Name: Applied Thermodynamics/15ME43

CO. No.	Statements
C211.1	Describe the application; apply the concepts of combustion thermodynamics in engineering field.
C211.2	Analyze and implement various aspects of air standard cycles and basic concepts of gas power cycles.
C211.3	Evaluate the performance of various working aspects of internal combustion engines
C211.4	Understand the different concepts and implement various vapour power cycles, Analyze the concepts and functioning of reciprocating compressors.
C211.5	Apply knowledge of working procedure of gas turbine and Jet and Rocket Propulsion system.
C211.6	Describe the various psychometric processes; understand the working of air conditioning systems and refrigeration systems.

Course Name: Kinematics of Machines/15ME44

C212.1	To identify and select the proper mechanisms for the application in real life situations.
C212.2	Calculate mobility for various mechanisms and enumerate rigid links and types of joints within mechanisms.
C212.3	Explain different mechanisms and conduct a velocity and acceleration analysis of the different mechanisms.
C212.4	Construct CAM profile for the specific follower motion.
C212.5	To identify different gear trains for various practical applications and solve simple problems.
C212.6	To classify gears and calculate the various spur gear dimensions.

Course Name: Manufacturing Process-II/15ME45

C213.1	Understand metal cutting principles, cutting tool materials, properties and also fluid selection.

C213.2	Classify and understand the principle and constructional features, operations performed on Lathe & drilling machine.
C213.3	Understand and to operate the Milling machine and to know the concept of indexing mechanism and its methods.
C213.4	Understand the concept of Grinding machines and its constructional features. And also to know the selection of grinding wheel.
C213.5	Understand the principles, applications and features of super finishing, polishing and buffing operations, honing etc.
C213.6	Select the types of non-traditional machines and methods of operations along with applications.

Course Name: Fluid Mechanics/15ME46B

C214.1	To impart basic knowledge of fluid, its properties and recognize the various types of fluid flow, Also variation of Pressure in a fluid is at rest.
C214.2	To made them understand the concept of Euler's equation and extracting Bernoullis's equation also to understand and analyze the Head losses in laminar and turbulent flow through pipes.
C214.3	To Contend the importance of flow measurement and use of dimensional analysis to design physical or numerical experiments and to apply dynamic similarity.
C214.4	Can understand the reasons for Major and minor loss of energy through pipe
C214.5	To understand and analyze the Head losses in laminar and turbulent flow through pipes.
C214.6	To learn the concept of Buoyancy and importance of continuity equation and can implement the compressible flow and flow around immersed bodies.

Course Name: Mech. Measurements & Metrology Lab/15MEL47B

C215.1	Understand the basic measurement units and calibrate various measuring devices.
C215.2	Use various measuring tools such as Sine Bar, Sine Center, Bevel Protractor to find taper and included angles.
C215.3	Gain knowledge on Optical Microscope, Tool Maker Microscope to measure screw thread parameters.
C215.4	Learn basic concepts of measuring temperature, pressure and strain using different methods.

C215.5	Gain knowledge on various measuring equipments applied to engineering analysis in industries.
C215.6	Impart knowledge of error and correction factors of various measuring devices.

Course Name: Machine Shop/15MEL48B

C216.1	Describe the knowledge and the skills required with respect to the operation, procedure, conduction and analyzing the results of experiments.
C216.2	Perform the operations in lathe machine.
C216.3	Analyze the operations in milling machine and it's mechanism.
C216.4	To know the concepts of grooving operations using Shaping machine.
C216.5	Demonstrate of operations on drilling machine.
C216.6	Impart the knowledge of Eccentric turning using four jaw chuck

Course Name: Management and Entrepreneurship/15AL51

C301.1	Understand the basic concepts of management and development of effective planning process.
C301.2	Understand the principles of organization and Illustrate different organizational structures.
C301.3	Understand the staff selection process, recruitment process and project selection process as well as directing, motivating and controlling.
C301.4	To know how to motivate, directing and controlling the managers and management.
C301.5	Develop entrepreneurship and its concepts pertaining to small scale industries for sustainable development.
C301.6	Understand different schemes of government support to small scale industries and preparation of project report.

Course Name: Design of Machine Elements-I/15ME52

C302.1	Apply the concept of mechanics of materials to estimate the stresses in a machine element & predict failure of components.
C302.2	Analyze failure of components using different theories of failure for static loadings
C302.3	Determine the stress concentration factor for different irregularities and strength of components under different impact loadings.
C302.4	Design the machine components for fatigue failure & also for threaded fasteners.
C302.5	Design of keys, Shafts, cotter & knuckle joint & couplings used for power transmission

C302.6	Design & Analyze the power screws and welded joints for different applications.

Course Name: Energy Engineering/15ME53

C303.1	Describe the working principle of steam power plant and ability to solve problems involving height of chimney to produce a given draft.
C303.2	Apply knowledge of super heater, De-super heater, control of super heaters, economizer
C303.3	Evaluate the various methods of starting diesel engines and need for lubrication.
C303.4	Import the knowledge of Hydrograph, how to draw the hydrograph, flow duration and mass curve and its applications.
C303.5	Apply the knowledge of nuclear energy, solar energy and wind energy.
C303.6	Demonstrate the various energy conversion methods such as Tidal power energy, Ocean thermal energy conversion, geothermal energy and photosynthesis.

Course Name: Dynamics of Machines/15ME54

C304.1	Students will be able to do static and dynamic analysis of different mechanisms subjected to forces using various principles.
C304.2	Students will be able to analyze the concept of friction in different bearings and belt drive.
C304.3	Students will be able to solve the problems on balancing of rotating masses in same and different planes.
C304.4	Analyze the concept of primary & secondary forces of reciprocating masses in different engines.
C304.5	Students will be able to determine the various parameters of governors and its usage.
C304.6	Course content helps the students to analyze gyroscopic effect on different vehicles and Analysis of Cams.

Course Name: Manufacturing Process-III/15ME55

C305.1	Students will be able to understand necessity of forming process compared with other manufacturing techniques, and the knowledge of parameters effect on the processing of the wrought products.
C305.2	Students will be able to determine the process, load required and possible reasons for the formation of defects in forged components.
C305.3	Students will be able to identify the process, load calculations and reasons for defective rolled products.

C305.4	Students will be able to apply the knowledge of drawing and extrusion to find out defects and problems occurred in the processes.
C305.5	Students will be able to select the different process, related equipments, and parameters for the fabrication of various sheet metal components.
C305.6	Students will be able to select the different high energy rate forming process and powder metallurgy for the fabrication of bulk components.

Course Name: Turbo Machines/ 15ME56

C306.1	Understanding the comparison of positive displacement machine and turbo machine.
C306.2	Gain the knowledge of working of centrifugal pumps.
C306.3	Study the performance of various hydraulic turbines.
C306.4	Impart the knowledge of performance of steam turbines.
C306.5	Sound knowledge of energy transfer in turbomachinary.
C306.6	Sound knowledge about stage efficiency, reheat factor and preheat factors in turbines and pumps, compression and expansion processes, the working of centrifugal and axial compressors.

Course Name: Fluid Mechanics & Machines Lab/15MEL57

C307.1	Students will able to analyze fluid flow principles.
C307.2	Gain the knowledge in analyzing the performance of turbines and pumps.
C307.3	Able to determine coefficient of friction, minor losses in flow through the pipes.
C307.4	Students will be able to calibrate flow measuring devices such as orifice meter, venture meter and V- Notch and performance of centrifugal pumps.
C307.5	Students will have the ability to test the performance of turbines like Pelton wheel, Francis turbine and Kaplan turbine.
C307.6	Students will have the ability to test the performance of two stages reciprocating air compressor and air blower.

Course Name: Energy Conversion Lab/15MEL58

C308.1	At the end of the course, students will be able to determine the Flash point, Fire point, calorific value and viscosity of various lubrication oils.
C308.2	Students will have the knowledge of engine operation through valve timing diagram.
C308.3	To conduct performance test on Two stroke Petrol Engine.

C308.4	To conduct performance test on 4 stroke Diesel Engine, Four Stroke Petrol Engines.
C308.5	Students able to draw valve timing and port timing diagram.
C308.6	Impart the knowledge of application of planimeter.

Course Name: Computer Integrated Manufacturing/15ME61

C309.1	Understand basic concepts of computer integrated Manufacturing**,** utilization parameters of machine and their capabilities
C309.2	Apply different work transfer methods and mechanism for high volume production
C309.3	Design automated assembly systems for high volume production and analyzes single station, multistation and automated guided vehicle system.
C309.4	Development of various types of computer aided manufacturing and planning systems
C309.5	Enhance various terminology, programming methods of robot and write part program in Robotics & CNC machine.
C309.6	Analyze flow lines and solve problems through line balancing methods for manufacturing

Course Name: Design of Machine Elements-II/15ME62

C310.1	Demonstrate the fundamentals of stress analysis, different stress in curved beams and Design and select power transmission elements.
C310.2	Make proper assumptions with respect to material, size, static and dynamic loads for springs, clutches and brakes.
C310.3	To change the existing design with minimum effort for better result/performance of IC-Engine parts
C310.4	Design of spur and helical gears for different power transmission ratio and to find BHN.
C310.5	Design bevel and worm gears based on strength, dynamic and wear loads.
C310.6	Performance of the rotating components can be increased with better knowledge of lubrication

Course Name: Heat & Mass Transfer/15ME63

C311.1	Provide sound understanding of the basic principles and laws, modes of heat transfer, different types of Fins and fin efficiency.
C311.2	Capability to analyze transient mode of heat transfer and use of Heiselers Charts.
C311.3	To know various heat transfer processes and heat exchangers.

C311.4	Able to analyze different regimes of boiling and condensation.
C311.5	To impart the knowledge of natural and forced convection and non dimensional numbers associated with it.
C311.6	Understand the concept of radiation heat transfer.

Course Name: Finite Element Methods/15ME64

C312.1	Learn basic principles of finite element method for analysis of structures.
C312.2	Understand importance of principle of minimum potential energy, Raleigh's Ritz and Galerkin's method to solve engineering problems.
C312.3	Analyze the finite element formulation of 2-D elements and higher order elements.
C312.4	Get exposure the finite element analysis of bars in engineering field.
C312.5	Gain knowledge on the finite element analysis of trusses.
C312.6	Impart knowledge of finite element analysis of beams and heat transfer problems.

Course Name: Mechatronics & Microprocessor/10ME65

C313.1	Learn basic concepts of Mechatronics systems.
C313.2	Understand importance of Transducers and Sensors.
C313.3	Gain knowledge on electrical actuation system and signal conditioning.
C313.4	Learn basic concepts of Microprocessor and number system, logic gates.
C313.5	Gain knowledge on logic function of INTEL 8085A Microprocessor.
C313.6	Impart knowledge of CPU, organization and programming of Microprocessor.

Course Name: TOE/15ME66X

C314.1	Develop equations of equilibrium , Mohr's diagram & characteristic equation of principal stress for 2D & 3D stress systems
C314.2	Able to identify the possible strain field using compatibility equations. Reducing the complexity by assuming plane stress & plane strain condition.
C314.3	Derive the solutions for a two dimensional problem in Cartesian coordinates using Airy's stress function method and to develop equations of equilibrium for 2D stress system in Polar co-ordinate system.
C314.4	Identify the stress distribution of different parts such as rotating disks & rotating cylinders. To derive equations for torsion of thin open sections & tubes.

C314.5	Derive equation for Radial & Circumferential stresses for disk, cylinders & sphere subjected to thermal loading.
C314.6	Understand the importance of basic theorems to solve practical problems.

Course Name: NTM/15ME665

C314.1	To appreciate the importance of NTM methods and their advantages over conventional methods.
C314.2	To demonstrate the working of USM processes.
C314.3	To operate with the elements of AJM & WJM processes.
C314.4	To gain the knowledge of elements related to ECM & Chemical machining processes.
C314.5	To select an appropriate NTM process for the machining of the components and suitable electrodes of EDM.
C314.6	To correlate specific applications of PAM, LBM and EBM process.

Course Name: Heat & Mass Transfer Lab/15MEL67

C315.1	Understand the concept and mechanism of forced, natural convection taking place in objects of different geometries, the various empirical correlations used in different fluid flow situations.
C315.2	Learn the thermal performance analysis of heat exchangers, their practical applications.
C315.3	At the end of the course, students will be able to understand conduction phenomenon thoroughly in objects of different geometries they can determine the thermal conductivity of composite wall, lagging material and critical heat flux.
C315.4	Understand the performance analysis of vapour compression refrigeration cycle and air conditioning system.
C315.5	Understand the concept of radiation heat transfer.
C315.6	To impart the knowledge non dimensional numbers associated with natural and forced convection.

Course Name: CAMA Lab/15MEL68

C316.1	le to define the different element types, properties and material models to the different structures being analyzed.
C316.2	dents can able to do the stress analysis of bar, truss, beam and simple mechanical structures and validate the results with theoretical results.

C316.3	dents will carry out static and dynamic analysis of simple beams and bars.
C316.4	dents will be able to analyze the thermal problems like conduction and convection using ANSYS.
C316.5	dents will be able to do Air flow analysis of pipe and flat plate.
C316.6	Student will able to solve thermal and mechanical stress problems**.**

Course Name: Engineering Economics/15ME71

C401.1	Students will be able to understand types of interest and its factors and use them in EMI and loan calculations.
C401.2	Students will be able to characterize different assets based on their Present, equivalent and future worth and judge the best alternative.
C401.3	Students will be able to appreciate depreciation, costing and estimation procedure. Perform tax analysis.
C401.4	Students will be able to Analyze the financial concepts and prepare financial statements for the company.
C401.5	Students will be able to use the knowledge of financial ratios for determining the firm's earning power.
C401.6	Students will be able to demonstrate the concepts of financial and profit planning through suitable budgeting.

Course Name: Mechanical Vibrations/15ME72

C402.1	Understand basic concepts of vibrations & learns to use the Fourier series method to idealize any motion in terms of sine & cosine curves which can be used in vibration analysis
C402.2	Able to write a mathematical model of un damped systems and can deploy the proper method to obtain the natural frequency of the system, which is required in failure analysis.
C402.3	Gains insight into the damped , forced vibrations and develops the skill to utilize the over, under and critically damped systems in different applications
C402.4	Realize the importance of vibration measuring, condition monitoring and methods to avoid vibrations.
C402.5	Learn to idealize any physical system into two DOF systems and determine their natural frequencies & mode shapes
C402.6	Able to solve multi DOF system and obtain their natural frequencies by numerical methods which helps the engineer to design stable system

Course Name: Hydraulics and Pneumatics/15ME73

C403.1	Describe the working principles of hydraulic and pneumatic system and its applications.
C403.2	Apply knowledge of pumps, motors and its application.
C403.3	Evaluate the various types of valves and its applications.
C403.4	Import the knowledge of circuit design, control valves and its applications
C403.5	Learn and apply multi-purpose cylinder applications
C403.6	Describe the working principles of hydraulic and pneumatic system and its applications.

Course Name: Operation Research/15ME74

C404.1	Ability to understand and analyze solution for linear programming problems in industry so that they are able to use resources (capitals, men, machine and materials) more effectively.
C404.2	Students will have the knowledge of optimizing the transportation models, assignment and travelling sales man problems. Solve the problem of transporting the products from origins to destinations with least transportation cost.
C404.3	Students will have the analysis of optimizing the Integer Programming models and Queuing theory.
C404.4	Students will have the Understand of Project management techniques: PERT-CPM & crashing techniques to reduce the man, machine and material to increase the profits and reduce the losses.
C404.5	Students will have the knowledge of Game Theory analytical and graphical method problems solving for different types of Job's.
C404.6	Students will have the Describe the Sequencing of different types of Job's to reduce man, machine and material cost to increase the profit.

Course Name: Non Conventional Energy Sources/15ME754

C405.1	Understand the present energy scenario and the available non conventional energy sources.
C405.2	Describe the basics of solar radiation geometry and various measurement techniques.

C405.3	Analyze the knowledge gained in tapping the solar energy through solar thermal devices, PV conversion and their performance analysis.
C405.4	Demonstrate the various energy conversion methods such as Wind, Tidal, OTEC and Geothermal.
C405.5	Apply knowledge of Biomass and Hydrogen energy and their impact on environment and sustainability.
C405.6	Understand the present energy scenario and the available Non conventional energy sources.

Course Name: Theory of Plasticity/15ME752

C405.1	Get exposed to concepts of theory of elasticity, importance of stress and strains which are needed to understand the theory of plasticity.
C405.2	They knew about types of strain and plastic deformation of ductile materials.
C405.3	Use different yield criteria and its importance.
C405.4	Realize the importance of experimental verification of stress- strain relationship and bending of beams and use it in design of mechanical components.
C405.5	They can analyze stress; shear and residual stresses are distributed on the different types of beam.
C405.6	Gain knowledge on torsion of circular & non circular shafts.

Course Name: Experimental Stress Analysis/15ME761

C406.1	ility to brief about types, mounting and performance of strain gages and wheat stone bridge circuits.
C406.2	dents can aware of about different configurations of strain rosettes and its error minimization.
C406.3	dents can brief about concepts of Photoelasicity, polar scope and calibration of different models.
C406.4	get exposure on Two and Three Dimensional photoelasicity models and techniques
C406.5	ey will understand about Birefringent and Brittle coating methods used in ESA.
C406.6	They can use moire techniques for finding stresses and displacements.

Course Name: Design Lab/15MEL77

C407.1	Understand the concept of natural frequency and damping coefficient in a single DOF vibrating system.
C407.2	To analyze the balancing of rotating masses by using static and dynamic balance.

C407.3	To demonstrate the concept of stress concentration for photo- elastic materials.
C407.4	To determine pressure distribution in journal bearings.
C407.5	To find the principle stresses using strain gauges.
C407.6	Knowing the concepts of whirling of shaft, governor and gyroscope.

Course Name: CIM & Automation Lab/15MEL78

C408.1	To practically relate to concepts discussed in Computer Integrated Manufacturing Course.
C408.2	To write CNC part programs for simulation of machining operations such as Turning, Drilling & Milling.
C408.3	Ability to identify the type of machining centre for the geometry given (cylindrical or prismatic), write the part program, explain the instructions, examine for the error in
	the program and choose right G and M codes to optimize the program and construct the final geometry by running the simulation using the software.
C408.4	To understand & write programs for Flexible Manufacturing Systems & Robotics.
C408.5	To understand the operating principles and practical applications of hydraulics, pneumatics and electro–pneumatic systems.
C408.6	To apply these learning's to automate & improve efficiency of manufacturing process.

Course Name: Operations Management/15ME81

C409.1	Understand the history and development of Operation Management. Able to apply the Operation Management principles in manufacturing and service activities. Getting exposure to Environmental and contemporary issues. Understands the Importance of Productivity and able to apply mathematics to improve productivity.
C409.2	Gets exposure to Decision making process in an industry under different environments, importance of decision making. Able to apply Mathematical models like Break even analysis and tradeoffs.
C409.3	Understands about the importance of forecasting, different methods of Fore casting. Able to apply forecasting methods like qualitative or quantity. Getting exposed to Measure and controlling of forecasting. Understands the use of Aggregate and Master Scheduling Techniques.

C409.4	Learns about the importance of Purchasing and Supply Chain Management .Gets exposure to different Methods of Procurement, Tendering process, vendor development. Understands the importance of maintaining Transparency in Purchasing activity and able to apply Procurement methods in an Industry or Service Sector.
C409.5	Gets exposure to the various skills required finding out the Capacity requirement of Plant and Machinery, Plant location, and Plant lay out. Able to apply the acquired skill in an Industry or Service Sector.
C409.6	Gets exposure in the area of material requirement, inventory, importance of MRP and Able to apply the recent management techniques like MRP-1 and ERP in an industry or service sector. Able to apply different Inventory methods in a manufacturing or Service activity.

Course Name: Control Engineering/15ME82

C410.1	Describe the concept of control action, types of controllers and its applications relevant to the system.
C410.2	Apply the many inter-relationships in mechanical and electrical models.
C410.3	Evaluate the concept of block diagram reduction technique and SFG.
C410.4	Import the knowledge the step, ramp and impulse input concepts by stability analysis
C410.5	apply the importance of root locus and bode plots
C410.6	Import the knowledge of lead-lag compensator and frequency response analysis.

Course Name: Power Plant Engineering/15ME831

C411.1	derstand Types of fuels and Equipment used for burning of coal in steam power plant.
C411.2	ppose ash handling, coal handling method in a thermal power plant.
C411.3	ferentiate Diesel engine power plants and Gas turbine power plants.
C411.4	lculate performance of a hydro-electric plant.
C411.5	plain working principle of different types of nuclear power plant.
C411.6	lect the suitability of site for a power plant and Indicate safety aspects of power plant.

Course Name: TRIBOLOGY/15ME831

C411.1	Describe the viscosity, Newton's law of viscosity.

C411.2	Apply knowledge of Hydrostatic and hydro dynamic lubrications.
C411.3	Evaluate the various types of bearing and its applications.
C411.4	Import the knowledge of oil flow and thermal equilibrium of journal bearing
C411.5	apply load carrying capacity and coefficient of friction
C411.6	Describe the wear, wear rate and its effects.

Course Name: Foundry Technology/15ME838

C411.1	Students can able to demonstrate the Oxidation of liquid metals, gas dissolution in liquid metals, methods of degassing, fluidity, factors affecting fluidity, fluidity tests, hot tearing, shrinkage of liquid metals.
C411.2	Students can able to understand the concept of Crystallization and development of cast structure and concept of progressive and directional solidification, need of gating system and rise ring system in casting methods.
C411.3	Students can able to demonstrate the Special Molding Techniques for manufacturing different components by using different pattern, Developments in cupola melting–hot blast cupola, water cooled cupola, balanced blast cupola, coke less cupola, cupola charge calculations.
C411.4	Ferrous Foundry: Melting procedures, casting characteristics, production, specification, and properties of some ferrous metals.
C411.5	Students can able to demonstrate the Non-Ferrous Foundry: Melting procedures, casting characteristics, production, specification, and properties of some typical
	aluminum, copper and magnesium based alloy castings.
C411.6	Modernization and Mechanization in foundry techniques in molding, core, material handling equipment's.

Course Name: Bio Mass Energy System/15ME843

C412.1	Knowledge about the various biomass resources and its energy content.
C412.2	Analyze the conversion of biomass to bio fuels for combustion process.
C412.3	Evaluate the performance of biomass based steam power plant for power generation.
C412.4	Demonstrate the concepts of bio-Methanization process.
C412.5	Apply knowledge of biofuels in IC Engine Combustion.
C412.6	Know the biogas production.

Course Name: Project Work/15ME85L

C413.1	Applying knowledge emerging areas of engineering and technology.
C413.2	Students able to apply engineering concepts with respect to different mechanical streams.
C413.3	Students focusing on more efficiency at most economically.
C413.4	Students improve communication skills, problem analyzing ability, design and development skills.
C413.5	Developing new ideas, creative thinking, improvement in reverse engineering in mechanical engineering related technology.
C413.6	Improve their skills to work in a team as a member, to manage project in interdisciplinary environment and to draw appropriate conclusion.

Course Name: Seminar/15ME86L

C414.1	Enhancing knowledge in emerging area of technology.
C414.2	Students self learning through seminar which may enable in lifelong learning.
C414.3	Improve their skills to work in a team.
C414.4	Improve their knowledge in project management and brought out their concern for ethical valve.
C414.5	Develop new ideas, creative thinking, improve in reverse engineering in related technology.
C414.6	Reduce the stage fear in leadership qualities.

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Approved by A.I.C.T.E. New Delhi.
Recognised by UGC Under Section 2(f))
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Department of Mechatronics

Vision of the Institute

To be a respected and most sought after engineering educational institution engaged in equipping individuals capable of building learning organizations in the new millennium.

Mission of the Institute

To develop competent students with good value systems and face challenges of the continuously changing world.

Vision of the Department

To develop the Mechatronics Engineering Department as a leading educational and research department with innovation in the design and development of electro-mechanical systems, intelligent machines and products.

Mission of the Department

Mission 1. To provide an outstanding education in Mechatronics Engineering with a rich diversity of skills.

Mission 2. To contribute to the community prosperity through professional services and research.

Mission 3. To prepare graduates with ability to engage in life-long learning and capable of carrying out engineering practice with competence.

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Bommanahalli, Hosur Road, Bangalore - 560 068.
Ph: 080-61754601/602, Fax: 080 - 25730551
E-mail: engprincipal@theoxford.edu Web: www.theoxfordengg.org

Program Educational Objectives

Inculcate knowledge of basic engineering sciences and fundamentals of mechanical, electrical and computer systems.

Create ability in graduates to design, develop product and applications in the field of Automation and Mechatronics and be able to use engineering tools that will enhance their productivity.

Prepare graduates to be effective engineers with good analytical and problem solving skill to innovate, research and develop in a multidisciplinary Mechatronics environment.

Program Specific Objectives

PSO 1 : An ability to understand the concepts of Mechatronics Engineering and to apply them to various areas like Mechanical, Electrical machines, Signal processing, Embedded systems, Communication Systems, Digital & Analog Devices, Computer fields etc

PSO 2: An ability to solve complex Mechatronics Engineering problems, using latest hardware and software tools, along with analytical skills to arrive cost effective and appropriate solutions

PSO 3: Excellent adaptability to changing work environment with good leadership qualities and zeal for social and environmental well-being.

Subject Code / Subject Name: 15MT32- Material Science & Technology

C232.1	Appreciate the necessity of engineering materials, Smart Sensors and its applications in various fields.

C232.2	Identify possible cause of failure due to fatigue and Creep.
C232.3	Demonstrate the knowledge of nucleation, Crystal growth, Solid solution and Phase diagrams.
C232.4	Appreciate the significance and applications of Various heat treatment processes.
C232.5	Explain the definition and classification and fabrication processes of composite materials.
C232.6	Identify the role of Carbon content in the material and accordingly the type of material and properties of material changes like steel and cast iron

Subject Code / Subject Name: 15MT33-Machanics of Materials

C233.1	Analyze the normal stresses and strains for axially loaded members using Hooke's law
C233.2	Enumerate principal stresses and shear stresses for simple two dimensional loadings
C233.3	Elucidate the stresses and strains in thick and thin cylindrical pressure vessels.
C233.4	Perform analysis of beams for static loading.
C233.5	Design torsional shafts and structural columns
C233.6	Calculate and represent the stress diagrams in bars and simple structures

Subject Code / Subject Name: 15MT34- Control Systems

C234.1	Apply modeling knowledge in implementation physical systems.
C234.2	Understand the reduction of block diagram & analyze using Signal flow graph.
C234.3	Comment on performance of a system by evaluating various parameters.
C234.4	Model a system by applying the concept of State Space analysis
C234.5	Determine the time and frequency-domain responses of first and second-order systems to step and sinusoidal (and to some extent, ramp) inputs.
C234.6	Apply root-locus technique to analyze and design control systems

Subject Code / Subject Name: 15MT35 - Analog & Digital Electronics

C235.1	Analyze the Importance & Applications of Diode as Rectifiers, Filters, Zener Diode Regulators & Switching Circuits.
C235.2	With the Knowledge of Active Filters & Oscillators students can better understand the Real-time Communication Systems
C235.3	Students are prepared to Understand, Analyze & Design Various Analog Electronics circuits if recruited to Analog Electronics Industry.
C235.4	Students are prepared to Understand, Analyze & Design Digital Circuits, if interested to work in VLSI Industry
C235.5	Formulate and employ a Karnaugh Map to reduce Boolean expressions and logic circuits to their simplest forms.

C235.6	Design and implement combinational logic circuits using reprogrammable logic devices. Content

Subject Code / Subject Name: 15MT36 - Computer Organization

C236.1	Define Basic structure of computers, machine instructions and assembly language programs
C236.2	Ability to differentiate Addressing modes, output operations, Stacks and Queues has
	been described
C236.3	Understand the role and responsibilities of OS in the computer system.
C236.4	I/O Devices, Interrupts, Direct Memory Access, Busses, Interface Circuits, and Standard I/O Devices has been described
C236.5	Analyze the working of the memory system and basic processing unit.
C236.6	Understand the interfacing concepts in input and output module.

Subject Code / Subject Name: 15MT42 - Fluid Mechanics And Machines

C242.1	Appreciate the fluid mechanics fundamentals, including concepts of mass and energy conservation.
C242.2	Apply the fundamentals to flow measurement problems.
C242.3	Perform dimensional analysis for problems in fluid mechanics.
C242.4	Appreciate the understanding of turbo machines and principles of energy transfer in turbo machines.
C242.5	Apply the fundamentals for energy transfer problems in various turbo machines.
C242.6	Identify the role of Carbon content in the material and accordingly the type of material and properties of material changes like steel and cast iron

Subject Code / Subject Name: 15MT43 – Microcontroller

C243.1	Understand the difference between microprocessor and microcontroller, operation of Peripherals of controller, and be able to program a microcontroller system in assembly code and C.
C243.2	Interface the system to switches, keypads, displays, A/D and D/A converters and build a microcontroller based Robot.
C243.3	Design and Develop a microcontroller based system.
C243.4	Understand of 8051 Microcontroller concepts, architecture, programming and application of Microcontrollers.
C243.5	Understand the basic idea about the data transfer schemes and its applications
C243.6	Impart the knowledge about the instruction set

SUBJECT CODE / SUBJECT NAME: 15MT44 - MANUFACTURING TECHNOLOGY

C244.1	Understand the principles and techniques of casting, forging, rolling & drawing.
C244.2	Apply the knowledge of metal working process.
C244.3	To express the different techniques of joining process for metal & non metals.
C244.4	Understanding and applying knowledge to execute CNC machining programs
C244.5	Calculate and understand appropriate single-point machining relationships taking tool material and machine constraints into consideration.
C244.6	Understand the principles and appropriateness of non-traditional machining processes

Subject Code / Subject Name: 15MT45 - Theory of Machines

C245.1	Explain the concepts of mechanism, machines, and types of motion, and calculate the mobility of a mechanism.
C245.2	Explain basic cam terminology, analyze various types of CAMS, and draw CAM profile diagrams.
C245.3	Determine the positions, velocities and accelerations of links of simple mechanisms by using graphical approach.
C245.4	Demonstrate the knowledge of various transmission mechanisms like gears and belts, and apply them for simple problems.
C245.5	Appreciate the principles of Balancing, Governors, and Gyroscope, and their applications
C245.6	Understand the fundamentals of machine design for desired kinematic or dynamic performance.

Subject Code / Subject Name: 15MT46 Instrumentation And Measurements

C246.1	Measure various electrical parameters with accuracy, precision, resolution.
C246.2	Use AC and DC bridges for relevant parameter measurement.
C246.3	Select appropriate passive or active transducers for measurement of physical phenomenon.
C246.4	Understand the errors in measurements and their rectification
C246.5	Understand the various measurement techniques available
C246.6	Understand the basic working of instruments used for measurement

Subject Code / Subject Name: 10MT51 -Design of Machine Elements

C351.2	Understand the technique of theories of failure, stress concentration, fatigue strength etc

C351.3	Calculate the stresses; parameters of machine elements subjected to various loads also make proper assumptions with respect to material, FOS for various machine components.
C351.4	Design machine elements like couplings, gears, bearings ad springs
C351.5	Design machine elements like power screws.
C351.6	Design machine elements like shafts, keys.

Subject Code / Subject Name: 10MT52 - Virtual Instrumentation

CO	DESCRIPTION
C352.1	Gain knowledge of Virtual Instrumentation and Lab View domain on various I/O Module , Sensor, DAQ Devices ,Communication and Measurement System
C352.2	Understanding the basic programming concepts and various logical Instructions.
C352.3	Determine the extent and nature of electronic circuitry in Virtual Instrumentation
C352.4	Recognize the components of virtual instrumentation and use them for PC based Measurement.
C352.5	Publish Vis front panels on the web,view and control them remotely from labview or
	from a web
C352.6	Develop real time application using Labview

Subject Code / Subject Name: 10MT53 - Hydraulics& Pneumatics

C353.1	Engineering applications of hydraulic system
C353.2	Engineering applications of pneumatic system
C353.3	Gain knowledge of basis of hydraulic system
C353.4	Gain knowledge of basis of pneumatic system
C353.5	Understanding the working principle of hydraulic system
C353.6	Understanding the working principle of pneumatic system

Subject Code / Subject Name:10MT54 Micro And Smart system technology

C354.1	Know the basic concept of micro and smart system technology.
C354.2	Understand the need of micro size machines and devices.
C354.3	Know how this micro system technology is evolved in all fields of science and technology
C354.4	Know the smart materials and their characteristics for the smart system applications.
C354.5	Understand the working of different sensors for smart system applications.
C354.6	Know how the different components of smart systems ate integrated with each other.

Subject Code / Subject Name: 10MT551- Wireless Network & Communication

C355.1	Have Knowledge of the fundamental concepts of wireless communication and networks.
C355.2	To understand the basics of wireless voice and data communication
C355.3	Differenciation between Wireless LAN, Wireless MAN, Wireless WAN
C355.4	Understand the working of modern network architectures from a design and performance perspective.
C355.5	Design requirements of network architectures
C355.6	Brief description regarding different wireless networks.

Subject Code / Subject Name: 10MT562 - Automation in Manufacturing

C356.1	Know the fundamentals of automation in manufacturing
C356.2	Need of automation in manufacturing
C356.3	Types of automation process and its requirement
C356.4	Knowledge about quality control and its requirement
C356.5	Understand the techniques of automation in manufacturing
C356.6	Operations performed in manufacturing industry

Subject Code / Subject Name: 10MT61 - PLC &SCADA

C361.1	Describe typical components of a Programmable Logic Controller.
C361.2	Explain the basic concepts of a Programmable Logic Controller.
C361.3	Use timer, counter, and other intermediate programming functions.
C361.4	Design and program basic PLC circuits for entry-level PLC applications.
C361.5	Design and program a small, automated industrial production line.
C361.6	Explain SCADA basic concept and application process,

Subject Code/Subject Name: 10MT62 -Embedded System (ARM)

C362.1	Gain the knowledge of various RISC and CISC architectures of processors
C362.2	Know the different register usage in processor core
C362.3	Know the function of Embedded system hardware and software components,
C362.4	Have knowledge of embedded system based on the ARM processor, various cache methods and instruction set.
C362.5	Understand the various instruction set for writing and optimizing ARM assembly and C code
C362.6	Able to optimize error in programming and debug error code in efficient way.

Subject Code / Subject Name: 10MT63- Power Electronics

C363.1	Have knowledge of power semiconductor devices, thyristors, AC voltage controllers.
C363.2	Have knowledge of choppers and inverters.

C363.3	Understand the characteristics and working principle of thyristors, AC voltage controllers.
C363.4	Understand the characteristics and working principle of choppers and inverters.
C363.5	Apply control techniques to meet desired switching objectives.
C363.6	Analys the importance and applications of diode as rectifiers, filters, Zener diode, regulators and switching circuits.

Subject Code / Subject Name: 10MT64 Computer Aided Machine Drawing

C364.1	Have knowledge about Engineering Drawing
C364.2	Understand the concepts of sections of solids, orthographic views.
C364.3	Understand the concepts of threads, fasteners, couplings.
C364.4	Understand the concepts of joints and assembly drawing.
C364.5	Understand the concepts of Detailing.
C364.6	Students will be able to demonstrate the usage of CAD software

Subject Code / Subject Name: 10MT652- Rapid Prototyping

C365.1	Have fundamental knowledge of modeling and simulation.
C365.2	Understand the techniques of discrete event simulation, random number generation.
C365.3	Understand the techniques to test for random number,
C365.4	Understand the techniques of random variants used in simulation study & simulation packages.
C365.5	Apply simulation packages for queuing system.
C365.6	Apply simulation packages for production system and maintenance system.

Subject Code / Subject Name: 10MT662- Process Instrumentation

C366.1	Have the knowledge of Joints, Links.
C366.2	Have the knowledge of Sensors.
C366.3	Have the knowledge of Control units
C366.4	Have the knowledge of Actuators .
C366.5	Have the knowledge of Elements of Automation.
C366.6	Describe motions and control system of Robots.

Subject Code / Subject Name: 10MT71: Industrial Robotics

C471.1	Gain knowledge of Robotics
C471.2	Gain knowledge of robotics in Automation
C471.3	Understand the working Methodology of Robotics and Automation
C471.4	Knowledge of robotics motion and sensors
C471.5	Write the program for Robot for various Application
C471.6	Knowledge of Robotic Control system and machine vision

Subject Code / Subject Name: 10MT72: Thermal Engineering

C472.1	Understand the concepts of systems ,energy interaction in systems and types
C472.2	Understand the energy interaction and thermodynamics equlibriunm
C472.3	Know the thermodynamics concepts related terms
C472.4	Understand the difference between heat and work different process related to work
C472.5	Know the first law of thermodynamics to cyclic process and properties
C472.6	Understand steady floe energy equation for open system

Subject Code / Subject Name: 10MT73 - Signal Processing

C473.1	Gain the Knowledge of signals and system transformation and filter
C473.2	Understand time domain ,frequency domain signals analog and digital system
C473.3	Operate on signals and systems to bring out this characteristics and desired information
C473.4	Design Analog and Digital filters and implement discrete time systems
C473.5	Understand the basics of convolution sum and integral
C473.6	Properties of signals signal operation

Subject Code / Subject Name: 10MT743- Real Time System

C474.1	Explain the types of real time systems and their properties
C474.2	Know concept of computer control
C474.3	Understand hardware and software requirements
C474.4	Know the languages for real time application
C474.5	Know the concept & working operation of operating systems
C474.6	Design RTSS and RTS developing Methodologies

Subject Code / Subject Name: 10MT753 Safety & Security Of System

C475.1	Have knowledge of IC Engines
C475.2	Have knowledge of Fuel ,ignition, Lighting System
C475.3	Understand the working principle of Transmission System
C475.4	Understand the working principle of gear box
C475.5	Understand the working principle of Lubrication System
C475.6	Know about CMV safety rules

Subject Code / Subject Name: 10MT81 Automotive Electronics &Hybrid vehicle

C481.1	Have knowledge of automotive electronics domain of various engine parts
C481.2	Have knowledge of automotive electronics sensors and types of sensors

C481.3	Know the electronics domain of various engine parts sensors, actuators, communication and measurement system
C481.4	Understanding engine parameters and a critical awareness of current problems with in the automotive electronics domain using various measurement technology
C481.5	Determine the extent and nature of electronic circuitry in automotive system including monitoring and control circuits for engines transmissions, brakes, steering, suspension, climate control system
C481.6	Understand the monitoring and control circuits for engines and instrumentations and radios and accessories involved in automotive industry

SUBJECT CODE / SUBJECT NAME: 10MT82- COMMUNICATION SYSTEM

C482.1	Know about communication systems, transmitter, receiver and modulation in communication system.
C482.2	Know concepts of amplitude modulation and its types, coherent detection of different signals.
C482.3	Gain knowledge on angle modulation and demodulation, FM and its types.
C482.4	Gain knowledge on phase locked loop, linear and nonlinear effects in FM systems.
C482.5	Know different waveform coding techniques.
C482.6	Gain knowledge on spread spectrum modulation, digital multiplexers and its types.

SUBJECT CODE / SUBJECT NAME: 10MT83 –ARTIFICIAL INTELLIGENCE

C483.1	Understand the importance of Artificial systems, their domain details.
C483.2	Analyze the different Techniques used and algorithm applied to the system along with the system characteristics.
C483.3	Gain Knowledge of Artificial Intelligence, Production Rules, Search Algorithms, Expert System & its architectures, Machine Learning.
C483.4	Understand the working methodology of Search Algorithms, Expert System & Machine Learning.
C483.5	Ability to apply Artificial Intelligence techniques for problem solving.
C483.6	Explain the limitations of current Artificial Intelligence techniques.

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Department of Physics

Vision of the Institute

To be a respected and most sought after engineering educational institution engaged in equipping individuals capable of building learning organizations in the new millennium.

Mission of the Institute

To develop competent students with good value systems and face challenges of the continuously changing world.

Vision of the Department

To inculcate interest in Physics and promote the understanding of it, and also to develop observational and computational skills, which will take the development in technology to new heights.

Mission of the Department

The department has been working towards fulfilling its vision through a synergic combination of teaching and research. The department also strives to promote excellence in technical education and scientific research through the effective use of Physics in real time engineering problems

Program Specific Objectives

PSO 1**:** Learn & understand more about basic principles & to develop problem solving skills and implementation in technology

PSO 2**:** Study of material properties and their applications is the prime role to understand and use in engineering applications and studies

PSO 3: Develop skills to impart practical knowledge in real time solution

PSO 4**:** Understand measurement technology, usage of new instruments and real time applications in engineering studies

Course Name: 15PHY12/22 (Engineering Physics)

CO1	Learn & understand more about basic principles & to develop problem solving skills and implementation in technology
CO2	Gain knowledge about modern about modern physics and quantum mechanics will update the basic concepts to implement the skills.
CO3	Study of material properties and their applications is the prime role to understand and use in engineering applications and studies
CO4	Study lasers and optical fibres and its applications are to input knowledge and to develop skills and to use modern instruments in the engineering applications
CO5	Understand crystal structure and applications are to boost the technical skills and its applications
CO6	Expose shock waves concepts and its applications will bring latest technology to the students at the first year level to develop research orientation programs at higher semester level
CO7	Understand basic concepts of nano science and technology

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PG COURSE OUTCOMES

Department Of

MBA Vision of the

Institute

To be a respected and sought-after group of educational institutions, we are very much engaged in equipping individuals to be capable of building learning organization in the new millennium

Mission of the Institute

To develop competent students with good value systems and face challenges of the continuously changing world

Vision of the Department

To impart value-based management education to the students, to nurture and enhance their competencies and to prepare them to face the challenges of industry, society and country

Mission of the Department

To provide integrated knowledge and demonstrated ability to the students and to groom them towards building their careers as well equipped professional. To foster a passion for learning, creative thinking, leadership skills that helps in developing entrepreneurial abilities among the students.

Program Educational Objectives

PEO1: To equip the students with necessary knowledge and managerial skills to occupy positions of management and administration in business, industry, public system and the government

PEO2: To inculcate appropriate ethical values and attitudes among students to function effectively in the work environment

PEO3: To provide a right mix of managerial and business exposure to function effectively in various domains of management

Program Specific Objectives

PSO1.To attain sufficient theoretical knowledge in areas of General Management, Marketing, Finance, Human Resources, Economics, Statistics and its application to solve practical problems in business.
PSO2. An ability to demonstrate interpersonal skills, problem solving skills, and leadership qualities to facilitate management graduates to adapt to changes in the environment for self-sustenance and to enable lifelong learning
PSO3. To in still a practice of professional standards and ethics and a sense of social responsibility in every management graduate.

Course Name: 16MBA11 (Management & Organizational Behaviour)

C111.1	Comprehend & correlate all the management functions which are happening around with fundamental concepts and principles of management.
C111.2	Understand the overview of management, theory of management and practical applications of the same.
C111.3	Effectively use their skills for self-grooming, working in groups and to achieve organizational goals
C111.4	Demonstrate their acumen in applying managerial and behavioral concept in real world/situation.

Course Name: 16MBA12 (Economics for Managers)

C112.1	Equipped with the skill to apply the theory of demand, theory of production and cost in decision making
C112.2	Differentiate between various markets structure, functioning and pricing decisions.
C112.3	Acquire the knowledge of indian industrial policies, its impact on industrial
	development so as to develop proper strategy in day to day management.

Course Name: 16MBA13 (Accounts for Managers)

C113.1	Acquire the knowledge about the concepts and fundamental principles of accounting.
C113.2	Demonstrate theoretical knowledge and its application in real time accounting.
C113.3	Capable of preparing financial statement of sole trading concerns and companies.
C113.4	Independently undertake financial statement analysis and take decisions
C113.5	Comprehend emerging trends in accounting and taxation.

Course Name: 16MBA14 (Quantitative Methods)

C114.1	Understand and applying descriptive statistical tools in business situations.
C114.2	Exhibit the skills in developing and applying probability distribution concepts in business and real time scenario.
C114.3	Exhibit the skills in developing and applying probability distribution concepts in business and real time scenario.
C114.4	Develop mathematical models using Linear Programming technique.
C114.5	Illustrate the use of network techniques for successful project implementation

Course Name: 16MBA15(Marketing Management)

C115.1	Acquire knowledge regarding basic concepts and functions of Marketing Management.
C115.2	Apply various marketing concepts to solve day-to-day corporate problems.
C115.3	Learn various strategies which enable decision making process.
C115.4	Study ever-changing environment and use of appropriate models and techniques of Marketing
C115.5	Synthesize ideas into a viable marketing plan

Course Name: 16MBA16 (Managerial Communication)

C116.1	Describe and develop written and oral communication.
C116.2	Independently prepare business letters and reports
C116.3	Exhibit, develop and apply negotiation strategies.

C116.4	Gain exposure to media management and demonstrate the skill in analyzing business situation.

Course Name: 16MBA21(Human Resource Management)

C121.1	Synthesize information regarding the effectiveness of recruiting methods & selection procedures
C121.2	Identify the various training methods and design a training program
C121.3	Design a job description and job specification for various levels of employees
C121.4	List out the regulations governing employee benefit practices.

Course Name: 16MBA22 (Financial Management)

C122.1	Understand the basic financial concepts
C122.2	Apply time value of money
C122.3	Evaluate the investment decisions
C112.4	Analyze the capital structure and dividend decisions.
C112.5	Estimate working capital requirements.

Course Name: 16MBA23 (Research Methods)

C123.1	Understand various research approaches, techniques and strategies in the appropriate in business.
C123.2	Apply a range of quantitative / qualitative research techniques to business and day to day management problems
C123.3	Demonstrate knowledge and understanding of data analysis, interpretation and report writing
C123.4	Develop necessary critical thinking skills in order to evaluate different research approaches in Business.

Course Name: 16MBA24 (Business Law & Policy)

C124.1	Demonstrate awareness towards legal and regulatory context of business
C124.2	Recognize and appropriately respond to ethical, legal and strategic concerns relating to human resource and organizational management
C124.3	Gain insights into various acts and understand the significance of corporate governance

Course Name: /Strategic Management

C125.1	Formulate a strategic plan that operationalizes the goals and objectives of the firm.
C125.2	Use management concepts to analyze complex business situations
C125.3	Associate with various Strategic Management models for Business situations

C125.4	Ability to evaluate and critique theories and models in corporate environment.

Course Name: 16MBA26(Entrepreneurship Development)

C126.1	Display keen interest and orientation towards entrepreneurship
C126.2	Develop a business plan
C126.3	Become aware about various sources of funding for an entrepreneur including financial institutions, venture capitalists and Angel Investors
C126.4	Gain consciousness towards social entrepreneurship and rural entrepreneurship opportunities

Course Name: 14MBAMM301(Consumer Behaviour)

C231.1	Explain the background and concepts vital for understanding Consumer Behaviour.
C231.2	Identify the role of variables that determines Consumer Behaviour in Social & cultural domain
C231.3	Identifying the psychological and behavioural practices adopted by organizations to enhance the Consumer Behaviour.

Course Name: (Retail Management)

C232.1	Find out the contemporary retail management, issues, and strategies
C232.1	Evaluate the recent trends in retailing and its impact in the success of modern business.
C232.3	Relate store management and visual merchandising practices for effective retailing.

Course Name:14MBAMM303 (Service Management)

C233.1	Develop an understanding about the various concepts and importance of Services Marketing.
C233.2	Enhance knowledge about emerging issues and trends in the service sector.
C233.3	Learn to implement service strategies to meet new challenges.

Course Name: 14MBAFM301 (Principles and Practices of Banking)

C234.1	Understand the banking system in India
C234.2	Know the nature of banker – customer relationship
C234.3	Make use of Negotiable instruments practically
C234.4	Have familiarity in using banking technologies like internet banking, Mobile banking, NEFT, ECS etc.
C234.5	Understand the concept of international banking and management of asset and liability in banks

Course Name: 14MBAFM302(Investment Banking & Financial Services)

C235.1	Understand the functioning of Investment banking
C235.2	Be aware of operation connected with depositories and custodians
C235.3	Know how financial services likefactoring, venture capital, leasing and hire purchase are provided in the financial system.
C235.4	Understand the working of Housing finance and non-banking finance companies.
C235.5	Identify the developments happening in micro finance, credit rating and securitization system.

Course Name: 14MBAFM303 (Investment Management)

C236.1	Understand the process of investments.
C236.2	Get an insight into functioning of stock markets in India and abroad.
C236.3	Have insight into the relationship of the risk and return.
C236.4	Have familiarity of the fundamental and technical analysis
C236.5	Learn the Theories of Portfolio management and also the tools and techniques for efficient portfolio management.

Course Name: 14MBAHR301(Industrial Relations & Legislations)

C237.1	Gain the insights of IR practices in the industry.
C237.2	Develop the knowledge related to employee-management relations
C237.3	Implementation of various industrial acts

Course Name: 14MBAHR302(Recruitment & Selection)

C238.1	Learn the various recruitment policies and procedures.
C238.2	To provide a conceptual framework of Selection Procedure in the Industry.
C238.3	To understand the new concepts and techniques of recruitment and Selection in the Corporate

Course Name: 14MBAHR303(Compensation & Benefits)

C239.1	Gain insights of various conceptual aspects of Compensation and Benefits.
C239.2	Determine the performance based compensation system for business excellence.
C239.3	Understand the Legal & Administrative Issues in Compensation Global Compensation.

Course Name: 14MBAMM407(Sales Management)

C241.1	Know the distinction between the skills required for selling and sales management
C241.2	Develop a plan for organising, staffing & training sales force.
C241.3	Organise sales territories to maximize selling effectiveness.
C241.4	Evaluate sales management strategies.

Course Name: (Integrated Marketing Communication)

C242.1	Define and apply knowledge of various aspects of managerial decision making related to marketing communications strategy and tactics.
C242.2	Ability to create an integrated marketing communications plan which includes promotional strategies.
C242.3	Explain the role of IMC in the overall marketing &Use effectiveness measures to evaluate IMC strategies.

Course Name: 14MBAMM409(E-Marketing)

C243.1	Recognize appropriate e-marketing objectives.
C243.2	Appreciate the e-commerce framework and technology.
C243.3	Illustrate the use of search engine marketing, online advertising and marketing strategies.

Course Name: 14MBAFM407(Mergers, Acquisitions & Corporate Restructuring)

C244.1	Understand corporate merger and acquisition activity
C244.2	Analyze the mergers & acquisition deals that have taken place in the recent past
C244.3	Understand synergies of mergers & acquisition deals.
C244.4	Compute the valuation associated with M&A.
C244.5	Understand the human and cultural aspects of M&A's

Course Name: 14MBAFM408(Risk Management & Insurance)

C245.1	Understand the process of identifying the risk
C245.2	Recognize the complexities involved in risk identification and measurement
C245.3	Be acquainted with the function of Insurance in risk management.
C245.4	Be aware of various types of insurance contracts.
C245.5	Understand working of insurance companies.

Course Name: 14MBAFM409(Tax Management)

C246.1	Understand the process of computing residential status.
C246.2	Realize the complexities involved in tax liability of Individuals
C246.3	Know the corporate tax system.
C246.4	Be aware of deductions and exemptions of taxes

Course Name: 14MBAHR407(Public Relations)

C247.1	Gain the insights of Public relations principles and practices.
C247.2	Learn the various theories of mass communication
C247.3	Understand the various issues in crisis management

Course Name: 14MBAHR408(Work Place Ethics & Value Systems)

C248.1	Learn the principles and practices of workplace ethics.
C248.2	Understand the concepts of corporate governance and ethics.
C248.3	Gain insights of Discrimination and Harassment at Workplace

Course Name: 14MBAHR409(International Human Resource Management)

C249.1	Apply the concepts and knowledge about the range of Human Resource functions.
C249.2	Deploy the expatriate employees and expatriate failures on international assignments.
C249.3	Evaluate the effects of different Human Resource and International Industrial Relations strategies adopted by multinational organizations

Course Name : 14MBA48(Internship/Project work)

C2410.1	To understand the working of the organization/Company/industry
C2410.2	To take up an in-depth study of an issue/problem in the area of Marketing/Finance/Human Resources
C2410.3	Knowledge of comprehending the data collected and editing, tabulating and presenting for analysis.

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Department of MCA

Vision of the Institute

To be a respected and most sought after engineering educational institution engaged in equipping individuals capable of building learning organizations in the new millennium

Mission of the Institute

To develop competent students with good value systems and face challenges of the continuously changing world

Vision of the Department

With a vision to be a respected and sought after group of educational institutions, we are very much engaged in equipping individuals to be capable of building learning organization in the new millennium

Mission of the Department

Our mission is to develop competent students with good value systems to face challenges of the continuously changing world.

Program Educational Objectives

PEO1:	Exhibit their expertise in problem Solving skills through design, analysis, Implementation and evaluation of hardware and software systems.
PEO2:	Engage in the Computer Science and Applications related Profession locally and globally by contributing ethically to the competent and professional practices.
PEO3:	Effectively adapt as individuals and as team members in multidisciplinary projects involving technical, managerial, economical and social constraints.
PEO4:	Demonstrate Leadership and Entrepreneurship Skills by incorporating organizational goals and providing facilities for peer members with defined objective
PEO5:	Develop Communication Skills necessary to function productively to achieve successful professional career with integrity and societal commitments

Program Specific Objectives

PSO1:	The graduates of the Program will have firm foundation in understanding and applying the principles of mathematics, computing techniques and its applications.
PSO2:	The graduates of the Program will have skills to develop, deploy ad maintain applications for desktop, web, mobile, cloud and cross platforms using modern tools and technologies.
PSO3:	The graduates of the Program will be prepared to achieve their career goals in the software industry or pursue higher studies and enhance their professional knowledge.
PSO4:	The graduates of the program will practice the profession with ethics, integrity, leadership and social responsibility.

Program Outcomes

1.	Computational Knowledge: Apply knowledge of computing fundamentals, computing specialization, mathematics, and domain knowledge appropriate for the computing specialization to the abstraction and conceptualization of computing models from defined problems and requirements
2.	Problem Analysis: Identify, formulate, research literature, and solve complex computing problems reaching substantiated conclusions using fundamental principles of mathematics, computing sciences, and relevant domain disciplines.

3.	Design /Development of Solutions: Design and evaluate solutions for complex computing problems, and design and evaluate systems, components, or processes that meet specified needswith appropriate consideration for public health and safety, cultural, societal, and environmental considerations.
4.	Conduct Investigations of Complex Computing Problems: Use research-based knowledge and research methods including design of experiments, analysis and interpretation of data,
	and synthesis of the information to provide valid conclusions.
5.	Modern Tool Usage: Create, select, adapt and apply appropriate techniques, resources, and modern computing tools to complex computing activities, with an understanding of the limitations.Program Outcomes (POs) defined by NBA.
6.	Professional Ethics: Understand and commit to professional ethics and cyber regulations, responsibilities, and norms of professional computing practice.
7.	Life-long Learning: Recognize the need, and have the ability, to engage in independent learning for continual development as a computing professional.
8.	Project management and finance: Demonstrate knowledge and understanding of the computing and management principles and apply these to one's own work, as a member and leader in a team, to manage projects and in multidisciplinary environments.
9.	Communication Efficacy: Communicate effectively with the computing community, and with society at large, about complex computing activities by being able to comprehend and write effective reports, design documentation, make effective presentations, and give and understand clear instructions.
10.	Societal and Environmental Concern: Understand and assess societal, environmental, health, safety, legal, and cultural issues within local and global contexts, and the consequential responsibilities relevant to professional computing practice.
11.	Individual and Team Work: Function effectively as an individual and as a member or leader in diverse teams and in multidisciplinary environments.
12.	Innovation and Entrepreneurship: Identify a timely opportunity and using innovation to pursue that opportunity to create value and wealth for the betterment of the individual and society at large.

Course Name: Data Structures Using C(16MCA11)

CO1	Understand basics of C programming languageAcquire knowledge of - Various types of data structures, operations and algorithms - Sorting and searching operationsAcquire knowledge of
CO2	Acquire knowledge of - Various types of data structures, operations and algorithms - Sorting and searching operations
CO3	Analyze the performance of - Stack, Queue, Lists, Trees, Hashing, Searching and Sorting techniques
CO4	Implement all the applications of Data structures in a high-level language
CO5	Design and apply appropriate data structures for solving computing problems.

Course Name: UNIX Programming(16MCA12)

CO1	Understand and experience the UNIX environment, File system and hierarchy
CO2	Demonstrate commands to extract, interpret data for further processing.
CO3	Apply commands to perform different tasks on various applications
CO4	Analyze the usage of different shell commands, variables and AWK filtering.
CO5	Evaluate different commands with sample shell scripts

Course Name: UNIX Programming(16MCA12)

CO1	Understand and experience the UNIX environment, File system and hierarchy
CO2	Demonstrate commands to extract, interpret data for further processing.
CO3	Apply commands to perform different tasks on various applications
CO4	Analyze the usage of different shell commands, variables and AWK filtering.
CO5	Evaluate different commands with sample shell scripts

Course Name: Web Technologies(16MCA13)

CO1	Understand and experience the UNIX environment, File system and hierarchyUnderstand the fundamentals of web and thereby develop web applications using various development languages and tools.
CO2	Build the ability to select the essential technology needed to develop and implement web application
CO3	Use Scripting language utilities for static and dynamic environment
CO4	Design XML document with presentation using CSS and XSLT.
CO5	Develop CGI applications using PERL.

Course Name: Computer Organization(16MCA14)

CO1	Understand the Basics of Digital System
CO2	Understand the Basics of Computer System Organization
CO3	Apply the concepts of the number system in Designing Digital System.
CO4	Analyze the need of Logic circuits in digital system
CO5	Create logic circuits for real time requirement

Course Name: Discrete Mathematical Structures(16MCA15)

CO1	Use the logical notation to define and reason about fundamental mathematical concepts such as sets, relations, functions, and integers.
CO2	Calculate numbers of possible outcomes of elementary combinatorial processes such as permutations and combinations.
CO3	Calculate probabilities and conditional probabilities.
CO4	Apply graph theory models of data structures and state machines to solve problems of connectivity and constraint satisfaction, for example, scheduling.

Course Name: Data Structures Using C Laboratory(16MCA16)

CO1	Apply data structure concepts to develop interactive applications in C
CO2	Linear data structures and their applications such as Stacks, Queues and Lists
CO3	Non-Linear Data Structures and their Applications
CO4	Be fluent in the use of different types of sorting and searching techniques

Course Name: UNIX Programming Laboratory(16MCA17)

CO1	Understand the Unix programming environment.
CO2	Be fluent in the use of Vi editor
CO3	Be able to design and implement shell scripts to manage users with different types of permission and file based applications
CO4	Be fluent to write Awk scripts

Course Name: Web Programming Laboratory(16MCA18)

CO1	Understand the concept and usages web based programming techniques.
CO2	Learning and developing XHTML documents using JavaScript and CSS

CO3	To be familiar in the use of CGI and Perl programs for different types of server applications.
CO4	Design and implement user interactive dynamic web based applications.

Course Name: Python Programming(16MCA21)

CO1	Understand and comprehend the basics of python programming.
CO2	Apply knowledge in real time applications.
CO3	Understands about files and its applications.

Course Name: Object Oriented Programming Using C++(16MCA22)

CO1	Differentiate between object oriented programming and procedure oriented programming & Disseminate the importance of Object oriented programming
CO2	Apply C++ features such as Classes, objects, constructors, destructors, inheritance, operator overloading, and Polymorphism, Template and exception handling in program design and implementation.
CO3	Use C++ to demonstrate practical experience in developing object-oriented solutions.
CO4	Analyze a problem description and build object-oriented software using good coding practices and techniques.
CO5	Implement an achievable practical application and analyze issues related to object-oriented techniques in the C++ programming language.

Course Name: Database Management System(16MCA23)

CO1	Demonstrate the fundamentals of data models and conceptualize and depict a database system and Make use of ER diagram in developing ER Model
CO2	To Summarize the SQL and relational database design
CO3	Illustrate transaction processing, concurrency control techniques and recovery
CO4	Inference the database design in the real world entities.

Course Name: Operating Systems(16MCA24)

CO1	Understand the Basics of Computer and Operating Systems Structure
CO2	Realize the concept of Process Management and Mutual Execution
CO3	Understand the concepts of the Deadlock and different approaches to memory management.
CO4	Learn the concepts of file system
CO5	Understand the concepts of Computer Security.

Course Name: System Software(16MCA25)

CO1	Understand the introductory concepts of system software, SIC and SIC/XE machine architecture.
CO2	Understand the design and implementation of Assemblers with implementation examples.
CO3	Design and implement the linkers and loaders, macro processors and respective implementation examples
CO4	Learn the basic design and working of compilers.

Course Name: Python Programming Laboratory(16MCA26)

CO1	Apply object-oriented programming concepts to develop dynamic interactive Python applications.
CO2	Use the procedural statements: assignments, conditional statements, loops, method calls and arrays
CO3	Design, code, and test small Python programs with a basic understanding of top-down design
CO4	Learn how to create GUI andsolve real-world problem using language idioms, data structures and standard library

Course Name: Object Oriented Programming Using C++ Laboratory(16MCA27)

CO1	Apply and implement major programming and object oriented concepts like function overloading, operator overloading, Encapsulations, and inheritance, message passing to solve real-world problems.
CO2	Use major C++ features such as Virtual functions, Templates for data type independent designs and File I/O to deal with large data sets
CO3	Analyze, design and develop solutions to real-world problems applying OOP Concepts of C++.

Course Name: Database Management Systems Laboratory(16MCA28)

CO1	Understand, appreciate the underlying concepts of database technologies
CO2	Able to create database with different types of integrity constraints and use the SQL commands such as DDL, DML, DCL, TCL to access data from database objects.
CO3	Design and implement a database schema for a given problem domain
CO4	Perform embedded and nested queries. Take up real world problems independently

Course Name: Computer Networks(16MCA31)

CO1	UUnderstand the types of Networks & Communication medias.
CO2	Identify the components required to build different types of networks
CO3	Understand the functionalities needed for data communication into layers
CO4	Choose the required functionality at each layer for given application
CO5	Understand the working principles of various application protocols

Course Name: Java Programming(16MCA32)

CO1	Understand the basic programming constructs of Java. Apply suitable OOP concepts to develop Java programs for a given scenario.
CO2	Illustrate the concepts of Generalization and run time polymorphism applications
CO3	Exemplify the usage of Packages, Interfaces, Exceptions and Multithreading
CO4	Demonstrate Enumerations, Wrappers, Auto boxing, Generics,collection framework and I/O operations
CO5	Implement the concepts of Networking using Java network classes

Course Name: Analysis and Design of Algorithms(16MCA33)

CO1	Categorize problems based on their characteristics and practical importance.
CO2	Develop Algorithms using iterative/recursive approach
CO3	Compute the efficiency of algorithms in terms of asymptotic notations
CO4	Design algorithm using an appropriate design paradigm for solving a given problem
CO5	Classify problems as P, NP or NP Complete. Implement algorithms using various design strategies and determine their order ofgrowth.

Course Name: Software Engineering16MCA34)

CO1	Categorize problems based on their characteristics and practical importance.
CO2	Apply the correct process models for software development.
CO3	Apply the techniques, skills, and modern engineering tools necessary for engineering practice.
CO4	Define, formulate and analyze a problem as per the testing techniques.
CO5	Apply new Generation of Software Engineering Technology to Meet Current and Future Industrial Challenges of Emerging Software Trends.

Course Name: CYBER SECURITY(16MCA354)

CO1	Define and illustrate cyber security concepts and applications
CO2	Analyze the working of cyber security principles to system design
CO3	Illustrate appropriate techniques to solve cyber security threats
CO4	Evaluate and implement cyber security through network security protocols

Course Name: Computer Networks Laboratory(16MCA36)

CO1	Understandthe basic terminologies used for computer networking.
CO2	Understand the functions of layers in the Internet Model.
CO3	Demonstrate application layer protocols used for process to process communication.
CO4	Demonstrate subnetting and routing mechanisms for a given network topology. Exemplify link layer functionalities.
CO5	Describe the components and working of wireless networks

Course Name: Java Programming Laboratory(16MCA37)

CO1	Understand Java programming language fundamentals and run time environment.
CO2	Acquire knowledge and skill necessary to write java programs.
CO3	Learn the object oriented concepts and its implementation in Java
CO4	Implement the multithreading and client side programming

Course Name: Analysis and Design of Algorithms Laboratory(16MCA38)

CO1	Implement the concepts of time and space complexity, divide-and-conquer strategy, dynamic programming, greedy and approximate algorithms.
CO2	Describe the methodologies of how to analyze an algorithm
CO3	Choose a better algorithm to solve the problems

Course Name: Advanced Java Programming(16MCA41)

CO1	Learn the concept of Servlet and its life cycle
CO2	Understand JSP tags and its services
CO3	Create packages and interfaces
CO4	Build Database connection
CO5	Develop Java Server Pages applications using JSP Tags. Develop Enterprise Java Bean Applications

Course Name: Advanced Web Programming(16MCA42)

CO1	Acquire knowledge of - Build the Web Applications using JQuery, PHP, Ruby and D3.js. - Model-View-Controller (MVC) Architecture.
CO2	Design the Web Pages using Ruby, Rails and Layouts.
CO3	Apply the knowledge gained in the Building a web portals.
CO4	Evaluate web site performance against user acceptance testing.
CO5	Develop Java Server Pages applications using JSP Tags. Develop Enterprise Java Bean Applications

Course Name: Software Testing and Practices(16MCA43)

CO1	Acquire knowledge of basic principles and knowledge of software testing and debuggingand test cases.
CO2	Understand the perceptions on testing like levels of testing, generalized pseudo code and with related examples
CO3	Study the various types of testing.
CO4	Analyze the difference between functional testing and structural testing.
CO5	Analyze the performance of fault based testing

Course Name: Data Warehousing And Data Mining(16MCA442)

CO1	Learn the concept of Data warehousing and OLAP.
CO2	Understand storage and retrieval technique of data from DATA CUBE.
CO3	Analyze different types of data and different preprocessing techniques.
CO4	Evaluate various Association algorithms and its applications. Apply different Classification technique.
CO5	Evaluate different types of classifiers. Analyze different clustering techniques and their applications

Course Name: Software Architecture(16MCA443)

CO1	Acquire knowledge of - working principles, characteristics and basic applications of Architectural patterns. - project life cycle context. - how the architecture is influenced. - the quality attributes of architecture.
CO2	Modeling quality attributes through - check lists. - experiments. - back-of-the envelope analysis.

CO3	Understand the techniques of requirements gathering through interviewing stake holders, etc.
CO4	Understand different types of design patterns.

Course Name: Big Data Analytics(16MCA452)

CO1	Understand the Map Reduce technique for solving Big Data problems
CO2	Understand algorithms for Big Data by deciding on the apt Features set
CO3	Analyze main memory consumption for Big Data analytics
CO4	Analyze main memory consumption for Big Data analytics
CO5	Understand and analyze the usage of map reduce techniques for solving big data problems

Course Name: Principles of User Interface Design(16MCA454)

CO1	Use the new technologies that provide interactive devices and interfaces.
CO2	Apply the process and evaluate UID.
CO3	Understand Direct Manipulation and Virtual Environment
CO4	Discuss the command, natural languages and issues in design for maintaining QoS
CO5	Persuade user documentations and information search.

Course Name: Advanced Java Programming Laboratory(16MCA46)

CO1	Designing HTML pages to demonstrate Java Servlets, JSP, Bean and EJB programs.
CO2	Implementing Dynamic HTML using Servlet and demonstration of service methods, auto web page refresh, Session tracking using cookie and Http Session in Servlet.
CO3	Learn the fundamental of connecting to the database.
CO4	Demonstrate JSP (page attributes, action tags and all basic tags) and types of EJB application

Course Name: Advanced Web Programming Laboratory(16MCA47)

CO1	Understand, analyze and apply the role of server side scripting languages
CO2	Build web application using PHP, Ruby, jQuery, XML and store values in MYSQL.
CO3	Build web applications consisting of graphs using D3.JS.
CO4	Analyze a web project and identify its elements and attributes In comparison to traditional projects.

Course Name: Software Testing Laboratory16MCA48)

CO1	Analyze the performance of fault based testing, planning and Monitoring the process, Documentation testing
CO2	This course provides to experience on software testing projects using software testing tools.
CO3	Understand the process to be followed in software development life cycle.JS.
CO4	Practical solutions to the problems. Define, formulate and analyze a problem.

Course Name: Object-Oriented Modeling And Design Patterns(16MCA51)

CO1	Acquire knowledge of - Basic UML Concepts and terminologies - Life Cycle of Object oriented Development - Modeling Concepts
CO2	Identify the basic principles of Software modeling and apply them in real world applications
CO3	Produce conceptual models for solving operational problems in software and IT environment using UML
CO4	Analyze the development of Object Oriented Software models in terms of - Static behaviour - Dynamic behaviour
CO5	Evaluate and implement various Design patterns

Course Name: Programming Using C# & .NET(16MCA52)

CO1	Understand C# and client-server concepts using .Net Frame Work Components
CO2	Apply delegates, event and exception handling to incorporate with ASP, Win Form, ADO.NET
CO3	Analyze the use of .Net Components depending on the problem statement.
CO4	Implement & develop a web based and Console based application with Database connectivit

Course Name: Mobile Applications(16MCA53)

CO1	Illustrate effective user interfaces that leverage evolving mobile device capabilities
CO2	Develop applications using software development kits (SDKs), frameworks and toolkits
CO3	Establish various methods to integrate database and server-side technologies
CO4	Design and develop open source software based mobile applications

CO5	Build and deploy competent mobile development solutions

Course Name: Cloud Computing(16MCA542)

CO1	Understand the cloud computing delivery model and the enabling technologies.
CO2	Understand the cloud computing platforms, key technology drivers and cloud programming/software environments
CO3	Identify the need for cloud computing model and compare various key enabling technologies.
CO4	Analyze and choose an appropriate programming environment for building cloud applications.

Course Name: Internet of Things (IoT)(16MCA552)

CO1	Understand constraints and opportunities of wireless and mobile networks for Internet of Things.
CO2	Analyze the societal impact of IoT security events
CO3	Develop critical thinking skills.
CO4	Analyze, design or develop parts of an Internet of Things solution and map it toward selected business model(s)
CO5	Evaluate ethical and potential security issues related to the Internet of Things.

Course Name: Software Project Management(16MCA554)

CO1	Understand the practices and methods for successful software project management.
CO2	Identify techniques for requirements, policies and decision making for effective resource management
CO3	Apply the evaluation techniques for estimating cost, benefits, schedule and risk
CO4	Devise a framework for software project management plan for activities, risk, monitoring and control
CO5	Devise a framework to manage people

Course Name: Software Design Laboratory(16MCA56)

CO1	Understand the fundamental principles of Object-Oriented analysis, design,
	development and programming
CO2	Demonstrate and represent the UML model elements, to enable visual representation of the system being developed
CO3	Implement object oriented design model with the help of modern tool, Rational software Architect

CO4	Analyze and differentiate the static and dynamic behavior of the system for achieving the intended functionalities of the system
CO5	Evaluate Various design patterns for applicability, reasonableness, and relation to other design criteria

Course Name: .Net Laboratory(16MCA57)

CO1	Understand C# and client-server concepts using .Net Frame Work Components
CO2	Apply delegates, event and exception handling to incorporate with ASP, Win Form, ADO.NET
CO3	Analyze the use of .Net Components depending on the problem statement
CO4	Implement & develop a web based and Console based application with Database connectivity

Course Name: Mini Project Mobile Applications(16MCA58)

CO1	Illustrate effective user interfaces that leverage evolving mobile device capabilities
CO2	Develop applications using software development kits (SDKs), frameworks and toolkits. Establish various methods to integrate database and server-side technologies
CO3	Design and develop open source software based mobile applications
CO4	Build and deploy competent mobile development solutions

Course Name: Project Work(16MCA61), Seminr(18MCA62)

CO1	Identify the suitable problem making use of techinical and engineering knowledge gained from previous courses with the awareness of impact of technology on the society and their ethical responsibilities
CO2	Ability to segregate work and execute/implement projects using appropriate tools
CO3	Develop skills to determine technical and general information by means of oral as well as written presentaion and profesional skills

Course Name: Project Work(16MCA61)

CO1	Illustrate effective user interfaces that leverage evolving mobile device capabilities
CO2	Develop applications using software development kits (SDKs), frameworks and toolkits. Establish various methods to integrate database and server-side technologies
CO3	Design and develop open source software based mobile applications
CO4	Build and deploy competent mobile development solutions

CHILDREN'S EDUCATION SOCIETY (Regd.)
THE OXFORD COLLEGE OF ENGINEERING
(Recognised by the Govt. of Karnataka, Affiliated to Visvesvaraya Technological University, Belagavi.
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M. Tech in Digital Electronics &Communication

Vision of the Institute

To be a respected and most sought after engineering educational institution engaged in equipping individuals capable of building learning organizations in the new millennium.

Mission of the Institute

To develop competent students with good value systems and face challenges of the continuously changing world.

Vision of the Department

To impart technical education par excellence and prepare leaders to serve the industries and society.

Mission of the Department

Mission 1. To Provide the world with a highly committed and quality conscious engineering workforce.

Mission 2. To Encourage the students to build self-help, Power of initiative, courage to change and create new things.

Mission 3. To inculcate the spirit of cooperation and capacity for organization with special emphasis on their self-reliance and sustainability tomeet ever changing requirements of local and global industries.

Program Educational Objectives

PEO 1.	Graduates apply their knowledge of mathematics and science to identify, analyze and solve problems in the field of Electronics & communication to develop sophisticated communication systems.
PEO 2.	Graduates to design and build up interdisciplinary systems by solving core engineering problems in communication systems which are technically sound, economically feasible and socially acceptable.
	Graduates exhibit desire for life-long learning which directs them to obtain thorough knowledge in their chosen fields and motivate them for higher studies/research.

Program Specific Objectives

PSO 1: An ability to understand the basic core courses of Electronics & Communication Engineering and to relate them to various areas of application like Communication Systems, control system, Signal processing, VLSI and Embedded systems.

PSO 2: Should have capability to apply modern tools to analyse and solve complex designs with optimal solutions for various real-world applications.

PSO 3: Excellent adaptability to changing work environment with good leadership qualities and zeal for social and environmental well-being.

Course Name: C101 (Advanced Engineering Mathematics-16ELD11)

C101.1	Understand vector spaces, basis, linear transformations and the process of obtaining matrix of linear transformations arising in magnification and rotation of images.
C101.2	Apply the techniques of QR and singular value decomposition for data compression, least square approximation in solving inconsistent linear systems.
C101.3	Learn the idea of random variables (discrete/continuous) and probability distributions in analyzing the probability models arising in control systems and system communications.
C101.4	Utilize the concepts of functional and their variations in the applications of communication systems, decision theory, synthesis and optimization of digital circuits.
C101.5	Apply the idea of joint probability distributions and the role of parameter-dependent random variables in random process.

Course Name: C102 (Antenna Theory and design-16ECS12)

C102.1	Classify different types of antennas
C102.2	Define and illustrate various types of array antennas
C102.3	Design antennas like Yagi-Uda, Helical antennas and other broad band antennas
C102.4	Describe different antenna synthesis methods
C102.5	Apply methods like MOM

Course Name: C103 (Advanced Embedded systems-16EVE13)

C103.1	Understand the basic hardware components and their selection method based on the characteristics and attributes of an embedded system.
C103.2	Explain the hardware software co-design and firmware design approaches.

C103.3	Acquire the knowledge of the architectural features of ARM CORTEX M3, a 32 bit Microcontroller including memory map, interrupts and exceptions.
C103.4	Apply the knowledge gained for Programming ARM CORTEX M3 for different Applications.

Course Name: C104 (Advanced Digital Communication-16ECS14)

C104.1	Acquire knowledge of application and practical implementation of various Digital Modulation techniques.
C104.2	Explain Inter symbol interference (ISI) and its channel modeling and different filtering algorithms for the ISI elimination.
C104.3	Explain different types spread spectrum system
C104.4	Identify the effect of signal characteristics on the choice of a channel model.
C104.5	Analyse the performance of Digital Modulation techniques, Different filtering algorithms and Spread spectrum communication system

Course Name:C105(Advanced Computer networks -16ECS151)

C105.1	Choose appropriate multiple access and multiplexing techniques as per the requirement
C105.2	Choose standards for establishing a computer network
C105.3	Identify switching techniques based on the applications of the network
C105.4	Identify IP configuration for the network with suitable routing, scheduling, error control and flow control
C105.5	Analyze and develop various network traffic management and control techniques

Course Name:C106 (Advanced Communication Lab-16ECSL16)

C106.1	Plot the radiation pattern of some antennas using Matlab and wave guide setup
C106.2	Obtain the S-parameters of Magic tee and directional couplers.
C106.3	Test the IC CD4051 for modulation techniques.
C106.4	Study multiplexing techniques using OFC kit.

Course Name:C111 (Advanced DSP -16ECS21)

C111.1	Design adaptive filters for a given application
C111.2	Design multirate DSP Systems
C111.3	Implement adaptive signal processing algorithm
C111.4	Design active networks
C111.5	Understand advanced signal processing techniques, including multi-rate processing and time-frequency analysis techniques

Course Name: C112 (Error Control Coding-16ECS22)

C113.1	Analyse a discrete memoryless channel, given the source and transition probabilities.
C113.2	Apply the concept of modern linear algebra for the error control coding technique.
C113.3	Construct and Implement efficient LBC, Cyclic codes etc encoder and decoders.
C113.4	Apply decoding algorithms for efficient decoding of Block codes and Convolutional codes.

Course Name: C113 (Wireless Communication -16ECS23)

C114.1	Acquire knowledge of characteristics of mobile/wireless communication channels
C114.2	Apply statistical models of multipath fading
C114.3	Understand the multiple radio access techniques
C114.4	Understand the need of coding, diversity, interleaving and link techniques for mo bile/wireless communications network
C114.5	Design receiver and transmitter diversity techniques
C114.6	Identify and describe modern techniques for high-rate wireless communications, using MIMO transmission

Course Name: C114 (RF and Microwave Circuit Design-16ECS24)

C115.1	Discuss and analyse waves propagation in Networks
C115.2	Apply the Smith Chart for finding various parameters in transmission lines
C115.3	Analyse the basic considerations in active networks
C115.4	Describe and design active networks
C115.5	Design RF/MW Frequency Mixers and phase shifters

Course Name: C115 (Multimedia Over Communication links-16ECS252)

C116.1	Understand basics of different multimedia networks and applications
C116.2	Analyze media types like audio and video to represent in digital form.
C116.3	Understand different compression techniques to compress audio.
C116.4	Understand different compression techniques to compress audio video.
C116.5	Describe the basics of Multimedia Communication Across Networks

Course Name: C116 (Advanced DSP Lab- 16ECSL26)

C116.1	Realize the following using Matlab -Response of LTI systems.
C116.2	Realize the following using Matlab - DFT and DCT & Decimation
C116.3	Realize the following using Matlab on Wavelet Transforms
C116.4	Implement the following using 6713 processor - Response of LTI systems and convolution.
C116.5	Implement the following using 6713 processor - FFT realization and DTMF generation

Course Name: C211 (Wireless Broadband LTE 4G - 16ECS41)

C211.1	Understand the system architecture and the function standard specified components of the system of LTE 4G.
C211.2	Analyze the role of LTE radio interface protocols and EPS Data convergence protocols to set up, reconfigure and release data and voice from a number of users.
C211.3	Demonstrate the UTRAN and EPS handling processes from set up to release including mobility management for a variety of data call scenarios.
C211.4	Test and Evaluate the Performance of resource management and packet data processing and transport algorithms.

Course Name: C212 (Advances in Image Processing - 16ECS422)

C212.1	Understand the representation of the digital image and its properties
C212.2	Apply pre-processing techniques required to enhance the image for its further analysis
C212.3	Use segmentation techniques to select the region of interest in the image for analysis
C212.4	Represent the image based on its shape and edge information.
C212.5	Describe the objects present in the image based on its properties and structure.

C212.6	Use morphological operations to simplify images, and quantify and preserve the main shape characteristics of the objects.

M. Tech in Digital Communication and Networking

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C102.2	Apply the techniques of QR and singular value decomposition for data compression in solving inconsistent linear systems.
C102.3	Apply the techniques of least square approximation in solving inconsistent linear systems.
C102.4	Utilize the concepts of functionals and their variations in the applications of communication systems, decision theory, synthesis and optimization of digital circuits.
C102.5	Learn the idea of random variables (discrete/continuous) and probability distributions in analyzing the probability models arising in control systems and system communications.
C102.6	Apply the idea of joint probability distributions and the role of parameter-dependent random variables in random process.

Course Name: C102 (Antenna Theory and Design- 16ELD11)

C202.1	Classify different types of antennas
C202.2	Define and illustrate various types of array antennas
C202.3	Design antennas like Yagi-Uda, Helical antennas and other broad band antennas
C202.4	Describe different antenna synthesis method
C202.5	Apply methods like MOM
C202.6	Describe different Resonant and Broadband antennas

Course Name: C103 (Advanced Embedded System - 16EVE13)

C203.1	Understand the basic hardware components and their selection method based on the characteristics and attributes of an embedded system.
C203.2	Explain the hardware software co-design approaches.
C203.3	Explain the firmware design approaches
C203.4	Acquire the knowledge of the architectural features of ARM CORTEX M3 32-bit microcontroller including memory map.
C203.5	Acquire the knowledge of the architectural features of ARM CORTEX M3, a 32-bit microcontroller including interrupts and exceptions.

C203.6	Apply the knowledge gained for Programming ARM CORTEX M3 for different applications.

Course Name: C104 (Advanced Digital Communication - 16ECS14)

C204.1	Acquire knowledge of application and practical implementation of various Digital Modulation techniques.
C204.2	Explain Inter symbol interference (ISI) and its channel modeling and different filtering algorithms for the ISI elimination.
C204.3	Explain different types spread spectrum system
C204.4	Identify the effect of signal characteristics on the choice of a channel model.
C204.5	Analyze the performance of Digital Modulation techniques
C204.6	Analyze the performance of Different filtering algorithms and Spread spectrum commu system

Course Name:C105(Advanced Computer Networks - 16ECS151)

C205.1	Choose appropriate multiple access and multiplexing techniques as per the requirement.
C205.2	Choose standards for establishing a computer network
C205.3	Identify switching techniques based on the applications of the network
C205.4	Identify IP configuration for the network with suitable routing, scheduling, error con flow control
C205.5	Analyze and develop various network traffic management techniques
C205.6	Analyze and develop various control techniques

Course Name: C106 (Advanced Communication Lab- 16ECSL16)

C212.1	Plot the radiation pattern of some antennas using Matlab and wave guide setup
C212.2	Obtain the S-parameters of Magic tee and directional couplers.
C212.3	Test the IC CD4051 for modulation techniques
C212.4	Study multiplexing techniques using OFC kit.
C212.5	Obtain the modes transit time, electronic timing range and sensitivity of Klystron source
C212.6	Obtain the VI characteristics of GUNN diode, and measurement of guide wave length, frequency, and VSWR.

Course Name: C110 (Advanced DSP- 16ECS21)

C216.1	Design adaptive filters for a given application
C216.2	Design Multirate DSP Systems
C216.3	Implement adaptive signal processing algorithm
C216.4	Design active networks
C216.5	Understand advanced signal processing techniques, including multi-rate processing
C216.6	Understand advanced signal processing techniques, time-frequency analysis techniques

Course Name:C301 (Error Control Coding - 16ECS22)

C301.1	Analyze a discrete memoryless channel, given the source and transition probabilities
C301.2	Apply the concept of modern linear algebra for the error control coding technique.
C301.3	Construct and Implement efficient LBC encoder and decoders.
C301.4	Construct and Implement efficient Cyclic codes encoder and decoders.
C301.5	Apply decoding algorithms for efficient decoding of Block codes.
C301.6	Apply decoding algorithms for efficient decoding of Convolutional codes.

Course: C302(Wireless Communication - 16ECS23)

C302.1	Acquire knowledge of characteristics of mobile/wireless communication channels
C302.2	Apply statistical models of multipath fading
C302.3	Understand the multiple radio access techniques
C302.4	Understand the need of coding, diversity, interleaving and link techniques for mo bile/wireless communications network
C302.5	Design receiver and transmitter diversity techniques
C302.6	Identify and describe modern techniques for high-rate wireless communications, using MIMO transmission

Course Name:C303(RF and Microwave Circuit Design - 16ECS24)

C303.1	Discuss and analyze waves propagation in Networks
C303.2	Apply the Smith Chart for finding various parameters in transmission lines
C303.3	Analyze the basic considerations in active networks
C303.4	Describe and design active networks

C303.5	Design RF/MW Frequency Mixers and phase shifters
C303.6	Design RF/MW control circuit design

Course Name:C304(Multimedia Over Communication links - 16ECS252)

C304.1	Understand basics of different multimedia networks and applications.
C304.2	Analyze media types like audio and video to represent in digital form.
C304.3	Understand different compression techniques to compress audio.
C304.4	Understand different compression techniques to compress audio video.
C304.5	Describe the basics of Multimedia Communication standards
C304.6	Describe the basics of Multimedia Communication Across Networks

Course Name: C306 (Advanced DSP Lab - 16ECSL26)

C306.1	Realize the Response of LTI systems using MATLAB
C306.2	Realize the DFT and DCT using MATLAB
C306.3	Realize the Decimation using MATLAB
C306.4	Realize Wavelet Transforms using MATLAB
C306.5	Implement the Response of LTI systems and convolution using 6713 processor
C306.6	Implement the FFT realization and DTMF generation using 6713 processor

Course Name: C210 (Wireless Broadband LTE 4G- 16ECS41)

C312.1	Understand the system architecture and the function standard specified components of the system of LTE 4G.
C312.2	Analyze the role of LTE radio interface protocols and EPS Data convergence protocols to set up, reconfigure and release data and voice from a number of users.
C312.3	Demonstrate the UTRAN handling processes from set up to release including mobility management for a variety of data call scenarios.
C312.4	Demonstrate the EPS handling processes from set up to release including mobility management for a variety of data call scenarios.
C312.5	Test the Performance of resource management and packet data processing and transport algorithms.
C312.6	Evaluate the Performance of resource management and packet data processing and transport algorithms.

Course Name:C211(Real Time Systems- 16ECS424)

C313.1	Analyze Real time operating systems.
C313.2	Describe the functions of Real time operating systems.
C313.3	Describe the multi resources services Real time operating systems.
C313.4	Demonstrate embedded system components
C313.5	Demonstrate embedded system applications.
C313.6	Design a Real Time operating system.

M. Tech in Digital VLSI Design and Embedded Systems

Course Name: C101 (Advanced Engineering Mathematics-16ELD11)

C101.1	Understand vector spaces, basis, linear transformations and the process of obtaining matrix of linear transformations arising in magnification and rotation of images.
C101.2	Apply the techniques of QR and singular value decomposition for data compression, least square approximation in solving inconsistent linear systems.
C101.3	Learn the idea of random variables (discrete/continuous) and probability distributions in analyzing the probability models arising in control systems and system communications.
C101.4	Utilize the concepts of functional and their variations in the applications of communication systems, decision theory, synthesis and optimization of digital circuits.
C101.5	Apply the idea of joint probability distributions and the role of parameter-dependent random variables in random process.

Course Name: C102 (DVD-16EVE12)

C102.1	Analyze issues of On-chip interconnect Modeling and Interconnect delay calculation.
C102.2	Analyze the Switching Characteristics in Digital Integrated Circuits.
C102.3	Use the Dynamic Logic circuits in state-of-the-art VLSI chips.
C102.4	Study critical issues such as ESD protection, Clock distribution, Clock buffering, and Latch phenomenon
C102.5	Use Bipolar and Bi-CMOS circuits in very high speed design.

Course Name: C103 (Advanced Embedded systems-16EVE13)

C103.1	Understand the basic hardware components and their selection method based on the characteristics and attributes of an embedded system.
C103.2	Explain the hardware software co-design and firmware design approaches.
C103.3	Acquire the knowledge of the architectural features of ARM CORTEX M3, a 32 bit Microcontroller including memory map, interrupts and exceptions.
C103.4	Apply the knowledge gained for Programming ARM CORTEX M3 for different Applications.

Course Name: C104 (LPVD-16EVE14)

C104.1	Identify the sources of power dissipation in CMOS circuits.
C104.2	Perform power analysis using simulation based approaches and probabilistic analysis.
C104.3	Use optimization and trade-off techniques that involve power dissipation of digital circuits.
C104.4	Make the power design a reality by making power dimension an integral part of the design process
C104.5	Use practical low power design techniques and their analysis at various levels of design abstraction and analyse how these are being captured in the latest design automation environments.

Course Name:C105(ASIC Design -16EVE153)

C105.1	Describe the concepts of ASIC design methodology, data path elements, logical effort and FPGA architectures
C105.2	Analyze the design of FPGAs and ASICs suitable for specific tasks, perform design entry and explain the physical design flow.
C105.3	Design data path elements for ASIC cell libraries and compute optimum path delay.
C105.4	Create floor plan including partition and routing with the use of CAD algorithms.

Course Name:C106 (VLSI and ES Lab1-16EVEL16)

C106.1	Develop Verilog Code for the design of digital circuits
C106.2	Use FPGA/CPLD board and Logic Analyzer or Chipscope to verify the results
C106.3	Develop Assembly language programs for different applications using ARMCortex M3 Kit and Keil uVision-4 tool.
C106.4	Develop C language programs for different applications using ARM-Cortex M3 Kit and Keil uVision-4 tool

Course Name: C111 (Design of Analog and Mixed Mode VLSI Circuits-16EVE21)

C111.1	Use efficient analytical tools for quantifying the behaviour of basic circuits by inspection.

C111.2	Design high-performance, stable operational amplifiers with the tradeoffs between speed, precision and power dissipation.
C111.3	Design and study the behaviour of phase-locked-loops for the applications.
C111.4	Identify the critical parameters that affect the analog and mixed-signal VLSI circuits' performance
C111.5	Perform calculations in the digital or discrete time domain, more sophisticated data converters to translate the digital data to and from
	inherently analog world.

Course Name: C112 (VLSI Testing -16EVE22)

C112.1	Analyze the need for fault modeling and testing of digital circuits
C112.2	Generate fault lists for digital circuits and compress the tests for efficiency
C112.3	Create tests for digital memories and analyze failures in them
C112.4	Apply boundary scan technique to validate the performance of digital circuits
C112.5	Design built-in self tests for complex digital circuits

Course Name: C113 (Advances in VLSI Design-16EVE23)

C113.1	Apply design automation for complex circuits using the different Implementation methodology like custom versus semi-custom, hardwired versus fixed, regular array versus ad-hoc.
C113.2	Use the approaches to minimize the impact of interconnect parasitic on performance, power dissipation and circuit reliability
C113.3	Impose the ordering of the switching events to meet the desired timing Constraints using synchronous, clocked approach.
C113.4	Infer the reliability of the memory

Course Name: C114 (Real Time Operating System-16EVE24)

C114.1	Develop programs for real time services, firmware and RTOS, using the fundamentals of Real Time Embedded System, real time service utilities, debugging methodologies and optimization techniques.

C114.2	Select the appropriate system resources (CPU, I/O, Memory, Cache, ECC Memory, and Microcontroller/FPGA/ASIC to improve the system performance.
C114.3	Apply priority based static and dynamic real time scheduling techniques for the given specifications.
C114.4	Analyze deadlock conditions, shared memory problem, critical section problem, missed deadlines, availability, reliability and QoS.
C114.5	Develop programs for multithreaded applications using suitable techniques and data structure

Course Name: C115 (System Verilog-16EVE251)

C115.1	Write test benches for moderately complex digital circuits
C115.2	Use System Verilog language
C115.3	Appreciate functional coverage
C115.4	Apply constrained random tests benches using System Verilog
C115.5	Analyze a verification case and apply System Verilog to verify the design

Course Name: C116 (VLSI and ES Lab-2-16EVEL26)

C116.1	Learn the various issues in Mixed signal designs basically data converters.
C116.2	Acquire hands-on skills of using CAD tools in VLSI design.
C116.3	Appreciate the design process in VLSI through a mini-project on the design of a CMOS sub-system.
C116.4	Select a suitable task switching technique in a multithreaded application.
C116.5	Implement different techniques of message passing and Inter task Communication.
C116.6	Implement different data structures such as pipes, queues and buffers in multithreaded programming.

Course Name: C211 (Synthesis and Optimization of Digital Circuits-16ELD41)

C211.1	Understand the process of synthesis and optimization in a top down approach for digital circuits models using HDLs.
C211.2	Understand the terminologies of graph theory and its algorithms to optimize a Boolean equation
C211.3	Apply different two level and multilevel optimization algorithms for combinational circuits

C211.4	Apply the different sequential circuit optimization methods using state Models and network models.
C211.5	Apply different scheduling algorithms with resource binding and without resource binding for pipelined sequential circuits and extended sequencing models.

Course Name: C212 (CMOS RF Circuit Design-16EVE421)

C212.1	Analyze the effect of nonlinearity and noise in RF and microwave design.
C212.2	Exemplify the approaches taken in actual RF products.
C212.3	Minimize the number of off-chip components required to design mixers and Low-Noise Amplifiers.
C212.4	Explain various receivers and transmitter topologies with their merits and drawbacks.
C212.5	Demonstrate how the system requirements define the parameters of the circuits and how the performance of each circuit impacts that of the overall transceiver.

Course Name: C213 (Advances in Image Processing-16ECS422)

C213.1	Understand the representation of the digital image and its properties
C213.2	Apply pre-processing techniques required to enhance the image for its further analysis.
C213.3	Use segmentation techniques to select the region of interest in the image for analysis
C213.4	Represent the image based on its shape and edge information.
C213.5	Describe the objects present in the image based on its properties and structure.

M.Tech in Power Electronics

SUBJECT CODE / SUBJECT NAME: 16EEE11/ Applied Mathematics

C111.1	Employ numerical techniques in order to achieve more accurate values in the computation of roots of algebraic and non-linear equations
C111.2	Utilize analytical and numerical schemes to solve partial differential equations applicable to engineering problems.
C111.3	Understand vector spaces, basis, linear transformations and the process of obtaining matrix of linear transformations arising in magnification and rotation of images.
C111.4	Apply standard iterative methods to compute Eigen values and solve ordinary differential equations
C111.5	Employ linear and non-linear programming techniques in simulation of network systems and optimization of electrical circuits.

SUBJECT CODE / SUBJECT NAME: 16EPE12/ POWER SEMICONDUCTOR DEVICES ANDCOMPONENTS

C112.1	Discuss power electronic concepts, electronic switches and semiconductor physics
C112.2	Explain representation of switches in P-spice and power computations.
C112.3	Explain the internal structure, the principle of operation, characteristics and base drive circuits of power semiconductor devices; power diodes, power BJT, power MOSFET
C112.4	Explain the internal structure, the principle of operation, characteristics and base drive circuits of power semiconductor devices; thyristors, power IGBT, power FET
C112.5	Design a heat sink to control the temperature rise of semiconductor devices
C112.6	Design magnetic components inductors and transformers used in the power electronic circuits

SUBJECT CODE / SUBJECT NAME: 16EPE13 / POWER ELECTRONIC CONVERTERS

C113.1	Use the knowledge of PWM techniques in controlling different power electronic converters
C113.2	Apply the knowledge of power electronics in design and analysis of DC –DC PWM converters
C113.3	Design and analyze DC –AC and AC – DC converters and control their operation using PWM techniques
C113.4	Design and analyze different resonant converters and their control circuits
C113.5	Design & Analyze of AC – AC converters
C113.6	Design & Analyze of multilevel converters.

SUBJECT CODE / SUBJECT NAME: 16EPE14 / MODELLING AND DESIGN OF CONTROLLERS

C114.1	Describe the role of computer simulations in the analysis and design of power
	electronics systems
C114.2	Understand the functional modelling of static systems.
C114.3	Use sampling technique to determine a digital equivalent to a continuous time system
C114.4	Design digital controllers in discrete time and frequency domain
C114.5	Design optimal and robust controllers by different methods
C114.6	Explain essentials of discrete computation

SUBJECT CODE / SUBJECT NAME: 16EPE154 / EMC in Power Electronics

C115.1	Describe Electromagnetic interference and its classification and measurement of conducted high frequency disturbance
C115.2	Survey electromagnetic interference specific to power electronic equipment
C115.3	Explain the characteristics of circuit elements used for noise suppression
C115.4	Explain EMI suppression methods used in semiconductor and electromechanical devices.
C115.5	Explain design of EMI filter circuits and filtering methods.
C115.6	Explain EMS reduction techniques for power electronic equipment

SUBJECT CODE / SUBJECT NAME: 16EPEL16 / POWER ELECTRONICS LABORATORY-1

C116.1	Analyze the static and dynamic characteristics of various semiconductor devices.
C116.2	Apply the knowledge of converters in assessing the performance of single phase and three phase fully controlled and semi controlled converters for RL load for continuous current modes.
C116.3	Apply the knowledge of converters in assessing the performance of single phase and three phase fully controlled and semi controlled converters for RL load for discontinuous current modes.
C116.4	Assess the performance of single phase bridge inverter for RL load and control the voltage by pulse width modulation
C116.5	Apply the knowledge of power electronics in performance analysis of chopper converter
C116.6	Apply the knowledge of power electronics in performance analysis of synchronous buck converter

SUBJECT CODE / SUBJECT NAME: 16EPE17 / Seminar

C117.1	Attain, use and develop knowledge in the field of electrical and electronics engineering
C117.2	Identify, understand and discuss current, real-time issues
C117.3	Improve oral and written communication skills
C117.4	Explore an appreciation of the self in relation to its larger diverse social and academic contexts
C117.5	Apply principles of ethics and respect in interaction with others.
C117.6	Attain, use and develop knowledge in the field of other disciplines through
	independent learning and collaborative study

SUBJECT CODE / SUBJECT NAME: 16EPE21 / ELECTRIC DRIVES

C121.1	Explain characteristics of DC motors, induction motors and synchronous motors
C121.2	Explain braking of electric motors.
C121.3	Classify electric drives
C121.4	Discuss dynamics conditions and stability considerations of Electric drive
C121.5	Suggest a drive for a specific application
C121.6	Explain using microprocessor in the control of an electric drive.

SUBJECT CODE / SUBJECT NAME: 16EPE22 / SWITCHED - MODE POWER SUPPLIES

C122.1	Explain a SMPS, its characteristics, new technologies, basic principles and control modes
C122.2	Suggest a suitable DC/DC converter for an SMPS.
C122.3	Explain the method of selecting key peripheral components of SMPS
C122.4	Design the power factor correction circuit of SMPS
C122.5	Explain selection of magnetic core and designing of high-frequency transformer
C122.6	Design protection and monitoring circuit for SMPS

SUBJECT CODE / SUBJECT NAME: 16EPE23 / MODELLING AND ANALYSIS OF ELECTRICAL MACHINES

C123.1	Explain the basic concepts of modeling.
C123.2	Develop mathematical models for DC motors for transient state analysis.
C123.3	Use reference frame theory to transform three phase to two phase.
C123.4	Develop dynamic model for three phase induction motor in stator ad rotor reference frames.
C123.5	Model synchronous machine using Park's transformation for the analysis of steady state operation.

C123.6	Model synchronous machine to perform dynamic analysis under different conditions

SUBJECT CODE / SUBJECT NAME: 16EPE24 / FACTS CONTROLLERS

C124.1	Discuss the growth of complex electrical power networks, the lack of controllability of the active- and reactive-power flows in energized networks
C124.2	Describe the conventional controlled systems and the basic operating principles of FACTS
C124.3	Describe the various components of a general SVC, its control system, control characteristics and the design of the SVC voltage regulator
C124.4	Explain the use of SVC in stability enhancement, damping sub synchronous oscillations, improvement of HVDC link performance
C124.5	Explain the concepts of series compensation, TCSC controller and its operation, characteristics, modelling and applications.
C124.6	Explain the operation of voltage source converter based FACTS

SUBJECT CODE / SUBJECT NAME: 16EPE253 / POWER QUALITY PROBLEMS AND MITIGATION

C125.1	Explain causes, effects of PQ problems and classification of mitigation techniques for PQ problems
C125.2	Explain PQ standards, terminology and monitoring requirements through numerical problems.
C125.3	Explain passive shunt and series compensation using lossless passive components
C125.4	Explain the design, operation and modelling of active shunt compensation equipment.
C125.5	Explain the design, operation and modelling of active series compensation equipment
C125.6	Discuss mitigation of power quality problems due to nonlinear loads.■

SUBJECT CODE / SUBJECT NAME: 16EPEL26/ POWER ELECTRONIS LABORATORY-2

C126.1	Conduct experiments on single phase fully controlled converter fed separately excited DC motor to assess the performance in continuous and discontinuous current modes
C126.2	Conduct experiments to assess the performance of Chopper fed DC drives for class A and class C commutation in continuous current mode
C126.3	Conduct experiments on three phase fully controlled converter fed separately excited DC motor to assess the performance in continuous and discontinuous current modes
C126.4	Simulate different converters for analyzing the waveform in continuous current modes
C126.5	Simulate different converters for analyzing the waveform in discontinuous current modes
C126.6	Simulate forward converter, fly back converter and resonant converter to study their performance

SUBJECT CODE / SUBJECT NAME: 16EPE27/ TECHHNICAL SEMINAR

C127.1	Attain, use and develop knowledge in the field of electrical and electronics engineering
C127.2	Identify, understand and discuss current, real-time issues
C127.3	Improve oral and written communication skills
C127.4	Explore an appreciation of the self in relation to its larger diverse social and academic contexts
C127.5	Apply principles of ethics and respect in interaction with others.
C127.6	Attain, use and develop knowledge in the field of other disciplines through independent learning and collaborative study

SUBJECT CODE / SUBJECT NAME: 14EPE31/ Seminar

C231.1	Attain, use and develop knowledge in the field of electrical and electronics engineering and other disciplines through independent learning and collaborative study
C231.2	Identify, understand and discuss current, real-time issues
C231.3	Improve oral and written communication skills
C231.4	Explore an appreciation of the self in relation to its larger diverse social and academic contexts.
C231.5	Apply principles of ethics and respect in interaction with others
C231.6	Work in a team to achieve common goal.

SUBJECT CODE / SUBJECT NAME: 14EPE32 & 33/ Internship

C232.1	Gain practical experience within industry in which the internship is done
C232.2	Acquire knowledge of the industry in which the internship is done
C232.3	Develop a greater understanding about career options while more clearly defining personal career goals
C232.4	Develop and refine oral and written communication skills
C232.5	Identify areas for future knowledge and skill development
C232.6	Acquire the knowledge of administration, marketing, finance and economics

SUBJECT CODE / SUBJECT NAME: 14EPE41/ HVDC POWER TRANSMISSION

C241.1	Explain importance of DC power transmission
C241.2	Describe the basic components of a converter, the methods for compensating the reactive power demanded by the converter.

C241.3	Explain the methods for simulation of HVDC systems and its control.
C241.4	Describe filters for eliminating harmonics and the characteristics of the system impedance resulting from AC filter designs
C241.5	Explain the protection of HVDC system and other converter configurations used for the HVDC transmission
C241.6	Explain the recent trends for HVDC applications.

SUBJECT CODE / SUBJECT NAME: 14EPE423 / DSP Applications to Drives

C242.1	Explain the architectural features of TMSLF2407 DSP processor, its peripherals
C242.2	Explain C2xxDSP CPU, its components and instruction set, and the peripheral interface.
C242.3	Explain General Purpose Input /Output (GPIO) Functionality, interrupts on TMS320LF2407 and the analog to digital conversion (ADC).
C242.4	Describe the capability of event managers of DSP.
C242.5	Model DC – DC converters.
C242.6	Perform mathematical modelling and control of different motors using DSP processor.

SUBJECT CODE / SUBJECT NAME: 14EPE43, 14EPE44 & 14EPE44/ Project phase - 2

C243.1	Present the project and be able to defend it
C243.2	Make links across different areas of knowledge and to generate, develop and
	evaluate ideas and information so as to apply these skills to the project task
C243.3	Habituated to critical thinking and use problem solving skills
C243.4	Communicate effectively and to present ideas clearly and coherently in both the written and oral forms
C243.5	Work in a team to achieve common goal.
C243.6	Learn on their own, reflect on their learning and take appropriate actions to improve it

M.Tech in Structural Engineering

Course Name: C101 COMPUTATIONAL STRUCTURAL MECHANICS **16CSE11**

C101.1	Formulate force displacement relation by flexibility and stiffness method
C101.2	Analyze the plane trusses, continuous beams and portal frames by transformation approach
C101.3	Analyse the structures by direct stiffness method

Course Name: C102 ADVANCED DESIGN OF RC STRUCTURES 16CSE12

C102.1	Achieve Knowledge of design and development of problem solving skills
C102.2	Understand the principles of Structural Design.
C102.3	Design and develop analytical skills.
C102.4	Summarize the principles of Structural Design and detailing
C102.5	Understands the structural performance

Course Name: C103 MECHANICS OF DEFORMABLE BODIES 16CSE13

C103.1	Achieve Knowledge of design and development of problem solving skills.
C103.2	Understand the principles of stress-strain behaviour of continuum
C103.3	Design and develop analytical skills.
C103.4	Describe the continuum 3- di in 2 dimensions
C103.5	Understand the concepts of elasticity and plasticity

Course Name: C105 STRUCTURAL DYNAMICS 16CSE15

C105.1	Achieve Knowledge of design and development of problem solving skills.
C105.2	Understand the principles of Structural Dynamics
C105.3	Design and develop analytical skills.
C105.4	Summarize the Solution techniques for dynamics of Multi-degree freedom systems

C105.5	Understand the concepts of damping instructors.

Course Name:C106 RESEARCH METHODOLOGY AND IPR 16RMI17

C106.1	Discuss research methodology and the technique of defining a research problem
C106.2	Explain the functions of the literature review in research, carrying out a literature search, developing theoretical and conceptual frameworks and writing a review.
C106.3	Explain various research designs, sampling designs, measurement and scaling techniques and also different methods of data collections
C106.4	Explain several parametric tests of hypotheses, Chi-square test, art of interpretation and writing research reports
C106.5	Discuss various forms of the intellectual property, its relevance and business impact in the changing global business environment and leading International Instruments concerning IPR.

Course Name: C111 ADVANCED DESIGN OF STEEL STRUCTURES 16CSE21

C111.1	Able to understand behaviour of Light gauge steel members
C111.2	Able to understand design concepts of cold formed/unrestrained beams
C111.3	Able to understand Fire resistance concept required for present days
C111.4	Able to analyze beam column behavior

Course Name: C112FINITE ELEMENT METHOD OF ANALYSIS16CSE22

C112.1	Explain the basic theory behind the finite element method.
C112.2	Formulate force-displacements relations for 2-D elements
C112.3	Use the finite element method to analyze real structures.
C112.4	Use a Finite Element based program for structural analysis

Course Name: C113 EARTH QUAKE RESISTANT STRUCTURES 16CSE23

C113.1	Achieve Knowledge of design and development of problem solving skills. Understand the principles of engineering seismology
C113.2	Design and develop analytical skills.

C113.3	Summarize the Seismic evaluation and retrofitting of structures
C113.4	Understand the concepts of earthquake resistance of reinforced concrete buildings.

Course Name: C114 Course Name: C114 ANALYSIS AND DESIGN OF PLATES AND SHELLS

C114.1	Achieve Knowledge of design and development of problem solving skills.
C114.2	Understand the principles of Analysis and Design
C114.3	Design and develop analytical skills.
C114.4	Summarize the performance of shells
C114.5	Understand the concepts of energy principle

Course Name: C114 Course Name DESIGN OF TALL STRUCTURES 16CSE254

C115.1	Achieve Knowledge of design and development of problem solving skills.
C115.2	Understand the principles of Analysis and Design
C115.3	Design and develop analytical skills.
C115.4	Summarize the performance of shells
C115.5	Understand the concepts of energy principle

Course Name: C211 DESIGN OF BRIDGES 16CSE31

C**211**.1	Achieve Knowledge of design and development of problem solving skills.
C**211**.2	Understand the principles of Analysis and Design
C**211**.3	Design and develop analytical skills.
C**211**.4	Summarize the performance of shells
C**211**.5	Understand the concepts of energy principle

Course Name: C212 DESIGN OF MASONRY STRUCTURE 16CSE332

C**212**.1	Achieve Knowledge of design and development of problem solving skills.
C**212**.2	Understand the principles of design and construction of masonry structures
C**212**.3	Design and develop analytical skills.
C**212**.4	Summarize the masonry Characteristics.
C**212**.5	Evaluate the strength and stability of the masonry structures

Course Name: C204 RELIABILITY ANALYSIS OF STRUCTURES 16CSE324

C**212**.1	Understand the concepts of statistics for probabilistic analysis and importance
C**212**.2	uncertainty (randomness) in structural analysis and design.
C**212**.3	Apply the theoretical principles of randomness of variables in structural
C**212**.4	engineering through density functions.
C**212**.5	Analyze components of structure to assess safety using concepts related to structural reliability by various methods.

Course Name: C213 16CSE31Design of Bridges

C213.1	Describe historical growth, select ideal site and bridge, calculate values of design parameters of slab culvert at critical section as per IRC, design and detailing required for the execution of the project.
C213.2	Carry out analysis of box culvert as per IRC to obtain the values of design parameters and to design and detail the components following IS code procedure.
C213.3	Demonstrate the use of Pigeauds Method andCourbon's Methodin theanalysis of T beam bridge as per IRC, design to obtain the safe dimensions various components, optimum reinforcement required following IS code procedure
C213.4	Analysis a balanced cantilever bridge as per IRC and to obtain the safe values of design parameters and to design and detail the components as per IS code procedure
C213.5	Display the use of Courbon's Methodin the analysis of PSC bridge as per IRC, design to obtain the safe value of prestressing force, obtain the dimensions of various components to keep the stresses within codal provisions following IS code procedure..

Course Name: C214 16CSE323Stability of Structures

C214.1	Achieve Knowledge of design and development of problem solving kills
C214.2	Understand the principles of strength and stability. Design and develop analytical skills
C214.3	Appraise the Stability analysis by finite element approach.
C214.4	Understand the concepts of lateral buckling of beams

Course Name: C215 16CSE332Design of Masonry Structures

C215.1	Achieve Knowledge of design and development of problem solving skills.

C215.2	Understand the principles of design and construction of masonry
C215.3	Design and develop analytical skills.
C215.4	Summarize the masonry Characteristics.
C215.5	· Evaluate the strength and stability of the masonry structures.

M.Tech in Computer Science

Course Name: C101 (MATHEMATICAL FOUDATION OF COMPUTER SCIENCE-16SCS11)

C101.1	Understand the numerical methods to solve and find the roots of the equations.
C101.2	Utilize the statistical tools in multi variable distributions.
C101.3	Use probability formulations for new predictions with discrete and continuous RV's.
C101.4	To understand various graphs in different geometries related to edges.
C101.5	Understand vector spaces and related topics arising in magnification and rotation of images.

Course Name: C102 (ADVANCES IN OPERATING SYSTEMS -16SCS12)

C102.1	Demonstrate the Mutual exclusion, Deadlock detection and agreement protocols of Distributed operating system
C102.2	Learn the various resource management techniques for distributed systems
C102.3	Identify the different features of real time and mobile operating system
C102.4	Modify existing open source kernels in terms of functionality or features used
C102.5	Demonstrate the Mutual exclusion, Deadlock detection and agreement protocols of Distributed operating system

Course Name: C103 (ADVANCES IN DATA BASE MANAGEMENT SYSTEMS-16SCS13)

C103.1	Select the appropriate high performance database like parallel and distributed database
C103.2	Infer and represent the real world data using object oriented database
C103.3	Interpret rule set in the database to implement data warehousing of mining
C103.4	Discover and design database for recent applications database for better interoperability

Course Name: C104 (INTERNET OF THINGS-16SCS14)

C104.1	Develop schemes for the applications of IOT in real time scenarios
C104.1	Manage the Internet resources
C104.3	Model the Internet of things to business
C104.4	Understand the practical knowledge through different case studies

C104.5	Understand data sets received through IoT devices and tools used for analysis

Course Name:C105(ADVANCES IN COMPUTER NETWORKS-16SCS151)

C105.1	List and classify network services, protocols and architectures, explain why they are layered.
C105.2	Choose key Internet applications and their protocols, and apply to develop their own applications (e.g. Client Server applications, Web Services) using the sockets API.
C105.3	Explain develop effective communication mechanisms using techniques like connection establishment, queuing theory, recovery Etc.
C105.4	Explain various congestion control techniques.

Course Name: C201 (MANAGING BIG DATA -16SCS21)

C201.1	Describe big data and use cases from selected business domains
C201.2	Explain NoSQL big data management
C201.3	Install, configure, and run Hadoop and HDFS
C201.4	Perform map-reduce analytics using Hadoop
C201.5	Use Hadoop related tools such as HBase, Cassandra, Pig, and Hive for big data Analytics

Course Name: C202 (ADVANCES IN COMPUTER NETWORKS-16SCS22)

C202.1	Design and apply iterative and recursive algorithms.
C202.2	Design and implement optimization algorithms in specific applications.
C202.3	Design appropriate shared objects and concurrent objects for applications

Course Name: C203 (ADVANCED ALGORITHMS-16SCS23)

C203.1	Compare the strengths and limitations of cloud computing
C203.2	Identify the architecture, infrastructure and delivery models of cloud computing
C203.3	Apply suitable virtualization concept.
C203.4	Choose the appropriate cloud player
C203.5	Address the core issues of cloud computing such as security, privacy and interoperability
C203.6	Design Cloud Services
C203.7	Set a private cloud

Course Name: C204 (ADVANCES IN STORAGE AREA NETWORKS-16SCS241)

C204.1	Identify the need for performance evaluation and the metrics used for it
C204.2	Apply the techniques used for data maintenance.
C204.3	Realize strong virtualization concepts
C204.4	Develop techniques for evaluating policies for LUN masking, file systems

Course Name: C205 (INFORMATION AND NETWORK SECURITY -16SCS251)

C205.1	Apply Object Oriented Software Engineering approach in every aspect of software project
C205.2	Analyze the requirements from various domains
C205.3	Adapt appropriate object oriented design aspects in the development process
C205.4	Implement and test the software projects using object oriented approach
C205.5	Learn the issues and concepts relating to maintenance of software projects
C205.6	Adapt the concepts and tools related to software configuration management

Course Name: C301 (MACHINE LEARNING TECHNIQUES-16SCS31)

C301.1	Choose the learning techniques with this basic knowledge.
C301.2	Apply effectively neural networks and genetic algorithms for appropriate applications.
C301.3	Apply bayesian techniques and derive effectively learning rules.
C301.4	Choose and differentiate reinforcement and analytical learning techniques

Course Name: C302 (INFORMATION AND NETWORK SECURITY-16SCS322)

C302.1	Analyze the vulnerabilities in any computing system and hence be able to design a security solution.
C302.2	Identify the security issues in the network and resolve it.
C302.3	Evaluate security mechanisms using rigorous approaches, including theoretical.

Course Name: C303 (APPLICATION AND WEB SECURITY -16SCS331)

C303.1	Achieve Knowledge of web application's vulnerability and malicious attacks.
C303.2	Understand the basic web technologies used for web application development
C303.3	Understands the basic concepts of Mapping the application.
C303.4	Able to illustrate different attacking illustrations
C303.5	Basic concepts of Attacking Data Stores.

M.Tech in SCN

Course Name: (ADVANCES IN COMPUTER NETWORKS/16SCN12)

C112.1	List and classify network services, protocols and architectures, explain why they arelayered.
C112.2	Choose key Internet applications and their protocols, and apply to develop their own applications(e.g.ClientServerapplications,WebServices)usingthesocketsAPI.
C112.3	Explain develop effective communication mechanisms using techniques like connection establishment, queuing theory, recoveries.
C112.4	Explain various congestion control techniques.

Course Name: (INFORMATION AND NETWORK SECURITY/16SCN13)

C113.1	Analyzethevulnerabilitiesinanycomputingsystemandhencebeabletodesignasecuritysolution.
C113.2	Identify the security issues in the network and resolve it.
C113.3	Evaluate security mechanisms using rigorous approaches, including theoretical.

Course Name: (INTERNET OF THINGS/16SCN14)

C114..1	Develop schemes for the applications of IOT in real time scenarios
C114..2	Manage the Internet resources
C114..3	Model the Internet of things to business
C114..4	Understand the practical knowledge through different case studies
C114..5	Understand data sets received through IoT devices and tools used for analysis

Course Name: (WIRELESS NETWORKS AND MOBILE COMPUTING/16SCN151)

C115.1	Explain state of art techniques in wireless communication.
C115.2	Discover CDMA, GSM. Mobile IP,WImax
C115.3	Demonstrate program for CLDC, MIDP let model and security concerns

Course Name:(MULTI-CORE ARCHITECTURE AND PROGRAMMING/16SCN152)

C115.1	Identify the limitations of ILP and the need for multi core architectures
C115.2	Define fundamental concepts of parallel programming and its design issues

C115.3	Solve the issues related to multiprocessing and suggest solutions
C115.4	Makeoutthesalientfeaturesofdifferentmulticorearchitecturesandhowtheyexploitparallelism
C115.5	Demonstrate the role of Open and programming concept

Course Name: (SOCIAL NETWORK ANALYSIS/16SCN153)

C115.1	Define notation and terminology used in network science.
C115.2	Demonstrate, summarize and compare networks.
C115.3	Explain basic principles behind network analysis algorithms.
C115.4	Analyzing real world network.

Course Name: (CLOUD SECURITY/16SCN154)

C115.1	Demonstrate the growth of Cloud computing, architecture and different modules of implementation.
C115.2	Evaluate the different types of cloud solutions among IaaS, PaaS,SaaS.
C115.3	Access the security implementation flow, actions and responsibilities of stakeholders.
C115.4	Generalize the Data Centre operations, encryption methods and deployment details.
C115.5	Provide recommendations for using and managing the customer's identity and choose the type of virtualization to beused.

Course Name: (COMPUTER NETWORKS AND IOT LABORATORY/16SCNL16)

C116.1	Apply key Internet applications and their protocols, and ability to develop their own applications(e.g.ClientServerapplications,WebServices)usingthesocketsAPI.
C116.2	Design and evaluate application layer protocol
C116.3	Analyze the vulnerabilities in any computing system and hence be able to design a security solution.
C116.4	Identify the security issues in the network and resolve it.
C116.5	Evaluate security mechanisms using rigorous approaches, including theoretical.

Course Name:(MULTIMEDIA COMMUNICATIONS/16SCN21)

C121.1	Deploy the right multimedia communication models.
C121.2	Apply QoS to multimedia network applications with efficient routing techniques.
C121.3	Solve the security threats in the multimedia networks.
C121.4	Develop the real-time multimedia network applications

Course Name: (NETWORK PROGRAMMING/16SCN22)

C122.1	Develop applications that communicate with each other using TCP and sCTP.
C122.2	Identify the IPv4 and IPv6compatibility.
C122.3	Evaluate socket programming APIs

Course Name: (WIRELESS AD-HOC NETWORKS/16SCN23)

C123.1	Design their own wireless network
C123.2	Evaluate the existing network and improve its quality of service
C123.3	Choose appropriate protocol for various applications
C123.4	Examine security measures present at different level
C123.5	Analyze energy consumption and management

Course Name: (ADVANCES IN STORAGE AREA NETWORKS/16SCN241)

C124.1	Identify the need for performance evaluation and the metrics used for it
C124.2	Apply the techniques used for data maintenance.
C124.3	Realize strong virtualization concepts
C124.4	Develop techniques for evaluating policies for LUN masking, file systems

Course Name: (SWITCHING & STATISTICAL MULTIPLEXING INTELECOMMUNICATIONS/16SCN242)

C124.1	Explain basics of telecommunications and digital form
C124.2	Elaborate switching and multiplexing, telecommunication.
C124.3	Illustrate transmission control in telecommunication
C124.4	Design and develop switching, multiplexing and traffic control.

Course Name: (ETHERNET TECHNOLOGY/16SCN243)

C124.1	Classify different types of Ethernet systems
C124.2	Contrast Ethernet Media systems
C124.3	Evaluate a complete Ethernet system

Course Name: (MOBILE APPLICATION DEVELOPMENT/16SCN244)

C124.1	Describe the requirements for mobile applications
C124.2	Explain the challenges in mobile application design and development
C124.3	Develop design for mobile applications for specific requirements
C124.4	Implement the design using Androids
C124.5	Implement the design using Objective C andiOS
C124.6	Deploy mobile applications in Android and iPone marketplace for distribution

Course Name: (WIRELESS SENSOR NETWORKS/16SCN251)

C125.1	Explain existing applications of wireless sensor actuator networks
C125.2	Apply in the context of wireless sensor networks and explain elements of distributed
	computing and network protocol design
C125.3	Contrast Various hardware, software platforms that exist for sensor networks
C125.4	Summarize various network level protocols for MAC, routing, time synchronization, aggregation, consensus and distributed tracking

Course Name: (MANAGING BIG DATA/16SCN252)

C125.1	Describe big data and use cases from selected business domains
C125.2	Explain NoSQL big data management
C125.3	Install, configure, and run Hadoop andHDFS
C125.4	Perform map-reduce analytics using Hadoop
C125.5	Use Hadoop related tools such as HBase, Cassandra, Pig, and Hive for big data Analytics

Course Name: (NETWORK MANAGEMENT/16SCN253)

C125.1	Analyze the issues and challenges pertaining to management of emerging network technologies such as wired/wireless networks and high-speed internets.
C125.2	Apply network management standards to manage practical networks
C125.3	Formulate possible approaches for managing OSI network model.
C125.4	Use on SNMP for managing the network
C125.5	Use RMON for monitoring the behavior of the network
C125.6	Identify the various components of network and formulate the scheme for the managing them

Course Name: (ADVANCES IN OPERATING SYSTEMS/16SCN254)

C125.1	Demonstrate the Mutual exclusion, Deadlock detection and agreement protocols of Distributed operating system.

C125.2	Learn the various resource management techniques for distributed systems
C125.3	Identify the different features of real time and mobile operating system
C125.4	Modify existing open source kernels in terms of functionality or features used

Course Name: (CLOUD COMPUTING/16SCN31)

C231.1	Compare the strengths and limitations of cloud computing
C231.2	Identify the architecture, infrastructure and delivery models of cloud computing
C231.3	Apply suitable virtualization concept.
C231.4	Choose the appropriate cloud player
C231.5	Address the core issues of cloud computing such as security, privacy and interoperability
C231.6	Design Cloud Services

Course Name: (COMPUTER SYSTEMS PERFORMANCE ANALYSIS /16SCN321)

C232.1	Identify the need for performance evaluation and the metrics used for it
C232.2	Implement Little's law and other operational laws
C231.3	Apply the operational laws to open and closed systems
C232.4	Use discrete-time and continuous-time Markov chains to model real world systems
C232.5	Develop analytical techniques for evaluating scheduling policies

Course Name: (NETWORK ROUTING ALGORITHMS/16SCN322)

C232.1	Given the network and user requirements and the type of channel over which the network has to operate, the student would be in a position to apply his knowledge for identifying a suitable routing algorithm, implementing it and analyzing its performance.
C232.2	The student would also be able to design a new algorithm or modify an existing algorithm to satisfy the evolving demands in the network and by the user applications.

Course Name: (INFORMATION SECURITY POLICIES IN INDUSTRY/16SCN323)

C232.1	Explain the content, need, and responsibilities of information security policies.
C232.2	Explain the standards, guidelines, Procedures, and key roles of the organization.
C231.3	Able to write policy document for securing network connection and interfaces.
C232.4	Explain the threats to the stored data or data in transit and able to write policy document.
C232.5	Able to write, monitor, and review policy document.

Course Name: (MACHINE LEARNING TECHNIQUES/16SCN324)

C232.1	Choose the learning techniques with this basic knowledge.
C232.2	Apply effectively neural networks and genetic algorithms for appropriate applications.
C231.3	Apply bayesian techniques and derive effectively learning rules.
C232.4	Choose and differentiate reinforcement and analytical learning techniques

Course Name: (ANALYSIS OF COMPUTER NETWORKS/16SCN331)

C233.1	List and classify network services, protocols and architectures, explain why they are layered.
C233.2	Implement key Internet applications and their protocols, and will apply to develop their own applications (e.g. Client Server applications, Web Services) using the socketsAPI.

Course Name: (PROTOCOL ENGINEERING/16SCN332)

C233.1	Describe the requirements for protocol engineering systems
C233.2	Explain the challenges in designing protocol engineering systems
C233.3	Implement the design usingSDL

Course Name:(WEB ENGINEERING/16SCN333)

C233.1	Ability to Model the requirements of a web application.
C233.2	Contrast technology-aware Web Application.
C233.3	Ability to analyze the performances of web applications

Course Name: (WEB MINING/16SCN334)

C233.1	Identifytheapplicationareasforwebcontentmining,webstructureminingandwebusage mining.
C233.2	Design to retrieval the web data
C233.3	Develop schemes to crawl the web data, organize and index
C233.4	Cluster the documents for fast access
C233.5	Develop algorithms used by web mining applications.
C233.6	Select between different approaches and techniques of web mining

M.Tech in Automobile Engineering

Course Name: C105 (ADVANCED MACHINE DESIGN- 16MAU14)

C105.1	Design machine components which are subjected to fluctuating loads.
C1085.2	Use LEFM approach for crack growth determination.
C105.3	Design machine components/parts based on creep criterions. They are able to implement the concept of reliability for designing a machine parts or machine.
C105.4	Explain the contact stresses and implementation of Hertz contact phenomenon to the real field problem. Identify failure modes and evolve design by analysis methodology.
C105.5	Design against fatigue failure is given explicit attention.

Course Name: C106 (Automatic Control systems- 16MAU152)

C106.1	Have understanding of control system required for vehicles and basics of control system development. Also
C106.2	Gets the knowledge of control system being used in automotive vehicle.

Course Name: C202 (AUTOMOTIVE POWERTRAINS-16MAU21)

C202.1	Explain layout and components of automotive transmission.
C202.2	Explain detailed concept, construction and principle of operation of various types of mechanical transmission components, hydrodynamic Devices and hydrostatic devices.
C202.3	Select of automatic transmission system.
C202.4	Select differential gear ratio, final drives and the design of other Transmission elements, gear shifting mechanism and synchronisers.
C202.5	Design bearings for transmission system and gear box.

Course Name: C203 (AUTOMOTIVE BODY ENGINEERING AND SAFETY- 16MAU22)

C203.1	Chassis layouts of passenger and commercial vehicles.
C203.2	Select the appropriate dimensions for driver's seat, passenger seat, Drivers and passengers cabin as per ergonomic requirements.
C203.3	Select appropriate body material
C203.4	To calculate aerodynamic forces and moments acting on vehicle body, Can be able to select suitable flow visualization technique.

C203.5	Select suitable method for reduction in aerodynamic forces and moments In heavy vehicles.
C203.6	Calculate load distribution leading to ergonomics, stability and safety of The vehicle.
C203.7	Identify the various safety aspects in a given vehicle.

Course Name: C204 (AUTOMOTIVE ELECTRICAL AND ELECTRONIC SYSTEMS -16MAU23)

C202.1	Explain principles of storage batteries used in Automobiles.
C202.2	Explain different charging and lighting systems..
C202.3	Select different Ignition systems and Engine Management Systems.
C202.4	Explain different advanced electrical and electronic systems.

Course Name: C205 (VEHICLE DYNAMICS- 16MAU24)

C205.1	Explain basics of vibrations.
C205.2	Analyze forces acting and the performance characteristics of tyres and Brakes.
C205.3	Analyze vehicle dynamics and its influence on the vehicle handling Characteristics.
C205.4	Explain principles of Steady State Handling Characteristics of Road Vehicles.

Course Name: C206 (Manufacturing Techniques in Automotive Engineering - 16MAU253)

C206.1	Select sheet metal forming processes
C206.2	Explain Forging process 3. Explain Powder Metallurgy Processes
C206.3	Use different metal joining methods used in automobiles
C206.4	Use plastic joining methods
C206.5	Explain Forging process

Course Name: C401 (ALTERNATIVE FUELS AND POLLUTION CONTROL - 16MAU41)

C401.1	Explain need for alternative fuels, various alternative fuels available and their suitability for automotive application.
C401.2	Explain sources of pollution from automobiles and effects of pollutants on living beings
C401.3	Select suitable means for controlling pollution from automobiles
C401.4	Select suitable method of sampling of pollutants
C401.5	Explain various techniques adopted for reduction of Pollution from Automobile.

Course Name: C402 (TWO AND THREE WHEELER TECHNOLOGY- **16MAU424)**

C402.1	Describe construction and working of different type of internal combustion engines for two and three wheeled vehicles.
C402.2	Laydown wiring diagram for two wheeler and three wheeled vehicles.
C402.3	Explain types of clutches, transmission and final drives used for two and three wheeled vehicles.
C402.4	Describe types of frames, brakes and tyres used for two and three wheeled vehicles.
C402.5	Laydown maintenance schedule for two and three wheeled vehicles.

Course Name: C102 (APPLIED MATHEMATICS -16MAU11)

C102.1	Employ numerical techniques in order to achieve more accurate values In the computation of roots of polynomials and non-linear equations.
C102.2	Understand vector spaces, basis, linear transformations and the process of obtaining matrix of linear transformations arising in magnification And rotation of images.
C102.3	Utilize standard numerical schemes to solve partial differential Equations applicable to mechanical engineering problems.
C102.4	Apply the numerical linear algebra techniques to solve algebraic, Transcendental and matrix Eigen value problems.
C102.5	Employ the idea linear transformations, inner product spaces and orthogonality

Course Name: C103 (AUTOMOIVE ENGINE AND SYSTEMS-16MAU12)

C103.1	Explain air fuel requirement for various operating conditions of engine, various layouts and working of various injection systems, engine cooling system, lubrication system, engine management systems, exhaust emission control techniques, recent development ins engines, etc.

C103.2	Analyze the combustion normal and abnormal combustion process, basic Principles for selection of combustion chambers.
C103.3	To calculate heat lost to the coolant, engine performance in terms of various performance parameters by conducting test on single cylinder and Multi cylinder engine.

Course Name: C104 (NOISE, VIBRATION AND HARSHNESS- 16MAU13)

C104.1	Explain basics of NVH.
C104.2	Use different instruments and analyse the data for identification of
	Sources of noise and vibrations.
C104.3	Conduct testing of vehicle components for vibrations.
C104.4	Take necessary steps to reduce the levels of vibrations and noise in Automobiles.

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CHILDREN'S EDUCATION SOCIETY (Regd.)
THE OXFORD COLLEGE OF ENGINEERING
(Recognised by the Govt. of Karnataka, Affiliated to Visvesvaraya Technological University, Belagavi.
Approved by A.I.C.T.E. New Delhi.
Recognised by UGC Under Section 2(f))
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Academic Year-2017-18

Department Of Automobile Engineering

Vision of the Institute

To be a respected and most sought after engineering educational institutions engaged in equipping individuals capable of building learning organizations in the new millennium.

Mission of the Institute

To develop competent students with good value systems and face challenges of the continuously changing world.

Vision of the Department

To establish the department as a renowned centre of excellence in the area of scientific education, research with industrial guidance and exploration of the latest advances in the rapidly changing field of Automobile Engineering.

Program Educational Objectives

Mission 1. Graduates shall display technical knowledge in basic Mechanical and Automobile Engineering subject areas enabling them to find career opportunities in relevant government agencies, reputed private firms.

Mission 2. Graduates shall gain practical knowledge in the working of Automobile Systems, capable of working on indigenous projects, ventures related to automotive discipline.

Mission 3. Graduates shall be well versed with the academic learning material of the course syllabus and ready to take up further learning through higher education and scientific research.

Mission 4. Graduates shall be well equipped with the requirements of the current industries to obtain job opportunities in Mechanical and Automotive sectors in the design, Manufacturing, Analysis domains.

Program Specific Objectives

PSO1. Graduate will demonstrate the knowledge to design, develop, implement and use same into various domains to identify cause and hence provide solutions in the automotive field.

PSO2. Graduate to work in interdisciplinary environment to design systems withthe future emission norms and safety standards in automobile sector.

PSO3. Graduate will be able to pursue of lifelong learning and professional development to face the challenging and emerging needs of our society.

Program Outcomes

1. Engineering knowledge: Apply the knowledge of mathematics, science, engineering fundamentals, and an engineering specialization to the solution of complex engineering problems.

2. Problem analysis: Identify, formulate, review research literature, and analyze complex engineering problems reaching substantiated conclusions using first principles of mathematics, natural sciences, and engineering sciences.

3. Design/development of solutions: Design solutions for complex engineering problems and design system components or processes that meet the specified needs with appropriate consideration for the public health and safety, and the cultural, societal, and environmental considerations.

4. Conduct investigations of complex problems: Use research-based knowledge and research methods including design of experiments, analysis and interpretation of data, and synthesis of the information to provide valid conclusions.

5. Modern tool usage: Create, select, and apply appropriate techniques, resources, and modern engineering and IT tools including prediction and modelling to complex engineering activities with an understanding of the limitations.

6. The engineer and society: Apply reasoning informed by the contextual knowledge to assess societal, health, safety, legal and cultural issues and the consequent responsibilities relevant to the professional engineering practice.

7. Environment and sustainability: Understand the impact of the professional engineering solutions in societal and environmental contexts, and demonstrate the knowledge of, and need for sustainable development.

8. Ethics: Apply ethical principles and commit to professional ethics and responsibilities and norms of the engineering practice.

9. Individual and team work: Function effectively as an individual, and as a member or leader in diverse teams, and in multidisciplinary settings.

10. Communication: Communicate effectively on complex engineering activities with the engineering community and with society at large, such as, being able to comprehend and write effective reports and design documentation, make effective presentations, and give and receive clear instructions.

11. Project management and finance: Demonstrate knowledge and understanding of the engineering and management principles and apply these to one's own work, as a member and leader in a team, to manage projects and in multidisciplinary environments.

12. Life-long learning: Recognize the need for, and have the preparation and ability to engage in independent and life-long learning in the broadest context of technological change.

Course: Material Science and Metallurgy -15AU32

CO-1	Explain different types of material crystal structures and arrangement of atoms. Describe various mechanical properties of materials
CO-2	Describe about different types of fractures and their importance in engineering applications
CO-3	Explain the concept of equilibrium diagram. Plot cooling curves and phase diagrams for pure metals and alloys
CO-4	Identify various ferrous metals and alloys based on composition and properties for prescribed application
CO-5	Select various nonferrous metals and alloys based on composition and properties for given application
CO-6	Describe about different types of composite materials and their production and application in engineering field

Course: Engineering Thermodynamics-15AU33

CO-1	Define and explain fundamental thermodynamic laws and concepts, work, various types of work and heat and its applications, entropy and its relations
CO-2	Explain Zeroth, First & Second law of thermodynamics and its applications
CO-3	Calculate load and IHP, BHP of IC engines
CO-4	Calculate efficiency and MEP of various gas power & vapor power cycles
CO-5	Calculate efficiency and MEP of various gas power & vapor power cycles
CO-6	Design cost effective thermodynamic systems

Course: Mechanics of Materials-15AU34

CO-1	Explain the concepts of stress, strain; material properties. Explain the behaviour of materials under different loading conditions such as tensile, compression, shear, bending etc.
CO-2	Calculate bending moment (BM) and shear forces (SF) and draw the BM and SF diagrams types of beams carrying different types loads such as point load, UDL, UVL and extend the same to real life situations
CO-3	Calculate principal stresses using analytical and graphical methods; estimate the stresses in thick and thin cylinders
CO-4	Evaluate Stresses & angle of twist induced in the shaft due to twisting

CO-5	Explain the concepts of torque and calculate the diameter of hollow and solid shafts subjected to twisting moment
CO-6	Calculate Critical load for different types columns using Euler's, Rankin's equations &limitations of these equations and explain the applications

Course: Mechanical Measurement &Metrology-15AU35

CO-1	Explain the significance of mechanical measurements and components of a generalized Measurement system
CO-2	Classify and explain principles of various types of transducers, modifying devices and terminating devices
CO-3	Explain the working principle of instruments used for measurement of Force, Torque, Pressure, Temperature, Strain and Vibration
CO-4	Explain the objectives of metrology and explain various standards of length such as line and end standards
CO-5	Demonstrate the skills of interpreting various types of limits, fits and tolerances, Classify the comparators and explain their working principles
CO-6	Explain the usage of instruments used for the measurement of screw thread and gear parameters.

Course: Manufacturing Process 1-15AU36

CO-1	Define various terminologies used in casting process
CO-2	Explain basic concepts used in construction of various moulds
CO-3	Analyze the working of various moulding machines
CO-4	Select the appropriate moulding machine and moulding process depending on the type of raw material required to produce the desired product
CO-5	Select the appropriate joining process depending on the type of joint required to produce the desired product
CO-6	Realize the significance of Non-Destructive Testing's (NDT's)

Course: Dynamics of Machines- 15AU52

CO-1	Calculate static forces at various points in different types of mechanism
CO-2	Calculate fluctuation of energy in flywheel and dimensions of flywheel
CO-3	Balance rotating masses and of reciprocating masses in internal combustion engine, V-engine, radial engine and to solve analytically and graphically to balance the systems
CO-4	Describe gyroscopic couple and to understand effect of gyroscopic couple
CO-5	Calculate gyroscopic effect on stability of vehicles, ship, aircraft etc.

CO-6	Analyze effect of profile of cam on motion of followers

Course: Design of Machine Elements 1-15AU53

CO-1	To know the Standards in Design, Selection of materials as per Codes &Standards
CO-2	Analyze the various modes of failure of machine components under different static load conditions and use appropriate theories of failures
CO-3	To understand the Impact stresses for machine components, Fatigue stress analysis stress concentration
CO-4	To evaluate dimensions of shafts and other simple machine components
CO-5	Able to understand design of joints like welded and riveted joints
CO-6	Terminologies and Design of threaded joints and power screws

Course: Automotive Fuels & Combustion-15AU54

CO-1	Introduce understanding about available energy sources for ICE
CO-2	Distinguish between properties of difference fuels
CO-3	Determine the A/F ratio for complete combustion
CO-4	Explain and differentiate between multi fuel and dual fuel engines
CO-5	Design SI& CI engine combustion chambers
CO-6	Explain stages of combustion in S.I. & C.I. engines

Course: Operation Research-10AU71

CO-1	Formulate and solve mathematical model (linear programming problem) for a physical situation like production, distribution of goods and economics.
CO-2	Apply the concept of simplex method and its extensions to dual simplex algorithm.
CO-3	Solve the problem of transporting the products from origins to destinations with least transportation cost.
CO-4	Understand the usage of game theory and Simulation for Solving Business Problems
CO-5	Analyzing different queuing situations and find the optimal solutions using models for different situations.
CO-6	Identify the resources required for a project and generate a plan and work schedule using CPM and PERT techniques.

Course: VBE-10AU72

CO-1	Classify the vehicles and define basic terms.

CO-2	Calculate various aerodynamic forces and moments acting on vehicle.
CO-3	Calculate load distribution in vehicle body
CO-4	Explain the ergonomics, stability the vehicle
CO-5	Identify various sources of noise and methods of noise separation
CO-6	Identify the various safety aspects in a given vehicle.

Course: Mechanical Vibrations-10AU73

CO-1	Classify different types of vibration / damping associated with systems and vibration Measuring instruments
CO-2	Calculate natural frequency, damping, logarithmic decrement and other parameters of single degree of freedom un-damped
CO-3	Compute the response of single degree of freedom damped vibrating systems to different excitation forces
CO-4	Compare the natural frequencies modes of multi-degree of freedom free vibrating systems using numerical methods
CO-5	Explain the natural frequencies / modes of multi-degree of freedom free vibrating systems using numerical methods
CO-6	Solve free damped vibrating systems problems

Course: Air Pollution and Control-10AU74

CO-1	Explain air pollution and pollutants, sources & their effects
CO-2	Describe different parameters responsible for pollutant formation
CO-3	Choose instruments for pollution measurements
CO-4	Analyze measurement of pollutants
CO-5	Understand mechanism of pollutant formation
CO-6	Understand various regulations governing Air pollution

Course: TTW-10AU752

CO-1	Gain the knowledge of different types of two and three wheeled vehicle
CO-2	Describe construction and working of different type of internal combustion engines for two and three wheeled vehicles.
CO-3	Lay down wiring diagram for two-wheeler and three wheeled vehicles.
CO-4	Describe types of frames, brakes and tires used for two and three wheeled vehicles.
CO-5	Explain types of clutches, transmission and final drives used for two and three wheeled vehicles.

CO-6	Understand various ignition and lubrications systems in TTW vehicle

Course: Fluid Mechanics-15AU42

CO-1	Define fluid properties, describe Pascal's law, Hydrostatic law, and solve static fluid problems
CO-2	Explain Buoyancy and Stability concepts of floating objects
CO-3	Explain the different methods of measurement of flows
CO-4	Analyze various forces acting on submerged bodies in engineering flow problems
CO-5	Explain the concepts of laminar flow, viscous flow through pipes and plates
CO-6	Analyze various forces acting on submerged bodies

Course: Kinematics of Machine-15AU43

CO-1	Identify degrees of freedom, mechanism, structure, mobility of various mechanisms. Analyse mechanisms using Grubler's criterion, Classify mechanisms in to continuous and Intermittent motion mechanisms
CO-2	Ability to calculate the velocity and acceleration of Planar Mechanisms
CO-3	Determine the path of contact, arc of contact, contact ratio of a Spur gear
CO-4	Design the epicyclic gear trains to find the speed and number of teeth in a gear train
CO-5	Construct the various types of follower motions and design cams and followers for specified motion profiles

Course: Automotive Engines -15AU44

CO-1	Explain the constructional details of SI and CI engines and classify engines
CO-2	Explain the construction and working of carburetors and fuel injection pumps
CO-3	Explain the combustion process in SI and CI engines
CO-4	Suggest an efficient cooling system for IC engines
CO-5	Suggest a proper lubricant to be used in an automobile used in various environmental conditions

Course: Computer Aided Machine Drawing -15AU45

CO-1	Use the Solid Edge software for drawing and solid modelling, Sketch the solutions of the sections of solids, determine the inclination of the cutting plane when true shape of section of an object is given

CO-2	Sketch and draw the orthographic views of simple machine parts (top view, front view, side view) using first angle projection
CO-3	Sketch and draw the sectional views of simple machine parts, sketch and draw ISO metric threads, Square, ACME & BSW forms of threads using conventional representation
CO-4	Distinguish between temporary and permanent joints and sketch and draw the different types of key, Sketch and draw two views of different types of riveted joints
CO-5	Sketch and draw two views of different automotive components, couplings and joints, create solid models of different parts and assemble them and draw their sectional views using Solid Edge software
CO-6	Prepare assembly drawings along with their bill of material

Course: Manufacturing Process 2-15AU46

CO-1	Define various terminologies used in production technology
CO-2	Explain basic concepts used in construction of various machine tools
CO-3	Analyze the various mechanisms underlying the working of various machine tools
CO-4	Select the appropriate machining process depending on the properties of the raw material required to produce the desired product
CO-5	Realize the significance of non-traditional machining
CO-6	Realize the significance of technological advances in the field of automating manufacturing engineering activities

Course: Automotive Chassis and Suspension-15AU61

CO-1	Explain different chassis layouts and frames solve for stability and weight distribution and suitability of frames
CO-2	Describe, about various Front Axles, factors of wheel alignment Steering Systems and Calculate dimensions of Front Axle
CO-3	Discuss about various types Propeller Shaft, Differential and Rear Axles and to solve numerical
CO-4	Compare various types of Brakes and components of braking system
CO-5	Understand various steering mechanisms
CO-6	Solve vehicle stability problems

Course: Heat & Mass Transfer-15AU62

CO-1	Explain fundamental principles and laws of conduction, convection and radiation modes of heat transfer

CO-2	Analyze one dimensional steady state heat transfer
CO-3	Understand for heat flow and temperature distribution in plan wall.
CO-4	Understandthedesignandperformanceanalysisofheatexchangersandtheirpractical applications, mass transfer theories, Condensation and Boiling phenomena
CO-5	Apply laws of radiation heat transfer to solve engineering problems
CO-6	Analyze one dimensional steady state heat transfer, unsteady state heat transfer, dimensional forced convection heat transfer problems

Course: Design of Machine Elements II -15AU63

CO-1	Students learn basic types of curved beams its stresses
CO-2	Memorize the terminology of springs and its types
CO-3	Able to understand terminologies and design of Gears
CO-4	Demonstrate the suitability of a type and class of lubricant for a specific application
CO-5	Illustrate the design of clutches
CO-6	Learn the types of brakes, specification and lubrication its design

Course: Automotive Transmission-15AU64

CO-1	Explain the constructional and working principle of different types of fluid flywheel, torque converter and one-way clutches
CO-2	Explain the constructional and working principle of different types of gear box
CO-3	Determine the gear ratio, speed of vehicle and number of teeth on driving and driven gears
CO-4	Explain the necessity, advantages, constructional and principle of operation of different types of automatic transmissions and hydraulic control
CO-5	Understand different gear selector mechanisms
CO-6	Understand various mechanical factors of vehicle movement

Course: Non-Destructive Testing -15AU663

CO-1	Explain Principles of selection of NDE.
CO-2	Describe various inspection methods like Magnetic particle & Radiographic Inspection
CO-3	Various inspection methods Computed Tomography (CT) & Thermal Inspection
CO-4	Various inspection methods Optical Holography & Eddy Current Inspection
CO-5	Ultrasonic Inspection, Acoustic Emission Inspection:
CO-6	Verify proper assembly and Inspect for in-service damage

Course: Earth Moving equipment's and Tractors-10AU81

CO-1	Classify the different types of earth moving equipments and its applications
CO-2	Understand the engine and undercarriage components and suspension systems
CO-3	List the transmission system and types of reduction of final drives
CO-4	Outline the overall hydraulic system and its applications
CO-5	Understand the steering and breaking of earth moving equipment and maintenance and safety procedure

Course: Autotronics-10AU82

CO-1	Identify the type of control system, their applications, Evolution of Mechatronics
CO-2	To Understand evolution of microprocessors, organization of microcomputers
CO-3	Analyze the micro processor programs and develop advanced mechatronics system
CO-4	Understand various automotive applications
CO-5	Explain organization and programming of Micro processor
CO-6	Explain Application of mechatronics with respect to Automotive field

Course: Alternative Energy Sources for Automobiles-10AU834

CO-1	Describe need for alternative fuels for Internal combustion engine and alternative drive systems for automobiles
CO-2	Describe principle of solar energy collection, construction of photo voltaic cells
CO-3	Explain various properties, methods of production of Bio gas, methanol, ethanol, SVO, Bio diesel
CO-4	Explain use of hydrogen for internal combustion engine application
CO-5	Describe use of various gaseous fuels for internal combustion engine application
CO-6	Understand various aspects of electrical and Hybrid vehicles

Course: Hybrid Vehicles-10AU841

CO-1	To understand an automobile engine components and Hybrid system, construction, operation, applications relative to automotives
CO-2	To improve performance of Hybrid Architecture engine by super charger, turbocharger & ignition system.
CO-3	Develop the concept of different gear system and power transmission system to rear wheel and of the I C engine.

CO-4	To control emission levels in the atmosphere as well as to bring environment friendly vehicles
CO-5	Explain the sizing of Drive system, Sizing power electronics
CO-6	Characteristics of Fuel Cell types and Alkaline fuel cell and hydrogen storage systems

CHILDREN'S EDUCATION SOCIETY (Regd.)
THE OXFORD COLLEGE OF ENGINEERING
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Department of Biotechnology

Vision of the Institute

To be a respected and most sought after engineering educational institution engaged in equipping individuals capable of building learning organizations in the new millennium.

Mission of the Institute

To develop competent students with good value systems and face challenges of the continuously changing world.

Vision of the Department

Aspiring to be recognized as a premier source of outstanding graduates, who in turn will help their enterprise attain and sustain industrial and societal competitiveness.

Mission of the Department

To create and disseminate knowledge by being accountable for developing and motivating our pupils to attain academic excellence and industrial competency. With our focus on teaching, learning & research, we engage in helping our students to face challenges in the field of Biotechnology

Program Specific Objectives

1: Graduates will gain and apply knowledge of Science, Biotechnology and Engineering concepts in order to design and perform the experiments followed by validating the data to solve complex problems in the multidisciplinary research fields of Biotechnology.

2: Graduates will be able to analyze, appraise and develop technologies to address the Biotechnology Engineering problems while keeping in mind safety & ethical factors to safeguard the environment and society at large.

Program Educational Objectives

1. To endow students with basics of mathematics, life sciences and engineering necessary to analyze and solve scientific problems.
2. To provide students with the necessary instructions and relevant practical experience combined with exposure to and adequate training to face basic challenges in Biotechnology.
3. To inculcate scientific temperament in students to pursue and engage in research projects related to health, food and environment.
4. To prepare students with efficient communication skills, team spirit and leadership qualities and awareness of professional conduct and mould them into responsible and competent engineers.
5. To empower students to work in scientific environment with ethical values and social responsibilities.

Program Outcomes

1. Engineering knowledge: Apply the knowledge of mathematics, science, engineering fundamentals, and an engineering specialization to the solution of complex engineering problems.

2. Problem analysis: Identify, formulate, review research literature, and analyse complex engineering problems reaching substantiated conclusions using first principles of mathematics, natural sciences, and engineering sciences.

3. Design/development of solutions: Design solutions for complex engineering problems and design system components or processes that meet the specified needs with appropriate consideration for the public health and safety, and the cultural, societal, and environmental considerations.

4. Conduct investigations of complex problems: Use research-based knowledge and research methods including design of experiments, analysis and interpretation of data, and synthesis of the information to provide valid conclusions.

5. Modern tool usage: Create, select, and apply appropriate techniques, resources, and modern engineering and IT tools including prediction and modelling to complex engineering activities with an understanding of the limitations.

6. The engineer and society: Apply reasoning informed by the contextual knowledge to assess societal, health, safety, legal and cultural issues and the consequent responsibilities relevant to the professional engineering practice.

7. Environment and sustainability: Understand the impact of the professional engineering solutions in societal and environmental contexts, and demonstrate the knowledge of, and need for sustainable development.

8. Ethics: Apply ethical principles and commit to professional ethics and responsibilities and norms of the engineering practice.

9. Individual and team work: Function effectively as an individual, and as a member or leader in diverse teams, and in multidisciplinary settings.

10. Communication: Communicate effectively on complex engineering activities with the engineering community and with society at large, such as, being able to comprehend and write effective reports and design documentation, make effective presentations, and give and receive clear instructions.

11. Project management and finance: Demonstrate knowledge and understanding of the engineering and management principles and apply these to one's own work, as a member and leader in a team, to manage projects and in multidisciplinary

environments.

12. Life-long learning: Recognize the need for, and have the preparation and ability to engage in independent and life-long learning in the broadest context of technological change.

Course Name: C202 (UNIT OPERATIONS -15BT32)

C202.1	State and describe the nature and properties of the fluids
C202.2	Classify fluid systems and understand its behaviour and derive equations governing fluid flow
C202.3	Study the different flow measuring instruments and demonstrate applications of Bernoulli's theorem in venturimeter, orifice meter and pumps.
C202.4	Illustrate the working of size reduction, sedimentation and mixing equipments.
C202.5	Understand the working of mass transfer operations and distinguish them
C202.6	Design and operate the heat exchange equipment

Course Name: C203 (Biochemistry -15BT33)

C203.1	Able to understand the basic concepts of biochemical reaction mechanisms, pH, buffer systems and stereochemistry
C203.2	Able to describe the structural and functional properties of biomolecules, their three dimensional organization and structure function relationships
C203.3	Able to comprehend the importance of cell membranes, transport mechanisms and the principles of molecular recognition and communication
C203.4	Able to interpret principles of bioenergetics of high energy compounds and the principles of photosynthetic machinery.
C203.5	Able to outline metabolic pathways of various biomolecules
C203.6	Able to evaluate the importance of the enzymes responsible for the homeostasis of biochemical reactions

Course Name: C204 (Microbiology -15BT34)

C204.1	Describe the structure and function of typical prokaryotic and eukaryotic cell structure like bacteria, algae, yeast & molds, protozoa, viruses, etc.
C204.2	lity to isolate, grow, identify the microorganisms.
C204.3	Study of equipments like LAF, hot air oven, autoclave microscope etc. and their role in sterilization and understanding the mechanism of chemical-based sterilization
C204.4	Learning to disinfect the microbes and to work in sterile environment.

C204.5	Define the role of microorganisms towards environmental protection, industrial applications and infectious diseases their diagnosis and control of the spread of the disease.
C204.6	Out-line industrial fermentation processes leading to the production of antibiotics, organic acids, enzymes, vitamins and therapeutic products.

Course Name: C205 (Cell Biology and Genetics -15BT35)

C205.1	Able to summarize and recollect the concepts of cell biology and understand the cell organelles and functions
C205.2	To analyze the knowledge of cell division and importance of cell cycle regulation and cell locomotion
C205.3	Explain the concepts of haematology and Growth factors
C205.4	understand the structure of genetic material, classical experiments and Mendelian laws of Inheritance
C205.5	Illustrate the gene interactions, linkage, mapping and the structure of chromosome.
C205.6	To interpret the knowledge of population genetics in brief &apply the fundamental aspects of genetics in biotechnology

Course Name: C206 (Basics of Computer Applications -15BT36

C206.1	Gain knowledge on implementation of programming languages to develop biological software tools.
C206.2	Able to develop their own web pages, databases and data mining.
C206.3	Students will be able to implement SQL and HTML in biological databases
C206.4	Graduates will be able to design Biological databases using ontology terms
C206.5	Students will be able to apply programming skills using MATLAB and excel in biological problems.
C206.6	Students will be designing programming protocols using C .C++ for Biological and Health care problems.

Course Name: C207 (UNIT Operations Laboratory -15BTL37)

C207.1	Arrive at required results based on experimental observations recorded systematically.

C207.2	Study and illustrate the working of different flow measuring instruments
C207.3	Understand and estimate the shape and size of irregular particles by sieve analysis
C207.4	Demonstrate the experimental procedure for mass transfer operation though distillation and diffusion studies.
C207.5	Study heat transfer operation in double pipe heat exchanger and compare flow
	patterns of double pipe heat exchanger
C207.6	Understand operation of centrifugal and reciprocating pumps by varying flow rates

Course Name: C208 (Microbiology Laboratory-15BTL38)

C208.1	To use different laboratory equipment and instruments such as Microscope, Laminar Air Flow Station, Autoclave, oven, incubators
C208.2	Prepare the media and use for the cultivation of the microorganisms.
C208.3	Perform laboratory experiments for the isolation, identification and characterization of microorganisms
C208.4	Carry-out experiments for the enumeration, staining and control.
C208.5	Understanding the biochemical characterization of microbes to establish taxonomic classification.
C208.6	Ability to interpret the growth pattern and mechanism and correlation w.r.t industrial microbiology

Course Name: C209 (Biostatistics and Biomodelling -15BT41)

C209.1	The students will be able to explain the concepts of data collection, presentation of charts, graphs & data
C209.2	The students will be able to describe different laws of probability
C209.3	The students will be able to apply concepts of analysis of variance in inferring the statistical data
C209.4	The students will be able to analyze different methods in design of experiments
C209.5	The students will be able o evaluate the case studies of lung cancer, endangered plants species

C209.6	The students will be able to recognize how data illuminate ethical, political, scientific, economic and overall public health issues

Course Name: C210 (Biochemical Thermodynamics -15BT42)

C210.1	State & describe the concepts of system, surrounding, process, laws of thermodynamics & entropy
C210.2	Explain the PVT behaviour of pure fluids and derive equations of state for real gases
C210.3	Distinguish between various equations of state & their applications and analyze the thermodynamic diagrams
C210.4	Determine the importance of partial molar properties, activity co-efficient of solution & the concepts of phase equilibrium.
C210.5	Summarize vapor liquid equilibrium data for ideal solutions
C210.6	Illustrate the phase rule for reacting systems and effect of temperature, pressure on equilibrium constants

Course Name: C211 (Molecular Biology -15BT43)

C211.1	Explain replication, transcription and translation processes with underlying differences in prokaryotic and eukaryotic systems
C211.2	Recognize and explain the role of enzymes and factors involved in replication, transcription and translation
C211.3	Describe the regulation of gene expression in prokaryotes and eukaryotes and interpret its importance
C211.4	Elaborate importance of genetic recombination with special reference to bacterial system
C211.5	Categorize DNA damage occurring in living system and outline repair mechanisms
C211.6	Apply the knowledge of molecular biology in biotechnological applications

Course Name: C212 (Bioprocess Principles & Calculations -15BT44)

C212.1	To understand the concept of unit conversions and basic chemical calculations
C212.2	To understand and calculate material balances around steady- state multi-unit processes with and without chemical reactions

C212.3	To understand and solve energy balances around multi-unit processes with and without chemical reactions
C212.4	To explain the various unit operations involved in bioprocess engineering
C212.5	To apply the calculations involving fuels and combustion
C212.6	To implement Stochiometric requirements of reactants and products in biochemical reactions

Course Name: C213 (Bioprocess Principles & Calculations -15BT45)

C213.1	Apply the principles of macromolecular structure and function
C213.2	Identify the development of recent methods available for molecular function
C213.3	Ability to analyze the structural difference & similarity in bimolecular structure
C213.4	Ability to understand the concept of biomolecules identification technique or method
C213.5	Evaluate theoretical and computational skills of biophysical aspects in structure activity studies.
C213.6	Formulate complete and logical plan for data analysis of structure activity studies in drug design, molecular docking and other applications

Course Name: C214 (Clinical Biochemistry -15BT46)

C214.1	Able to discuss the biochemistry and pathophysiology associated with various disorders of cellular metabolism and inborn errors of metabolism.
C214.2	Able to describe the structure and function of metabolic pathways for carbohydrates, amino acids and lipids and their corresponding clinical conditions.
C214.3	Able to analyze the medical problems associated with abnormal lipoprotein and enzyme levels and therapeutic agents used to treat such disorders.
C214.4	Able to assess the clinical manifestations of renal, hepatic, pancreatic, gastric and intestinal functions.
C214.5	Able to understand and outline the significance of hormonal systems and their corresponding disturbances.
C214.6	Able to evaluate the biochemical and clinical aspects of haematology including measurement of coagulation and thrombosis.

Course Name: C215 (Cell & Molecular Biology Laboratory -15BTL47)

C215.1	Acquire knowledge about cell division & identify the stages of mitosis & meiosis
C215.2	Analyze and select a suitable method for DNA, RNA & protoplast related experiments
C215.3	Perform gene transformation using the appropriate method
C215.4	Understand and apply method of competent cells, protoplast preparation and protoplast fusion for biotechnological applications
C215.5	Analyze and select a suitable method for separation of DNA by electrophoretic method
C215.6	Understand and analyze the principle of thermal cycler

Course Name: C216 (Clinical Biochemistry Laboratory -15BTL48)

C216.1	Able to understand and use many of the techniques and tools of biochemistry
C216.2	Able to explain the basic concepts of pH, buffers and colorimeter
C216.3	Able to comprehend fundamental principles of biochemical research and conduct qualitative and quantitative analysis of biological samples for
	constituents like glucose, urea, phosphate, iron & cholesterol
C216.4	Able to evaluate the properties of important biomolecules like carbohydrates, amino acids, proteins & lipids
C216.5	Able to implement experimental protocols, and adapt them to plan and carry out simple clinical investigations to identify biomolecules based on their color reactions
C216.6	Able to develop basic laboratory skills and use apparatus to obtain reproducible data from biochemical experiments and analyze, interpret, and report the results of clinical investigations.

Course Name: C301 (Bio-Kinetics and Bio-Reaction Engineering -15BT51)

C301.1	Understand the theories of chemical reaction and analyze experimental reaction kinetics data
C301.2	Distinguish ideal reactor systems and develop performance/design equations for conversion and space velocity

C301.3	Understand the non-ideal behaviour of reactor systems and residence time distribution of reactant molecules
C301.4	Define concepts involved in enzyme-catalyzed reaction and develop equations for enzyme substrate reaction and describe regulatory enzymes
C301.5	Compare media and sterilization techniques for industrial fermentation process and understand kinetics of microbial growth
C301.6	Design a system, component or process to meet desired needs within realistic constraints.

Course Name: C302 (Genetic Engineering and Applications -15BT52)

C302.1	Able to explain the basic concepts of gene cloning and of applications recombinant DNA technology
C302.2	Able to categorize vectors, enzymes and nucleic acid purification strategies important for transgenic technology, gene manipulation concepts and transgene methods.
C302.3	Able to outline and assess specific techniques like PCR, hybridization & construction of libraries used in genetic engineering
C302.4	Able to appraise the different gene/DNA transfer techniques to produce transgenic organisms
C302.5	Able to comprehend various methods of producing transgenic plants and animals and engineering microbes for the production of useful products like enzymes and antibiotics
C302.6	Able to formulate specific applications of genetic engineering for the welfare of mankind & society.

Course Name: C303 (Immunotechnology -15BT53)

C303.1	Classify the immune system and summarize their functions
C303.2	Outline the molecular and cellular mechanisms involved in the development of the immune response
C303.3	Explain the regulatory mechanism involved in development of immune response
C303.4	Describe the cause, challenges and treatment for Immune System Pathologies
C303.5	Describe the cause, challenges and treatment for Immune System Dysfunctions

C303.6	Apply the major immunological laboratory techniques and their application to both clinical analysis and experimental research

Course Name: C304 (Bioinformatics -15BT54)

C304.1	Students will use basic biological concepts, grounded in foundational theories, to interpret relationships among living things and to analyze and solve biological problems.
C304.2	To know the relevant online resources, databases and software tools
C304.3	To understand the underlying concepts of Bioinformatics in disease understanding
C304.4	To be able to design for engineering proteins and genetic engineering.
C304.5	Analyse biological data using modelling, predictive and drug design methods
C304.6	The students will be familiar with tools and techniques of bioinformatics and they can apply these techniques to Health care and pharmacy industry.

Course Name: C305 (Bioinstrumentation & Biosensors -15BT554)

C305.1	Understand the concept of transduction and methods of extracting information from biosensors.
C305.2	Gain knowledge in the state of the art of biological and medical sensors both in research and commercial products.
C305.3	Be familiar with a wide range of sensors and instrumentation from electrochemical to optical.
C305.4	Understand typical electronic instrumentation for biosensors and important concepts such as calibration and references.
C305.5	Gain knowledge of actuators for biological and medical applications from drug
	delivery devices to microfluidic systems
C305.6	Analyze sensor outputs through the use of signal processing and analogue circuit concepts

Course Name: C306 (Bioinstrumentation & Biosensors -15BT563)

C306.1	Apply reasoning to identify the components of environmental eco systems and effect of pollutant on environment.

C306.2	Characterize the various parameters for treatment of water, waste water and solid waste from their sources to provide valid conclusions.
C306.3	Identify major air pollutants and the methods to quantify it.
C306.4	Understand the impact of recovery, recycle of the useful resources from the wastes by adopting advanced techniques
C306.5	Able to demonstrate the need for sustainable development.
C306.6	Identify and demonstrate the knowledge to use suitable equipment for abatement and control of air & noise pollution

Course Name: C307 (Genetic Engineering and Immunotechnology Laboratory -15BTL57)

C307.1	Categorize the blood group and analyze the sample for diagnosis of typhoid.
C307.2	Measure the concentration of antigen or antibody present in the sample by selecting the appropriate immunochemical technique and infer the results
C307.3	Choose a suitable experimental method to isolate, quantify & measure the concentration of DNA& RNA
C307.4	Demonstrate the use of PCR and prepare amplified DNA using thermal cycler
C307.5	Perform gene transformation using the appropriate method
C307.6	Analyze and identify the DNA & protein by suitable technique

Course Name: C308 (Bioinformatics Laboratory -15BTL58)

C308.1	The students will be gaining expertise on practical data analytics, Data mining, machine learning.
C308.2	Utilize the biological information from public databases for given particular problem in biotechnology, medicine or biology.
C308.3	To gain foundational knowledge about molecular evolution, protein structure and gene expression using computational tools.
C308.4	Ability to write computer programs in various programming techniques to analyze bioinformatics data
C308.5	To apply the tools to address important problems of biotechnology and to verify the capability in handling a research project.

C308.6	The students will be able to visualize data and will apply this knowledge towards analysis of data related to graphical interfaces in the fields of systems biology ,functional genomics, and biomedicine

Course Name: C309 (Bio-Business and Entrepreneurship -15BT61)

C309.1	To understand analyze and explore entrepreneurship opportunity in biotechnology
C309.2	To Analyze societal problems and derive biotech based scientific solutions.
C309.3	To accelerate innovation and conservation of IPR
C309.4	To Explore funding opportunity for innovations and start-ups.
C309.5	To Exploit business opportunity through expired patent, technology learning and licencing.
C309.6	To illustrate scientific problem into a project proposal.

Course Name: C310 (Bioprocess Control and Automation -15BT62)

C310.1	Able to describe the Instrumentation of flow, pressure, temperature.
C310.2	Able to determine the transient response and to derive the transfer functions of first order systems and first order systems in series and to solve problems of response of first order systems for different types of input.
C310.3	Able to determine the transient response and to derive the transfer functions of second order systems.
C310.4	To Understand the parameters to be measured and controlled in the bioreactor.
C310.5	Able to apply the design aspects for block diagrams and use the concept of stability for solving the problems.
C310.6	Able to analyze online data and understand the dynamics and control of bioreactors.

Course Name: C311 (Enzyme Technology & Biotransformation -15BT63)

C311.1	Classify and identify the enzymes based on the biochemical reaction catalyzed by them
C311.2	Compare enzymes and catalyst, and explain the mechanism of enzyme catalysis
C311.3	Recognize & Interpret the importance of enzymes in medicine

C311.4	Explain the methods involved in study of enzyme kinetics , standardization and
	optimization of enzyme catalyzed reactions
C311.5	Compare immobilized enzymes over conventional enzymes, apply the knowledge of immobilized enzymes in bioprocess industry
C311.6	Summarize the applications of enzymes in medicine and industry

Course Name: C312 (Bioprocess Equipment Design & CAED -15BT64)

C312.1	To define the notations and terminology for welding and pipe joints.
C312.2	To draw various values and joints.
C312.3	To calculate the no of tubes, diameter and different parameter of double pipe heat exchanger.
C312.4	To calculate the dimensions of shell and tube heat exchangers.
C312.5	To apply the design aspects by solving the problems.
C312.6	To evaluate the no of plates & height of packing in distillation column and to design the fermenter.

Course Name: C313 (Cell Culture Techniques -15BT653)

C313.1	Ability to understand the importance of equipments a, their sterilization and usage aspects
C313.2	Able to Differentiate between the various sources of cells to be used in cell culture techniques
C313.3	Ability to Correlate between different biological samples and understand the importance of different media in tissue culture
C313.4	Ability to Comprehend the applications of plant tissue culture and their utilization.
C313.5	Ability to Comprehend the applications of animal and microbial cell culture in industry, healthcare and environment.
C313.6	Appraise the role of biotechnology in plant, animal and microbial sciences for sustainable eco-system & human welfare

Course Name: C314 (Biological Data Management -15BT661)

C314.1	To understand the types of databases and their data formats.
C314.2	To analyze biological data.

C314.3	To elaborate the use of microarray based data analysis.
C314.4	To study the importance of various Omics experiments, data generation techniques, data management strategies and their effective utilization
C314.5	To analyze omics based data for effective usage in biotechnology.
C314.6	To comprehend the nature of Clinical Data its management & related basic operations data integration, data

Course Name: C315 (Bioprocess Control & Automation Laboratory-15BTL67)

C315.1	To understand the characteristics of transducers of temperature, pressure & flow
C315.2	To understand determine the oxygen demand required for biological degradation of pollutant
C315.3	To analyze the response of first order systems for step and impulse input
C315.4	To interpret the response of first order systems.
C315.5	Describe the principles of controllers
C315.6	To explain the concept of control of DO& agitation

Course Name: C316 (Biokinetics And Enzyme Technology Laboratory -15BTL68)

C316.1	Able to apply principles of protein chemistry and enzymology for analysis and study of enzymes as biocatalysts
C316.2	Able to investigate various methods available for isolation, purification and characterization of enzymes
C316.3	Able to apply the principles and methods of immobilization of enzymes useful in a diverse range of industries
C316.4	Able to assess biokinetics parameters using different reactors
C316.5	Able to implement experimental protocols, and adapt them to plan and carry out investigations to relate experimental data with fundamental theories of enzyme kinetics
C316.6	Able to use basic laboratory skills and apparatus to obtain reproducible data from biochemical experiments and analyze, interpret, and report the results.

Course Name: C401 (Economics and Plant Design - 10BT71)

C401.1	Acquire knowledge in the design of process of a chemical plant

C401.2	The students will be able to develop step by step procedure for plant design considering all the types of design procedure
C401.3	Able to evaluate the capital investments, manufacturing cost required for the process plant
C401.4	The students will be capable of analyzing the cost and time value of money
C401.5	Understand the concept of depreciation, Profitability and taxes
C401.6	Generate the reports and statements needed for the economic evaluation

Course Name: C402 (Upstream Process Technology - 10BT72)

C402.1	Understand concept of in-vitro plant cell and tissue culture and design protocol for mass propagation of plants and for production of beneficial therapeutic metabolite
C402.2	Develop knowledge and applications of in-vitro animal cell culturing
C402.3	Appreciate the concept of hybridoma technology for custom made MAB and protein production through in-vitro animal cell culture
C402.4	To study the microbial cell culture techniques
C402.5	Specify, formulate and analyze fermentation technology to efficiently generate biotech products for the domains related to food, health and environment
C402.6	Specify, select and formulate Biotechnology based solutions, for sustainable development conceiving ethical and social issues.

Course Name: C403 (Downstream Process Technology - 10BT73)

C403.1	Understand and explain the importance of downstream processing in biochemical processes
C403.2	To design and implement protocol in Downstream processing of different types of biochemical products
C403.3	Apply the knowledge in design, economics, validation, optimization and scale-up of biochemical product recovery
C403.4	Compare the uses of conventional unit operations, as well as new concepts and emerging technologies in DSP
C403.5	Analyse and compare various parameters that has to be considered during scale up of chromatographic process
C403.6	Summarize the role of QC, QA, GMP & GLP in bioprocess industry

Course Name: C404 (Food Biotechnology - 10BT74)

C404.1	Strong knowledge in present trends in Food Processing and strategies so that they can analyse the self life and nutritional qualities to cater the need of society.
C404.2	In depth knowledge to carry out the association between the scientific and technological principles underlying the major elements of Food Technology and Chemical Engineering.
C404.3	Efficiently apply the instrumentation knowledge in Food processing, Food formulation which can be appropriately applied in food processing industry.
C404.4	With knowledge of processing and preservation can undertake research project or case study to assess food product for local consumption.
C404.5	After the detailed study can explore the field of food processing industry and food technological research work
C404.6	Knowledge and understanding of different tools used, production of recombinant proteins and additives to use in food technology, and ethics and safety of food biotechnology.

Course Name: C405 (FORENSIC SCIENCE - 10BT753)

C405.1	Understand the history, legal procedures, application of forensic science.
C405.2	Employ scientific crime detection techniques for collecting and categorizing crime scene data & different types of crime detection units.
C405.3	Demonstrate the ability to conduct interviews and interrogations, develop and investigative plans, follow up investigative leads, and document their findings
C405.4	Carry out detection tests in the area of laboratory forensic biology, Serology & toxicology
C405.5	Demonstrate problem-solving skills and the ability to interpret the statistical data and to develop algorithms for solving problems
C405.6	Evaluate the professional codes of ethics outlined by various professional forensic science organizations

Course Name: C406 (Biochips and Microarray Technology - 10BT761)

C406.1	Able to understand basic concepts of gene expression

C406.2	Able to know mechanism of MA construction & different types like Protein chip, tissue chip.
C406.3	To apply to concepts of programming and statistics in data analysis
C406.4	Able to understand concepts of MA in drug discovery
C406.5	Capability of analysis of data and finding biomarkers in cancer studies
C406.6	Capacity to develop target validation test by microarray.

Course Name: C407 (Upstream Process Bioprocessing Lab - 10BTL77)

C407.1	Acquire the basics of media preparation, inoculation techniques of plant cell culture
C407.2	Understand process of suspension culture development and induction of Secondary metabolite
C407.3	Demonstrate and practice the Estimation of Lycopene from fruits and
	Anthocyanin from leaf /callus tissue
C407.4	Acquire the knowledge of. Estimated and Protein from biological samples
C407.5	Understand and analyse the process of inoculum development and Shake flask studies in bioprocess
C407.6	Demonstrate fermenter operation

Course Name: C408 (Downstream Process Bioprocessing Lab - 10BTL78)

C408.1	Analyze and select appropriate unit operations for isolation and purification of bio molecules.
C408.2	Evaluate the bio-product using appropriate qualitative and quantitative analysis methods depending upon the chemical nature of analyte
C408.3	Analyze, compare and select a technique for concentrating biological products like extraction, precipitation, membrane separation
C408.4	Acquire the basic principles and techniques of chromatography to purify the biological products
C408.5	Enhance product quality by appropriate method of purification operation
C408.6	Analyze the proteins by SDS-PAGE and Western blotting techniques

Course Name: C409 (Project Management & IPR - 10BT81)

C409.1	Able to understand and utilize the knowledge of IP to get patent on their inventions
C409.2	This will help student in future to file the patent and processing of patent
C409.3	They can obtain patent in different fields of biotechnology.
C409.4	Students will develop capabilities for planning, executing, controlling and evaluating projects,
C409.5	Students will develop the skill of risk management and managing project lifecycles, resources, schedules and budgets.
C409.6	Students will understand the major principles and practices of project management applied to product contexts in the biotechnology industry.

Course Name: C410 (Bioethics & Biosafety - 10BT82)

C410.1	The students are able to interpret the ethical issues of biotechnology
C410.2	The students will build the knowledge of biosafety principles followed in BT research
C410.3	The students can categorize the transgenic research on the basis of biosafety principles, apply biosafety regulations & principles in transgenic research
C410.4	The students will have the knowledge about safety release of GMOs into environment & PBR
C410.5	The students will be able to devise business strategies by taking account of IPRs
C410.6	The students will be able to assists in technology up gradation and enhancing competitiveness.

Course Name: C411 (Lab to Industrial Scaling - 10BT832)

C411.1	Analyze the various parameters for bioreactor design.
C411.2	Identify appropriate qualitative and quantitative analysis methods depending upon the chemical nature of analyze.
C411.3	Enhance product output by selection of appropriate method of enrichment operation
C411.4	Enhance product quality by appropriate method of purification operation
C411.5	Analyze industrial problems in fermentation process and solving.
C411.6	Designing Bioreactors using computer programming skills

Course Name: C412 (Lab to Industrial Scaling - 10BT841)

C412.1	Explain the importance of microbial diversity in environmental system and process
C412.2	Distinguish between different pollutants and identify the appropriate treatment to relevant problem
C412.3	Understand and explain the importance of molecular approachs in environmental microbiology and biotechnology
C412.4	Explain the relevance of biotechnology in producing alternative fuels
C412.5	Describe existing and emerging technologies that are important in area of environmental biotechnology
C412.6	Describe biotechnological solutions to address environmental issues including pollution, mineral resources, renewable energy and water recycling

Course Name: C414 (Project Work - 10BT85)

C414.1	Identify a topic in relevant areas of Biotechnology
C414.2	Illustrate literature review to identify gaps and define objectives & scope of the work.
C414.3	Formulate the problem to meet the objectives of the proposed work
C414.4	Develop a prototypes/models, fabrication, experimental set-up/software systems necessary to meet the objectives
C414.5	Develop the work with a concern for society, environment and ethics

Course Name: C415 (Seminar - 10BT86)

C415.1	Enables to update with present technologies and trends in real world
C415.2	Enables to improve ability of data collection and presentation
C415.3	Enables to overcome stage fear and improve communication skills
C415.4	Enables to face spontaneous queries
C415.5	Prepare and write the report as per recommended format.
C415.6	Help to develop vocabulary & demonstrate efforts put in comprehensive analysis & interpretation of data

CHILDREN'S EDUCATION SOCIETY (Regd.)
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Department of Chemistry

Vision of the Institute

To be a respected and most sought after engineering educational institution engaged in equipping individuals capable of building learning organizations in the new millennium

Mission of the Institute

To develop competent students with good value systems and face challenges of the continuously changing world.

Vision of the Department

Our vision is to give our students an in-depth exposure to the latest developments in Chemistry made by reputed scientists and experts in this field. To equip individuals capable of earning in the new millennium.

Mission Of The Department

Our mission is to provide a contemporary foundation for addressing problems in Chemistry. Also to develop competent engineers with good values and to equip them to face the challenges of the continuously changing world.

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Program Educational Objectives

PEO 1. Mater the basic knowledge of Engineering Chemistry for building technical Competence in industries, research and development.

PEO 2. To develop knowledge in the fields of use of free energy in chemical Equilibrium, electrochemistry and energy storage systems, corrosion and metal finishing.

PEO 3. To understand the importance of the energy systems, environmental pollution, waste management, water chemistry, Instrumental methods of analysis and nano-materials.

PSO 1: Understand the principles of electrochemistry & battery technology

PSO 2: Apply the knowledge of Corrosion and metal finishing in solving environmental issues. **PSO 3**: Utilize the knowledge of fuels and solar energy for various Engineering applications **PSO 4:** Utilize the knowledge of water technology for various engineering applications as well as in daily life

Course Name: 17CHE12/22 (Engineering Chemistry)

CO1	Understand the principles of electrochemistry & battery technology in our day -today life.
CO2	Apply the knowledge of Corrosion and metal finishing in solving environmental issues.
CO3	Utilize the knowledge of fuels and solar energy for various Engineering applications
CO4	Apply the knowledge of polymer chemistry in replacement of conventional materials by polymers for various applications
CO5	Utilize the knowledge of water technology for various engineering applications
CO6	Develop solutions for problems associated with nano technology.

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Department of Civil Engineering

Vision of the Institute

To be a respected and most sought after engineering educational institution engaged in equipping individuals capable of building learning organizations in the new millennium.

Mission of the Institute

To develop competent students with good value systems and face challenges of the continuously changing world.

Vision of the Department

To impart very high-quality education to the students to make them do innovative sustainable engineering relevant to industry and people at large.

Mission of the Department

Mission 1. To emphasize on basics of engineering as well as their applications relevant to the industry

Mission 2. To serve the society with due consideration of economy, ecology and ethical issues of nation.

Mission 3. To sensitize the students and faculty to take up research and consultancy to beon par with international standards.

Program Educational Objectives

PEO 1.	Apply fundamental concepts of civil engineering in developing economically viable and sustainable sound solutions.
PEO 2.	To work collaboratively on multidisciplinary problems

Program Specific Objectives

PSO 1: Graduates will be able to apply technical skills and modern engineering tools for civilengineering day to day practice.

PSO 2: Graduates will be able to participate in critical thinking and problem solving of civilengineering field that requires analytical and design requirements

PSO 3: Graduates will be able to participate in critical thinking and problem solving of civil engineering field that requires analytical and design requirements.

Program Outcomes

1. Engineering knowledge: Apply the knowledge of mathematics, science, engineering fundamentals, and an engineering specialization to the solution of complex engineering problems.

2. Problem analysis: Identify, formulate, review research literature, and analyse complex engineering problems reaching substantiated conclusions using first principles of mathematics, natural sciences, and engineering sciences.

3. Design/development of solutions: Design solutions for complex engineering problems and design system components or processes that meet the specified needs with appropriate consideration for the public health and safety, and the cultural, societal, and environmental considerations.

4. Conduct investigations of complex problems: Use research-based knowledge and research methods including design of experiments, analysis and interpretation of data, and synthesis of the information to provide valid conclusions.

5. Modern tool usage: Create, select, and apply appropriate techniques, resources, and modern engineering and IT tools including prediction and modelling to complex engineering activities with an understanding of the limitations.

6. The engineer and society: Apply reasoning informed by the contextual knowledge to assess societal, health, safety, legal and cultural issues and the consequent responsibilities relevant to the professional engineering practice.

7. Environment and sustainability: Understand the impact of the professional engineering solutions in societal and environmental contexts, and demonstrate the knowledge of, and need for sustainable development.

8. Ethics: Apply ethical principles and commit to professional ethics and responsibilities and norms of the engineering practice.

9. Individual and team work: Function effectively as an individual, and as a member or leader in diverse teams, and in multidisciplinary settings.

10. Communication: Communicate effectively on complex engineering activities with the engineering community and with society at large, such as, being able to comprehend and write effective reports and design documentation, make effective presentations, and give and receive clear instructions.

11. Project management and finance: Demonstrate knowledge and understanding of the engineering and management principles and apply these to one's own work, as a member and leader in a team, to manage projects and in multidisciplinary

environments.

12. Life-long learning: Recognize the need for, and have the preparation and ability to engage in independent and life-long learning in the broadest context of technological change.

Course Name:232.1 (Strength of Materials-15CV32)

C232.1	To understand the basic material properties of structural materials such as steel, aluminium, wood and also their combinations under axial tension and compression.
C232.2	To learn methods of stress analysis after determining the internal forces under axial tension and compression, bending, shear and torsion.
C232.3	To evaluate the behaviour and strength of structural elements under the action of compound stresses and thus understand failure criteria.
C232.4	To understand the methods of analyses of design of structural frames such as pin jointed trusses and portal frames both determinate and indeterminate.
C232.5	To understand the basic concept of instability analyses of structural elements such as columns and struts.
C232.6	To understand the basic concepts of torsion developed in circular shaft.

Course Name:233.1 (Fluids Mechanics-15CV32)

C233.1	Possess a sound knowledge of fundamental properties of fluids and fluid continuum
C233.2	Compute and solve problems on hydrostatics, including practical applications
C233.3	Apply principles of mathematics to represent kinematic concepts related to fluid flow
C233.4	Apply fundamental laws of fluid mechanics and the Bernoulli's principle for practical applications
C233.5	Compute the discharge through pipes and over notches and weirs

Course Name:234.1 (BASIC SURVEYING -15CV34)

C234.1	Posses a sound knowledge of fundamental principles Geodetics[L1][PO1]
C234.2	Measurement of vertical and horizontal plane, linear and angular dimensions to arrive at solutions to basic surveying problems.
C234.3	Capture geodetic data to process and perform analysis for survey problems
C234.4	Analyze the obtained spatial data and compute areas and volumes. Represent 3D data on plane figures as contours

Course Name:235.1 (ENGINEERING GEOLOGY -15CV35)

C235.1	Students will able to apply the knowledge of geology and its role in Civil Engineering
C235.2	Students will effectively utilize earth's materials such as mineral, rocks and water in civil engineering practices.
C235.3	3. Analyze the natural disasters and their mitigation.
C235.4	Assess various structural features and geological tools in ground water exploration, Natural resource estimation and solving civil engineering problems
C235.5	Apply and asses use of building materials in construction and asses their
	properties

Course Name:236.1 (Building Materials and Construction-15CV36)

C236.1	Select suitable materials for buildings and adopt suitable construction techniques.
C236.2	Adopt suitable repair and maintenance work to enhance durability of buildings.

Course Name: C242 (Analysis of Determinate Structures(15CV42)

C242.1	To evaluate the forces in determinate trusses by method of joints and sections.
C242.2	To evaluate the deflection of cantilever, simply supported and overhanging beams by different methods
C242.3	To understand the energy principles and energy theorems and their applications to determine the deflections of trusses and bent frames.
C242.4	To determine the stress resultants in arches and cables.
C242.5	To understand the concept of influence lines and construct the ILD diagram for the moving loads.
C242.6	To know the comparison between moment area and conjugate beam method.

Course Name: C243(applied hydraulics 15CV43)

C243.1	Apply dimensional analysis to develop mathematical modelling and compute the parametric values in prototype by analyzing the corresponding model parameters
C213.2	Design the open channels of various cross sections including economical channel sections
C213.3	Apply Energy concepts to flow in open channel sections, Calculate Energy dissipation,
C213.4	Compute water surface profiles at different conditions

C213.5	Design turbines for the given data, and to know their operation characteristics under different operating conditions
C213.6	The working principles of the hydraulic machines for the given data and analyzing the performance of Turbines for various design data.

Course Name:C244 (concrete technology15CV44)

C244.1	Relate material characteristics and their influence on microstructure of concrete.
C244.2	Distinguish concrete behavior based on its fresh and hardened properties
C244.3	Illustrate proportioning of different types of concrete mixes for required fresh and hardened properties using professional codes.
C244.4	Adopt suitable concreting methods to place the concrete based on requirement.
C244.5	Select a suitable type of concrete based on specific application.
C244.6	Describe the physical & mechanical properties of aggregates

Course Name: C245 (Applied geotechnical Eng. 15CV45)

C245.1	Will acquire an understanding of the procedures to determine index properties of any type of soil, classify the soil based on its index properties
C245.2	Will be able to determine compaction characteristics of soil and apply that knowledge to assess field compaction procedures
C245.3	Will be able to determine permeability property of soils and acquires conceptual knowledge about stresses due to seepage and effective stress; Also acquire ability to estimate seepage losses across hydraulic structure
C245.4	Will be able to estimate shear strength parameters of different types of soils using the data of different shear tests and comprehend Mohr-Coulomb failure theory.
C245.5	Ability to solve practical problems related to estimation of consolidation settle soil deposits also time required for the same.
C245.6	To implement the knowledge attained in solving civil engineering problems of making roads, townships etc.

Course Name: C246 (Advanced Surveying 15CV46)

C246.1	Apply the knowledge of geometric principles to arrive at surveying problems
C246.2	Use modern instruments to obtain geo-spatial data and analyze the same to appropriate engineering problems.
C246.3	Capture geodetic data to process and perform analysis for survey problems with the use of electronic instruments;

C246.4	Design and implement the different types of curves for deviating type of alignments.
C246.5	To apply basic principles in analyzing position of celestial bodies
C246.6	To implement the knowledge attained in solving civil engineering problems of making roads, townships etc.

Course Name: C351(Design of RC Structural Elements 15CV52)

C252.1	Determine the moment in indeterminate beams and frames having variable moment of inertia and subsidence using slope defection method
C252.2	Determine the moment in indeterminate beams and frames of no sway and sway using moment distribution method.
C252.3	Construct the bending moment diagram for beams and frames by Kani's method.
C252.4	Construct the bending moment diagram for beams and frames using flexibility method
C252.5	Analyze the beams and indeterminate frames by system stiffness method

Course Name: C253: Applied Geotechnical Engineering-(15CV53)

C253.1	To evaluate the forces in determinate trusses by method of joints and sections.
C253.2	To evaluate the deflection of cantilever, simply supported and overhanging beams by different methods
C253.3	To understand the energy principles and energy theorems and their applications to determine the deflections of trusses and bent frames.
C253.4	To determine the stress resultants in arches and cables.
C253.5	To understand the concept of influence lines and construct the ILD diagram for the moving loads.

Course Name: C254Computer Aided Building Planning and Drawing(15CV54)

C254.1	Ability to plan and execute geotechnical site investigation program for different civil engineering projects
C254.2	Understanding of stress distribution and resulting settlement beneath the loaded footings on sand and clayey soils
C254.3	Ability to estimate factor of safety against failure of slopes and to compute lateral pressure distribution behind earth retaining structures
C254.4	Ability to determine bearing capacity of soil and achieve proficiency in proportioning shallow isolated and combined footings for uniform bearing pressure
C254.5	Capable of estimating load carrying capacity of single and group of piles

Course Name: C355(:Air pollution and Control (15CV551)

C355.1	1. Identify the major sources of air pollution and understand their effects on health and environment.
C355.2	2. Evaluate the dispersion of air pollutants in the atmosphere and to develop air quality models.
C355.3	3. Ascertain and evaluate sampling techniques for atmospheric and stack pollutants.
C355.4	4. Choose and design control techniques for particulate and gaseous emissions.

Course Name: C356(Traffic Engineering-(15CV561)

C356.1	Understand the human factors and vehicular factors in traffic engineering design.
C356.2	Conduct different types of traffic surveys and analysis of collected data using statistical concepts.
C356.3	Use an appropriate traffic flow theory and to comprehend the capacity & signalized intersection analysis.
C356.4	Understand the basic knowledge of Intelligent Transportation System.

Course Name: C361 (Construction Management & Entrepreneurship 15CV61)

C361.1	Understand the construction management process.
C361.2	Understand and solve variety of issues that are encountered by every professional in discharging professional duties.
C361.3	Fulfill the professional obligations effectively with global outlook
C361.4	Create a construction project and safety plan
C361.5	Apply construction management skills as a member of a multi disciplinary team.
C361.6	To make them understand the concept of project management for planning and execution.

Course Name: C262 (Design of Steel Structural Elements 15CV62)

C362.1	Possess knowledge of Steel Structures Advantages and Disadvantages of Steel structures, steel code provisions.
C362.2	Possess knowledge of Plastic behaviour of structural steel.
C362.3	Understand the Concept of Bolted and Welded connections,
C362.4	Understand the Concept of Design of compression members, built-up columns and columns splices.
C362.5	Understand the Concept of Design of tension members, simple slab base and gusseted base.

C362.6	Understand the Concept of Design of laterally supported and un-supported steel beams.

Course Name:C263 (Highway Engineering 15CV63

C363.1	Acquire knowledge of different modes of transportation systems, history, development of highways and the organizations associated with research and development of the same in INDIA.
C363.2	Acquire the capability of proposing a new alignment or re-alignment of existing roads, conduct necessary field investigation for generation of required data.
C363.3	Evaluate the engineering properties of the materials and suggest the suitability of the same for pavement construction.
C363.4	Design road geometrics, structural components of pavement
C363.5	Design of highway drainage structural elements
C363.6	Evaluate the highway economics by few select methods and also will have a basic knowledge of various highway financing concepts.

Course Name: C264 (Water Supply and Treatment Engineering 15CV64)

C364.1	Estimate average and peak water demand for a community
C364.2	Evaluate available sources of water, quantitatively and qualitatively and make appropriate choice for a community.
C364.3	Evaluate water quality and environmental significance of various parameters and plan suitable treatment system.
C364.4	Design a comprehensive water treatment and distribution system to purify and distribute water to the required quality standards.
C364.5	Study drinking water quality standards and to illustrate qualitative analysis of water
C364.6	Design physical, chemical and biological treatment methods to ensure safe and potable water Supply. Revise

Course Name:C265 (Solid Waste Management 15CV651)

C365.1	Analyse existing solid waste management system and to identify their drawbacks
C365.2	Evaluate different elements of solid waste management system.
C365.3	Suggest suitable scientific methods for solid waste management elements.
C365.4	Design suitable processing system and evaluate disposal sites.

C365.5	Analyze different processing technologies and to study conversion of municipal solid waste to compost or biogas.
C365.6	Evaluate landfill site and to study the sanitary landfill reactions.

Course Name:C261 (Water Resources Management 15CV661)

C3661.1	Assess the potential of groundwater and surface water resources.
C3661.2	Address the issues related to planning and management of water resources.
C3661.3	Know how to implement IWRM in different regions.
C3661.4	Understand the legal issues of water policy.
C3661.5	Select the method for water harvesting based on the area.
C3661.6	Understand the importance of water and manage the water resources effectively.

Course Name: C471 (Environmental Engineering II-(10CV71)

C471.1	Acquires capability to design sewer and Sewerage treatment plant.
C471.2	Evaluate degree of treatment and type of treatment for disposal, reuse and recycle.
C471.3	Identify waste streams and design the industrial waste water treatment plant.
C471.4	Manage sewage and industrial effluent issues.

Course Name: C472Design of Steel Structures (10CV72)

C472.1	Understand the importance of hydrology and its components.
C472.2	Measure precipitation and analyse the data and analyze the losses in precipitation.
C472.3	Estimate runoff and develop unit hydrographs.
C472.4	Find the benefits and ill-effects of irrigation.
C472.5	Find the quantity of irrigation water and frequency of irrigation for various crops. loads.
C472.6	Find the canal capacity, design the canal and compute the reservoir capacity.

Course Name: C473 (Estimation and Valuation (10CV73)

C473.1	Understand the importance of hydrology and its components.
C473.2	Measure precipitation and analyze the data and analyze the losses in precipitation.

C473.3	Estimate runoff and develop unit hydrographs.
C473.4	Find the benefits and ill-effects of irrigation.
C473.5	Find the quantity of irrigation water and frequency of irrigation for various crops. Loads.
C473.6	Find the canal capacity, design the canal and compute the reservoir capacity.

Course Name:C474Design of Pre-Stressed Concrete Structures (10CV74)

C474.1	find the characteristics of aquifers.
C474.2	estimate the quantity of ground water by various methods.
C474.3	locate the zones of ground water resources.
C474.4	select particular type of well and augment the ground water storage.

Course Name:475 (Highway Geometric Design-10CV755)

C475.1	Design, conduct and administer surveys to provide the data required for transportation planning.
C475.2	Supervise the process of data collection about travel behavior and analyse the data for use in transport planning.
C475.3	Develop and calibrate modal split, trip generation rates for specific types of land use developments.
C475.4	Adopt the steps that are necessary to complete a long-term transportation plan.

Course Name:476 (Pavement Materials and Construction-10CV763)

C476.1	Design, conduct and administer surveys to provide the data required for transportation planning.

C476.2	Supervise the process of data collection about travel behavior and analyse the data for use in transport planning.
C476.3	Develop and calibrate modal split, trip generation rates for specific types of land use developments.
C476.4	Adopt the steps that are necessary to complete a long-term transportation plan.

Course Name:C481(Advanced Concrete Technology10CV81)

C481.1	Prepare detailed and abstract estimates for roads and building.

C481.2	Prepare valuation reports of buildings
C481.3	Interpret Contract document's of domestic and international construction works
C481.4	Estimate the quantities of work, develop the bill of quantities and arrive at the Cost of civil engineering Project
C481.5	Understand and apply the concept of Valuation for Properties
C481.6	Understand, Apply and Create the Tender and Contract document

Course Name:C482Design and Drawing of Steel Structures10CV82)

C482.1	Understand the requirement of PSC members for present scenario
C482.2	Analyse the stresses encountered in PSC element during transfer and at working
C482.3	Understand the effectiveness of the design of PSC after studying losses
C482.4	Capable of analyzing the PSC element and finding its efficiency.
C482.5	Design PSC beam for different requirements
C482.6	learn Design of Pre-Stressed Concrete Element

Course Name: C483 (Pavement Design 10CV833)

C483.1	Gain knowledge about the process of collecting data required for design, factors affecting pavement design, and maintenance of pavement.
C483.2	Systematically generate and compile required data for design of pavement (Highway & Airfield).
C483.3	Analyse stress, strain and deflection by boussinesq's, burmister's and westergaard's theory.
C483.4	Design rigid pavement and flexible pavement conforming to IRC58-2002 and IRC37-2001.
C483.5	Understand the requirements of various types of joints in pavements, which are provided to take care of climatic variations.
C483.6	Evaluate the performance of the pavement and also develops maintenance statement based on site specific requirements.

Course Name: C483(Finite Element Analysis10CV841)

C484.1	Gain knowledge about the process of collecting data required for design, factors affecting pavement design, and maintenance of pavement.
C484.2	Systematically generate and compile required data for design of pavement (Highway & Airfield).
C484.3	Analyse stress, strain and deflection by boussinesq's, burmister's and westergaard's theory.
C484.4	Design rigid pavement and flexible pavement conforming to IRC58-2002 and IRC37-2001.
C484.5	Understand the requirements of various types of joints in pavements, which are provided to take care of climatic variations.
C484.6	Evaluate the performance of the pavement and also develops maintenance statement based on site specific requirements.

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Department of Computer Science

Vision of the Institute

To be a respected and most sought after engineering educational institution engaged in equipping individuals capable of building learning organizations in the new millennium. To produce technocrats with creative technical knowledge and intellectual skills to sustain and excel in the highly demanding world with confidence.

Mission of the Institute

To develop competent students with good value systems and face challenges of the continuously changing world.

Vision of the Department

To produce technocrats with creative technical knowledge and intellectual skills to sustain and excel in the highly demanding world with confidence.

Mission of the Department

Mission 1.The department's aim is to develop the best computer science professionals who work creatively, communicate effectively & become technologically competent, and also to mould them into good citizens by inculcating sense of ethical values in them.

Mission 2. To encourage the students to built self-help, Power of initiative, courage to change and create new things.

Mission 3.To inculcates the spirit of cooperation and capacity for organization with special emphasis on their self-reliance and sustainability to meet ever changing requirements of local and global industries.

Program Educational Objectives

PEO To create graduates equipped with life-long learning skills and have a successful professional career in IT industry.

PEO To prepare graduates to pursue higher education and get inclined towards research & development in computer science engineering.

PEO 3. To provide adequate training and opportunities, with exposure to emerging cutting edge technologies and to work in teams on multidisciplinary projects with effective communication skills and leadership qualities.

Program Specific Objectives

PSO 1: To design efficient algorithms and develop effective code for real-time computations.

PSO 2: To apply software engineering principles in developing optimal software solutions.

Program Outcomes

1. Engineering knowledge: Apply the knowledge of mathematics, science, engineering fundamentals, and an engineering specialization to the solution of complex engineering problems.

2. Problem analysis: Identify, formulate, review research literature, and analyse complex engineering problems reaching substantiated conclusions using first principles of mathematics, natural sciences, and engineering sciences.

3. Design/development of solutions: Design solutions for complex engineering problems and design system components or processes that meet the specified needs with appropriate consideration for the public health and safety, and the cultural, societal, and environmental considerations.

4. Conduct investigations of complex problems: Use research-based knowledge and research methods including design of experiments, analysis and interpretation of data, and synthesis of the information to provide valid conclusions.

5. Modern tool usage: Create, select, and apply appropriate techniques, resources, and modern engineering and IT tools including prediction and modelling to complex engineering activities with an understanding of the limitations.

6. The engineer and society: Apply reasoning informed by the contextual knowledge to assess societal, health, safety, legal and cultural issues and the consequent responsibilities relevant to the professional engineering practice.

7. Environment and sustainability: Understand the impact of the professional engineering solutions in societal and environmental contexts, and demonstrate the knowledge of, and need for sustainable development.

8. Ethics: Apply ethical principles and commit to professional ethics and responsibilities and norms of the engineering practice.

9. Individual and team work: Function effectively as an individual, and as a member or leader in diverse teams, and in multidisciplinary settings.

10. Communication: Communicate effectively on complex engineering activities with the engineering community and with society at large, such as, being able to comprehend and write effective reports and design documentation, make effective presentations, and give and receive clear instructions.

11. Project management and finance: Demonstrate knowledge and understanding of the engineering and management principles and apply these to one's own work, as a member and leader in a team, to manage projects and in multidisciplinary environments.

12. Life-long learning: Recognize the need for, and have the preparation and ability to engage in independent and life-long learning in the broadest context of technological change.

13. Course Name: C231 (Engineering Mathematics-III -15MAT31)

C231.1	Apply the concept of Fourier series and Fourier transform and their application in system communication and digital signal processing.
C231.2	Analyze the z-transform discrete function arising in the field of antennas and propagation of signals and systems
C231.3	Explore numerical linear algebra and numerical integration to solve the problem encountered in network analysis, image and speech processing.
C231.4	Study the vector integral to use in the study of Green's, Stoke's and Divergence theorem arising in various application in the field of electromagnetic and fluid flow problems

Course Name:C232 (Analog And Digital Electronics -15CS32)

C232.1	Apply the knowledge of working principles of Field Effect Transistors & Operational Amplifiers on analog circuits.
C232.2	Apply the different simplification methods for Boolean functions and draw the logical circuits.
C232.3	Analyze data processing circuits, flip flops, and counters.
C232.4	Analyze HDL programs for combinational logic circuits.

Course Name:C233 (Data Structure in C -15CS33)

C233.1	Apply different types of data structures, algorithms and their operations for real time example.
C233.2	Analyze the performance of non-primitive data structures.
C233.3	Implement the applications of Data structures in a high-level language-C.
C233.4	Design and apply appropriate data structures for solving computing problems.

Course Name:C234 (Computer Organization -15CS34)

C234.1	Apply the knowledge of basic structure of computers and its working to address known queries.
C234.2	Apply the concepts of computer organization in the design of various systems
C234.3	Analyze the design of arithmetic and logical units
C234.4	Evaluate the performance of memory systems

Course Name:C235 (Unix Shell Programming -15CS35)

C235.1	Apply the knowledge of Unix operating system and its basic features to address known queries.
C235.2	Analyze the working of basic UNIX commands
C235.3	Apply UNIX concepts in shell &perl programs
C235.4	Identify & use UNIX utilities to create &manage simple file operations.

Course Name:C236 (Discrete Mathematical Structures -15CS36)

C236.1	Identify the correctness of an argument using propositional and predicate logic and truth tables. Prepare for a background in abstraction, notation and critical thinking for the mathematics most directly related to computer science
C236.2	Apply the Knowledge to solve problems using counting techniques and combinatorics in the context. Construct proofs using direct proof, proof by contradiction, and proof by cases, or mathematical induction.
C236.3	Understand and apply mathematical induction, combinatorics, discrete probability recursion, sequence and recurrence
C236.4	Acquire the knowledge and identify the various type's graphs and trees.

Course Name:C241 (Engineering Mathematics-IV -15MAT41)

C241.1	Acquire the knowledge of single step and multi-step numerical methods for ordinary differential equation arising in engineering fields
C241.2	Understand the series solution of Bessel's and Legendre's differential equation explore their precise utility in engineering applications.
C241.3	Explore the concept of potential fields through complex potential arising in the problem of fluid flow and electromagnetic theory
C241.4	Apply the problem associated with probability of sampling theory and Markov chain models arising in information theory and coding.

Course Name:C242 (Software Engineering -15CS42)

C242.1	Understand a software engineering lifecycle and apply the lifecycle for problem solving.
C242.2	Analyze requirements engineering process and system models
C242.3	Apply various testing methods for performance evaluation of software products
C242.4	Design simple real time applications.

Course Name:C243 (Design, Analysis of Algorithms -15CS43)

C243.1	Apply the knowledge of asymptotic notations, analysis framework and its importance.
C243.2	Apply computational solution to solve problems.

C243.3	Analyze the computational complexity of different algorithms.
C243.4	Construct an efficient algorithm using appropriate design strategies for problem solving.

Course Name:C244 (Microprocessor and Microcontroller -15CS44)

C244.1	Understand the architecture and ARM processor and apply instruction set to process data.
C244.2	Analyze memory chip design and interface various hardware devices with processor.
C244.3	Differentiate microprocessor and microcontroller, demonstrate ARM advanced instructions and design philosophy.
C244.4	Create solutions using assembly language programming.

Course Name:C245 (Object Oriented Programming with Java -15CS45)

C245.1	Understand the concepts of object oriented programming and apply features of java in real world scenario.
C245.2	Apply the concepts of classes, inheritance and exception handling to implement java program.
C245.3	Analyze Applets and Event Handling mechanisms to develop an application program.
C245.4	Design and develop Graphical User Interface using Swings.

Course Name:C246 (Data Communication -15CS46)

C246.1	Understand and apply the basic concepts of Data Communication.
C246.2	Analyze the different types of protocols in network model
C246.3	Evaluate the problems on line coding, multiplexing, error detection, MAC protocols and IP.
C246.4	Apply data communication concepts to configure simple network.

Course Name:C351 (Management, Entrepreneurship for It Industry -15CS51)

C351.1	Comprehend the management and its basic functions, preparation of project and ERP.
C351.2	Analyze the importance of planning, organizing, directing, controlling and IPR.
C351.3	Evaluate the staffing activities required for an organization.
C351.4	Identify different financial institutions and organization for industrial support towards small scale industry.

Course Name:C352 (Computer Networks -15CS52)

C352.1	Understand the network principles and apply protocols, IEEE 802.11 standards for solving problems.
C352.2	Apply transport layer services and design real time data transfer protocols.
C352.3	Analyze mobile, multimedia networking and Network Management mechanisms.
C352.4	Differentiate routers, IP address classes and analyze Routing Algorithms to compute shortest path.

Course Name:C353 (Data Base Management System -15CS53)

C353.1	Apply the fundamentals of database concepts and technology.
C353.2	Apply Structured query language (SQL) for database manipulation.
C353.3	Analyze the use of concurrency and transactions in database
C353.4	Evaluate the need of database techniques for real world problems.

Course Name:C354 (Automata Theory and Computability -15CS54)

C354.1	Understand and apply the fundamental concepts of Automata theory and Computability.
C354.2	Design Grammars and Automata (recognizers) for different language classes.
C354.3	Translate between different models of Computation (e.g., Deterministic and Non-deterministic and Software models).
C354.4	Ability in formal reasoning and reduction of problems and Solving various problems using different models of Computation.

Course Name:C355 (Object Oriented Modelling and Design -15CS551)

C355.1	Understand and apply the concepts of Object Oriented (OO) models and Design Pattern.
C355.2	Analyze the application Domain and Prepare models from different viewpoints.
C355.3	Design and draw class diagram, sequence diagrams and interaction diagrams for any software systems.
C355.4	Choose and apply design pattern for software applications

Course Name:C356 (.Net Framework for Application Development 15CS564)

C356.1	Apply the knowledge of syntax and semantics of C# to address known queries.
C356.2	Apply Object Oriented Programming concepts in C# programming language.
C356.3	Analyze various controls to create custom interfaces for Windows Form applications in .NET framework.

C356.4	Evaluate the suitability of Window Form applications using C# programming language to solve a given problems.

Course Name: C362 (File Structures 15IS62)

C362.1	Identify the appropriate concept of file structure design and secondary storage devices.
C362.2	Apply appropriate file structure design for storage and data manipulation using object oriented programming.
C362.3	Analyze the suitable indexing and hashing techniques for file structure problem.
C362.4	Interpret a solution module and implement an object oriented application.

Course Name:C363 (Software Testing 15IS63)

C363.1	Understand the concepts of testing and apply to derive different test cases
C363.2	Analyze and compare the different testing techniques
C363.3	Apply the appropriate testing techniques in classifying the problem
C363.4	Create appropriate document for the software artifact

Course Name:C364 (Operating Systems 15CS64)

C364.1	Understand fundamentals of operating systems and applying CPU scheduling algorithms for given problem.
C364.2	Analyze process scheduling and process synchronization
C364.3	Apply suitable techniques for management of different resources.
C364.4	Demonstrate various operating system platforms through case studies.

Course Name:C365 (System Software 15IS652)

C365.1	Understand the architecture and apply working principle of system software.
C365.2	Build machine code for the given Assembly language programming.
C365.3	Analyze tokens by designing finite automata.
C365.4	Evaluate different parsers using Semantic rules.

Course Name:C471 (OBJECT ORIENTED MODELLING AND DESIGN 10CS71)

C471.1	Apply the knowledge of Object oriented concepts in software analysis
C471.2	Analyze object oriented models using UML appropriate notations
C471.3	Apply and analyze application domain models for different use cases
C471.4	Design a model using concepts of pattern orientation

Course Name:C472 (INFORMATION SYSTEMS 10IS72)

C472.1	Apply the basic concepts of Information Systems.

C472.2	Apply the applications of IT and IS, and their effects on health.
C472.3	Analyze the enterprise business and e-commerce systems in global market place.
C472.4	Analyze the skills to manage Customer Relationship Management (CRM), Supply Chain Management (SCM), and Decision Support System (DSS).

Course Name:C473 (Programming the Web 10CS73)

C473.1	Understand and apply the basic concepts of World Wide Web and web programming tool box.
C473.2	Analyze and create web pages using scripting language by applying style sheets.
C473.3	Analyze and Implement interactive user interface for dynamic functionality.
C473.4	Create a document using web programming tools and to demonstrate client server communication.

Course Name:C474 (Data Warehousing And Data Mining 10CS74)

C474.1	Understand basics of data warehousing and apply data, web mining concepts to process data.
C474.2	Differentiate clustering techniques and assess association techniques.
C474.3	Analyze various classification and web mining mechanism.
C474.4	Apply data mining concepts to demonstrate the working of OLTP and OLAP models.

Course Name:C475 (Java & J2ee 10IS753)

C475.1	Understand the object oriented concepts and apply in problem solving
C475.2	Design and implement Applet and event handling mechanism in application program
C475.3	Implement graphical interactive application using swings and database transaction using JDBC
C475.4	Develop distributed application and web application

Course Name:C476 (Storage Area Networks 10IS765)

C476.1	Apply the knowledge of Storage area network.
C476.2	Apply the techniques used for data maintenance in an intelligent storage system.
C476.3	Analyze different techniques and their rolein providing disaster recovery and business continuity capabilities.
C476.4	Differentiate different storage networking techniques.

Course Name:C481 (Software Architecture 10IS81)

C481.1	Apply the knowledge of software architecture, architectural styles and case studies to address known queries.
C481.2	Describe a software architecture by applying document approaches and views
C481.3	Analyze the quality attribute of a system at the architectural level
C481.4	Design and model architectural pattern and design pattern

Course Name:C482 (System Modelling and Simulation 10CS81)

C481.1	Use the basic concept of discrete event simulation and apply it to modelling paradigm.
C481.2	Analyze the real world system simulation for modelling.
C481.3	Develop the simulation skills to solve real world problems on systems.
C481.4	Apply the results to resolve issues in a real world environment.

Course Name:C483 (Information and Network Security 10IS835)

C483.1	Apply the knowledge of different types of threats to computing system and its associated attacks to address known queries.
C483.2	Analyze the mechanism of key distribution and management.
C483.3	Design security solutions for the vulnerabilities in any computing system.
C483.4	Develop the skills to solve the real time problem.

Course Name:C484 (ADHOC Networks 10IS841)

C484.1	Understand and apply the issues of ad-hoc wireless network.
C484.2	Analyze the challenges in designing protocols for wireless ad-hoc network
C484.3	Apply wireless communication protocols using real-life sensors.
C484.4	Use wireless security policies and Algorithms to evaluate an Ad-hoc network

Course Name:C485 (Information Retrieval 10IS842)

C485.1	Understand and apply the information retrieval principles to locate relevant information in large collections of data
C485.2	Apply efficient techniques for the indexing of document objects that are to be retrieved
C485.3	Analyze the features of retrieval systems for web-based and other search tasks
C485.4	Evaluate the performance of retrieval systems using test collections.

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Department Of Electronics and Communication

Vision of the Institute

To be a respected and most sought after engineering educational institution engaged in equipping individuals capable of building learning organizations in the new millennium.

Mission of the Institute

To develop competent students with good value systems and face challenges of the continuously changing world.

Vision of the Department

To impart technical education par excellence and prepare leaders to serve the industries and society.

Mission of the Department

Mission 1. To Provide the world with a highly committed and quality conscious engineering workforce.

Mission 2. To Encourage the students to built self-help, Power of initiative, courage to change and create new things.

Mission 3. To inculcate the spirit of cooperation and capacity for organization with special emphasis on their self-reliance and sustainability to meet ever changing requirements of local and global industries.

Program Educational Objectives

PEO 1.	Graduates apply their knowledge of mathematics and science to identify, analyze and solve problems in the field of Electronics & communication to develop sophisticated communication systems.
PEO 2.	Graduates to design and build-up interdisciplinary systems by solving core engineering problems in communication systems which are technically sound, economically feasible and socially acceptable.
	Graduates exhibit desire for life-long learning which directs them to obtain thorough knowledge in their chosen fields and motivate them for higher studies/research.

Program Specific Objectives

PSO 1 : An ability to understand the basic core courses of Electronics & Communication Engineering and to relate them to various areas of application like Communication Systems, control system, Signal processing, VLSI and Embedded systems.

PSO 2: Should have capability to apply modern tools to analyze and solve complex designs with optimal solutions for various real-world applications

PSO 3: Excellent adaptability to changing work environment with good leadership qualities and zeal for social and environmental well-being.

Program Outcomes

1. Engineering knowledge: Apply the knowledge of mathematics, science, engineering fundamentals, and an engineering specialization to the solution of complex engineering problems.

2. Problem analysis: Identify, formulate, review research literature, and analyse complex engineering problems reaching substantiated conclusions using first principles of mathematics, natural sciences, and engineering sciences.

3. Design/development of solutions: Design solutions for complex engineering problems and design system components or processes that meet the specified needs with appropriate consideration for the public health and safety, and the cultural, societal, and environmental considerations.

4. Conduct investigations of complex problems: Use research-based knowledge and research methods including design of experiments, analysis and interpretation of data, and synthesis of the information to provide valid conclusions.

5. Modern tool usage: Create, select, and apply appropriate techniques, resources, and modern engineering and IT tools including prediction and modelling to complex engineering activities with an understanding of the limitations.

6. The engineer and society: Apply reasoning informed by the contextual knowledge to assess societal, health, safety, legal and cultural issues and the consequent responsibilities relevant to the professional engineering practice.

7. Environment and sustainability: Understand the impact of the professional engineering solutions in societal and environmental contexts, and demonstrate the knowledge of, and need for sustainable development.

8. Ethics: Apply ethical principles and commit to professional ethics and responsibilities and norms of the engineering practice.

9. Individual and team work: Function effectively as an individual, and as a member or leader in diverse teams, and in multidisciplinary settings.

10. Communication: Communicate effectively on complex engineering activities with the engineering community and with society at large, such as, being able to comprehend and write effective reports and design documentation, make effective presentations, and give and receive clear instructions.

11. Project management and finance: Demonstrate knowledge and understanding of the engineering and management principles and apply these to one's own work, as a member and leader in a team, to manage projects and in multidisciplinary

environments.

12. Life-long learning: Recognize the need for, and have the preparation and ability to engage in independent and life-long learning in the broadest context of technological change

13. Course Name: C202 (Analog Electronics-15EC32)

C202.1	To acquire the knowledge of BJT Amplifier, Hybrid Equivalent and Hybrid Models
C202.2	To explain construction, operation and characteristics of JFETs and MOSFETs
C202.3	To design and analyze various types of FET biasing, and Demonstrate the use of FET amplifiers.
C202.4	To design and analyze the frequency response of BJT and FET amplifiers at various frequencies.
C202.5	To demonstrate and apply Feedback and Oscillator circuits using FET.
C202.6	To define, demonstrate and analyze Power amplifier circuits in different modes of operation

Course Name: C203 (Digital Electronics-15EC33)

C203.1	Acquire knowledge of combinational logic and simplification techniques
C203.2	Analyse the performance of synchronous sequential circuits
C203.3	Design and develop Mealy and Moore models for digital circuits
C203.4	Apply knowledge gained in the design of Counters and registers
C203.5	Students can design and analyze state machines.
C203.6	Define and describe decoders, encoders, latches, flip flops and comparators

Course Name:C204(Network Analysis -15EC34)

C204.1	Acquire knowledge for solving problems related to series and parallel combination for passive components, source transformation and source shifting.
C204.2	Ability to apply the knowledge of mathematics, science in solving complex circuits
C204.3	Analyze the performance of various types of networks using different concepts and principles.
C204.4	Use Laplace transforms to understand the initial and final boundary conditions
C204.5	Apply theorems like thevenins,nortons superposition, power transfer etc. to reduce circuit complexities and arrive at feasible solutions
C204.6	Apply various parameters like z,y,t,h for the analysis of complex networks

Course Name: C205 (Electronic Instrumentation-15EC35)

C205.1	Understand different measurement parameters like accuracy and precision, the types of measurement errors and their statistical and probability analysis.
C205.2	Understand basic functional concepts of various analog measuring instruments like ammeter, voltmeter, multimeter and wattmeter.
C205.3	Analyze the working of digital measuring instruments and different methods of time and frequency measurement.
C205.4	Analyze basic concepts of microprocessor based instruments.
C205.5	Design various types of oscilloscopes and signal generators, AC and DC bridges.
C205.6	Design and implement various types of transducers.

Course Name:C206 (Engineering Electromagnetics-15EC36)

C206.1	Build an understanding of fundamental concepts Communication.
C206.2	Familiarize the student with basic concept of Maxwell equations.
C206.3	Introduce the student to apply knowledge of boundary condition for metal-dielectric interface, and metal-metal interface.
C206.4	Allow the student to understand the Concept of Electromagnetism.
C206.5	Make Students to understand the wave propagation in Dielectric medi Conducting medium.
C206.6	Develop the basic concept of Standing Wave Ratio between two different t medium.

Course Name: C212 (Microprocessors-15EC42)

C212.1	Recall the basic concepts of Digital Electronics and basics of programming.
C212.2	Classify different addressing modes and timing diagram for executing program efficiently.
C212.3	Implement the basic instructions of assembly language programming of 8086 processor.
C212.4	Develop assembly language programs using strings instructions and differentiate Procedure /Macros for various applications and demonstrate various DOS commands. Implement various instructions in assembly language programming.
C212.5	Select proper interfacing techniques 8086 microprocessor with 8255 Progra peripheral interface and writing Assembly language programs Interface peripheral devices with 8086 microproce

C212.6	Investigate and understand the need and architecture of numeric coproces different Pentium processors.

Course Name: C213 (Control Systems-15EC43)

C213.1	List the basic features, configurations of control systems and determine the time domain and frequency domain response for the first order and second order system.
C213.2	To understand the basics of system modelling such as electric, mechanical, electromechanical systems using differential equations, transfer functions, block diagrams and construct the various models.
C213.3	Able to apply root locus technique to analyze and develop Control systems.
C213.4	To analyze the characteristics of closed-loop control systems, State variable analysis, including steady-state and transient response
C213.5	Select the Frequency domain specifications, find its values from the graphical methods and determine the stability analysis of a control system.
C213.6	Designing of different control system methods, including root locus diagrams and frequency response techniques

Course Name: C214 (Signals and Systems-15EC44)

C214.1	To describe continuous and discrete time signals and systems mathematically.
C214.2	To understand elementary signals and classify signals into different categories based on their properties. To Understand the classification of systems, learn their properties and apply to real world problems.
C214.3	Analyze the signals in time domain using convolution difference/differential equations and analyse complex signals.
C214.4	Implement Linear Time Invariant (LTI) systems in time and transform domains.
C214.5	Evaluate the applications of Convolution, Transforms in real world examples.
C214.6	Develop the basics for understanding of courses such as signal processing, control systems and other engineering systems.

Course Name: C215 (Principles of Communication s/m-15EC45

C215.1	Memorize the basic underlying key building blocks of communication
C215.2	Describe the concepts of probability, random process and impact of noise in communication systems
C215.3	Analyze the time domain and frequency domain representations of AM,DSBSC,SSBSC
C215.4	Examine the angle modulation and phase locked loop

C215.5	Analyze the noise performance of different modulation techniques
C215.6	Develop the various transmission circuits using both analog and digital domain and evaluate its performance limits in the presence of noise

Course Name: C216 (Linear Integrated Circuits-15EC46)

C216.1	To describe the op-amp's basic construction, characteristics, parameter limitations, various configurations and countless applications of op-amp.
C216.2	To understand the various linear and non-linear applications of op-amp
C216.3	To Analyse Op-amp based AC amplifiers with voltage followers, inverting, non-inverting , Summing And difference Amplifiers
C216.4	To implement circuits for voltage sources/current sources, current sinks, Instrumentation and Precisions Amplifiers.
C216.5	To construct the circuits for Op-amp based linear and non-linear circuits comprising of Limiting Circuits, clamping circuits, sample and hold circuit, differentiator/Integrator circuit, Oscillators, crossing detectors, log amplifiers, multiplier and divider.
C216.6	Able to Design first and second order filters: LP, HP, BP and Band reject filters.
	DAC,ADC converters, VCO, Study of 555 timer in A stable &Monostable mode

Course Name:C301 (Management & Entrepreneurship-15ES51)

C301.1	Basic principles and concepts of management.
C301.2	Distinguish different plans and list steps in planning.
C301.3	The concepts of organizing and staffing.
C301.4	Interpret the concepts of directing and controlling.
C301.5	Demonstrate the meaning, functions, types and roles of an entrepreneur and describe various institutional supports.
C301.6	The small scale industries and prepare the project report.

Course: C302(Digital Signal Processing -15EC52)

C302.1	Recall discrete-time signals analytically and visualize them in the time domain.
C302.2	Describe the meaning and implications of the properties of systems and signals.
C302.3	Explain the Transform domain and its significance and problems related to computational complexity
C302.4	Solve time domain systems in Z-Transform and realization of discrete time systems
C302.5	Differentiate different Digital filter structures.

C302.6	Design the Digital filters for the given specifications.

Course Name: C303(Verilog HDL-15EC53)

C303.1	Demonstrate the basic knowledge of Verilog HDL and VHDL to design digital circuit
C303.2	Hierarchical top-down Vs bottom-up design, synthesizable code, test bench generation, simulation system tasks etc. Are covered
C303.3	Learn good coding techniques per current industrial practices
C303.4	Model digital hardware using a hardware description language and to name and describe the different phases of the design flow for digital hardware.
C303.5	Design and implement digital circuit in various types of descriptions like dataflow, behavioural, structural etc. depending on the type of circuit to be designed
C303.6	Students will understand the design flow of FPGA/ASIC based technologies an EDA tools for synthesizing and analyzing digital systems.

Course Name:C304(Information Theory & Coding -15EC54)

C304.1	Formulate equations for entropy mutual information and channel capacity for all types of channels
C304.2	Distinguish between different types error correcting codes based on probability of error and bit Energy to noise ratio.
C304.3	Design a digital communication system by selecting an appropriate error correcting codes for a particular application.
C304.4	Explain various methods of generating and detecting different types of error correcting codes
C304.5	Examine the basic equations of linear block codes.
C304.6	Compare the performance of digital communication system by evaluating the probability of error for different error correcting codes

Course Name:C305 (Operating System- 15EC553)

C305.1	Understand the goals and operation of operating system.
C305.2	Learn the different classes of operating systems.
C305.3	Analyzing the layered design and architecture of operating system.
C305.4	Analyze the differences between process- thread, allocation-deallocation etc.
C305.5	Apply the concepts of O.S for process management and memory management.
C305.6	Implementing the concept of scheduling techniques.

Course Name: C306 (Object Oriented Programming Using C++-15EC562)

C306.1	Explain the basics of Object Oriented Programming concepts.
C306.2	Apply the object initialization and destroy concept using constructors and destructors.
C306.3	Apply the concept of polymorphism to implement compile time polymorphism in programs by using overloading methods and operators.
C306.4	Use the concept of inheritance to reduce the length of code and evaluate the usefulness.
C306.5	Apply the concept of run time polymorphism by using virtual functions, overriding functions and abstract class in programs.
C306.6	Use I/O operations and file streams in programs

Course Name:C311 (Digital Communication-15EC61)

C311.1	Associate and apply the concepts of Band pass sampling to well specified signals and channels.
C311.2	Analyze and compute performance parameters and transfer rates for low pas and band pass symbol under ideal and corrupted non band limited channels.
C311.3	Analyzing of different electrical means of signal
C311.4	Test and validate symbol processing and performance parameters at the receiver under ideal and corrupted band limited channels.
C311.5	Demonstrate by simulation and emulation that band pass signals subjected to corrupted
C311.6	Distorted symbols in a band limited channel, can be demodulated and
	estimated at receiver to meet specified performance criteria

Course Name: C312 (ARM Microcontroller & Embedded Systems-15EC62)

C312.1	Describe the architectural features and instructions of 32 bit microcontroller ARM Cortex M3.
C312.2	Understand the instruction set of ARM Cortex M3 and perform assembly level programming.
C312.3	Apply the knowledge gained for Programming ARM Cortex M3 for different applications.
C312.4	Understand the basic hardware components and their selection method based on the characteristics and attributes of an embedded system.
C312.5	Develop the hardware /software co-design and firmware design approaches
C312.6	Explain the need of real time operating system for embedded system applications.

Course Name:C313(VLSI Design-15EC63)

C313.1	Demonstrate understanding of MOS transistor theory, CMOS fabrication flow and technology scaling.
C313.2	Draw the basic gates using the stick and layout diagrams with the knowledge of physical design aspects
C313.3	Interpret Memory elements along with timing considerations.
C313.4	Demonstrate knowledge of FPGA based system design
C313.5	Interpret testing and testability issues in VLSI Design
C313.6	Analyze CMOS subsystems and architectural issues with the design constraints

Course Name: C314 (Computer Communication Networks - 15EC64)

314.1	Develop an ability to independently understand basic computer network models.
C314.2	Ability to apply knowledge of communication channels to transmit packets using different communication protocols.
C314.3	Comparing the different types of network topologies and protocols.
C314.4	Understand and building the skills of subnetting and routing mechanisms.
C314.5	Relate the various types of Internet address for version 4 and version 6
C314.6	Analyze different concepts like DNS (Domain Name Systems) and TCP, UDP.

Course Name:C315(Digital Switching Systems-15EC654)

C315.1	The students will learn about the hierarchy of telecommunication network and also calculate the power levels of each network
C315.2	The subject also deals with different types of Multiplexing technique used to combining signals in real applications
C315.3	The basics of telecommunication network also can be known and the metrics of telecommunication is defined here
C315.4	The course also gives the brief explanation of different terms used in different parts of the world to suit particular area
C315.5	Different types of solutions were also learnt to solve problems in telecommunication
C315.6	The telecommunication company ensures the safety of individual calls my having different encoding schemes

Course Name:C316(Digital System Design using Verilog-15EC663)

C316.1	Construct the combinational circuits, using discrete gates and programmable logic devices

C316.2	Describe Verilog model for sequential circuits and test pattern generation.
C316.3	Design a semiconductor memory for specific chip design.
C316.4	Design embedded systems using small microcontrollers, larger CPUs/DSPs, or hard or soft processor cores. ·
C316.5	Synthesize different types of processors that are used in embedded system.
C316.6	Synthesize different types of I/O controllers that are used in embedded system

Course Name:C401(CCN-10EC71)

C401.1	Develop an ability to independently understand basic computer network models.
C401.2	Ability to apply knowledge of communication channels to transmit packets using different communication protocols.
C401.3	Comparing the different types of network topologies and protocols.
C401.4	Understand and building the skills of subnetting and routing mechanisms.
C401.5	Relate the various types of Internet address for version 4 and version 6
C401.6	Analyze different concepts like DNS (Domain Name Systems) and TCP,UDP.

Course Name:C402(Optical Fibre Communiction-10EC72)

C402.1	Recall the basic elements of optical fibre transmission link, fibre modes configurations and structures.
C402.2	Discuss the different kind of losses, signal distortion in optical wave guides and other signal degradation factors
C402.3	Implement the operation of optical receiver to evaluate its performance by calculating the probability of error.
C402.4	Differentiate the various optical source materials, LED structures, quantum efficiency, Laser diodes.
C402.5	Select the fiber optical receivers such as PIN APD diodes and valuate their noise performance in photo detector, receiver operation and configuration.
C402.6	Design the fiber optical network components, variety of networking aspects,
	SONET/SDH and operational principles WDM.

Course Name: C403 (Power Electronics-10EC73)

C403.1	Students are able to define fundamental Gate firing circuits.
C403.2	Students able to classify and recognize Converter and locate harmonics.
C403.3	Students can demonstrate the techniques, skills and modern engineering tools necessary for engineering practice.
C403.4	Students are able to relate and differentiate Rectifier, Chopper, Inverter and AC Voltage Controller.

C403.5	Students can able to judge result of engineering problems with simulation
C403.6	Students are able to design basic circuits for power electronics based on design application

Course: C404(Embedded System Design -10EC74)

C404.1	Design the embedded hardware and software design life cycle and development process.
C404.2	Classify different types number, instruction registers and Finite State Machine Model.
C404.3	Understand the memory subsystem architecture and dynamic memory allocation.
C404.4	Organize the concept of RTOS, Kernel and Embedded Hardware peripherals.
C404.5	Discuss embedded system design process and prototyping the Project.
C404.6	Analyze complexity and measure the performance and optimization of the Embedded System.

Course Name: C405 (DSP AA-10EC751)

C405.1	Describe the specific architecture of the DSP processorTMS320C54xx
C405.2	Understand the architecture of similar commercially produced DSP processors.
C405.3	Discuss the various issues that need to be addressed when implementing DSP algorithms in real hardware with finite resources such as processing speed, memory, and bit resolution.
C405.4	Better understand the relationship between academic course work
C405.5	Better understand the problems that might be encountered in a research or commercial environment.

Course Name: C406 (Real Time systems-10EC762)

C406.1	Acquired knowledge about the concepts of real time Computer control systems
C406.2	Implementation of Operating systems is adhered with the real time controls
C406.3	Automation of control systems is described with respect to process control applications
C406.4	Understanding with the process control applications and importance of Human computer interface
C406.5	Various control system methods is studied through Process control based applications

C406.6	Provides a adequate knowledge in Embedded computer systems

Course Name: C411(Wireless Communications-10EC81)

C411.1	Apply the cellular concepts to evaluate the signal reception performance in cellular networks
C411.2	Apply the traffic signal analysis to design cellular network with given quality of service constraints
C411.3	Analyze and design receiver and transmitter diversify techniques
C411.4	Determine the appropriate trans receiver design of multi antenna systems and evaluate the data rate performance
C411.5	Design wireless communication systems with 3g and 4g technologies
C411.6	Describe and differentiate 4 generations of wireless standards' for cellular networks

Course Name: C412(Digital Switching Systems-10EC82)

C412.5	The students will learn about the hierarchy of telecommunication network and also calculate the power levels of each network
C412.5	The subject also deals with different types of Multiplexing technique used to combining signals in real applications
C412.5	The basics of telecommunication network also can be known and the metrics of telecommunication
C412.5	The course also gives the brief explanation of different terms used in different parts of the world to suit particular area
C412.5	Different types of solutions were also learnt to solve problems in telecommunication
C412.5	The telecommunication company ensures the safety of individual calls my having different encoding schemes

Course Name: C413(Network Security -10EC832)

C413.1	Explain network security protocols and identify some of the factors driving the need for network security
C413.2	Understand the basic concepts of Network security and define the terms vulnerability, threat and attack
C413.3	Discuss the various Network security problems
C413.4	Explain Enterprise Security Framework

C415.5	Discuss the various attacks on networks and apply the concept of Network security framework in computer system administration.
C415.6	Identify, qualitatively and quantitatively characterize and formulate problems, evaluate them to find the best performance.

Course Name:C414 (Multimedia Communication-10EC841)

C414.1	Identify switching systems
C414.2	Discuss architecture and performance of telecom networks
C414.3	Explain satellite communication system
C414.4	Characterize the types of multimedia contents
C414.5	Identify different standards for multimedia communication.
C414.6	Implement required networks for multimedia communication.

CHILDREN'S EDUCATION SOCIETY (Regd.)
THE OXFORD COLLEGE OF ENGINEERING
(Recognised by the Govt. of Karnataka, Affiliated to Visvesvaraya Technological University, Belagavi.
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Department of Electrical & Electronics

EngineeringVision of the Institute

To be a respected and most sought after engineering educational institution engaged in equipping individuals capable of building learning organizations in the new millennium.

Mission of the Institute

To develop competent students with good value systems and face challenges of the continuously changing world.

Vision of the Department

To meet the educational and research needs of the student community and staff through collaboration with other academic and technical institutions, industry and government agencies and make the students to face problems of the country and society as a whole.

Mission of the Department

M1 - To develop and train competent Electrical and Electronics Engineers with adequate practical skills.

M2 - To provide state-of-the-art resources that contribute to achieve excellence in teaching-learning, research and development activities.

M3 - To inculcate, ethics, leadership, moral values and social activities.

Program Educational Objectives

PEO 1.	Be able to apply the fundamental knowledge of mathematics, science, electrical and electronics engineering to analyze and solve the complex problem in electrical, electronics and allied interdisciplinary areas.
PEO 2.	Possess good leadership skills, function ethically in multidisciplinary areas to develop sustainable solutions for global, environmental and social issues. Be able to inculcate lifelong learning to maintain and enhance professional skills.

Program Specific Objectives

PSO 1: Apply fundamental knowledge to identify, formulate, design and investigate various problems of electrical and electronic circuits, power electronics, control systems and power systems.

PSO 2: Apply modern software tools for design, simulation and analysis of electrical systemsto engage in life- long learning and to successfully adapt in multi-disciplinary environments. **PSO 3**: Solve ethically and professionally various Electrical Engineering problems in societal and environmental context and communicate effectively by applying project managementtechniques to complex engineering problems.

Program Outcomes

1. Engineering knowledge: Apply the knowledge of mathematics, science, engineering fundamentals, and an engineering specialization to the solution of complex engineering problems.

2. Problem analysis: Identify, formulate, review research literature, and analyse complex engineering problems reaching substantiated conclusions using first principles of mathematics, natural sciences, and engineering sciences.

3. Design/development of solutions: Design solutions for complex engineering problems and design system components or processes that meet the specified needs with appropriate consideration for the public health and safety, and the cultural, societal, and environmental considerations.

4. Conduct investigations of complex problems: Use research-based knowledge and research methods including design of experiments, analysis and interpretation of data, and synthesis of the information to provide valid conclusions.

5. Modern tool usage: Create, select, and apply appropriate techniques, resources, and modern engineering and IT tools including prediction and modelling to complex engineering activities with an understanding of the limitations.

6. The engineer and society: Apply reasoning informed by the contextual knowledge to assess societal, health, safety, legal and cultural issues and the consequent responsibilities relevant to the professional engineering practice.

7. Environment and sustainability: Understand the impact of the professional engineering solutions in societal and environmental contexts, and demonstrate the knowledge of, and need for sustainable development.

8. Ethics: Apply ethical principles and commit to professional ethics and responsibilities and norms of the engineering practice.

9. Individual and team work: Function effectively as an individual, and as a member or leader in diverse teams, and in multidisciplinary settings.

10. Communication: Communicate effectively on complex engineering activities with the engineering community and with society at large, such as, being able to comprehend and write effective reports and design documentation, make effective presentations, and give and receive clear instructions.

11. Project management and finance: Demonstrate knowledge and understanding of the engineering and management principles and apply these to one's own work, as a member and leader in a team, to manage projects and in multidisciplinary environments.

12. Life-long learning: Recognize the need for, and have the preparation and ability to engage in independent and life-long learning in the broadest context of technological change.

Course Name: 15EE32/ELECTRIC CIRCUIT ANALYSIS

C232.1	Apply knowledge of mathematics, science, and engineering to the analysis and design of electrical circuits.
C232.2	Identify, formulate, and solve engineering problems in the area circuits and systems.
C232.3	Solve complex electric circuits using superposition , Thevenin's and Nortons theorems
C232.4	Solve complex electric circuits using Reciprocity , Millman's and Maximum power transfer theorems
C232.5	Synthesize typical waveforms using Laplace transforms
C232.6	Analyze the solution and infer the authenticity of it.

Course Name: 15EE33–Transformers and Generators

C233.1	Understand the construction and operation of 1-phase, 3-Phase transformers and Autotransformer.
C233.2-	Explain different connections for the three phase operations, their advantages and applications.
C233.3-	Explain the construction and operation of Synchronous machines and evaluate the regulation of synchronous machines by different methods.
C233.4	Analyze the performance of the AC Generators on infinite bus and parallel operation.
C233.5	Determine the regulation of AC Generator by Slip test, EMF, MMF, and ZPF Methods.
C233.6	Analyze the operation of the synchronous machine connected to infinite machine.

Course Name: Analog Electronic Circuits / 15EE34

C234.1	Utilize the characteristics of transistor for different applications.
C234.2	Design and analyze biasing circuits for transistor.
C234.3	Observe the effect of negative feedback, different types of negative feedback topologies.
C234.4	Design and analyze and test transistor circuitry as amplifiers and oscillators.
C234.5	Design, analyze and test transistor circuitry as amplifiers and oscillators.
C234.6	Develop the ability to understand the design and working of FET amplifiers.

Course Name: 15EE35– Digital System Design

C235.2	Develop simplified switching equation using QuineMcClusky techniques and Design of Adder circuits
C235.3	Design Multiplexer, Encoder, Decoder, Subtractors and Comparator as digital combinational control circuits.
C235.4	Design flip flops, counters, shift registers as sequential control circuits
C235.5	Understand counters and sequence generators.
C235.6	Develop Mealy/Moore Models and state diagrams for the given clocked
	sequential circuits and Explain the functioning of Read only and Read/Write Memories, Programmable ROM, EPROM and Flash memory

Course Name: 15EE36 - Electrical &Electronics Measurements

C236.1	Measure resistance, inductance and capacitance using bridges and determine earth resistance.
C236.2	Construction and operation of single-phase and three phase Electrodynamometer P.Fmeter, Weston frequency meter and Phase sequence indicator
C236.3	Explain the working of various meters used for measurement of Power, Energy & understand the adjustments, calibration & errors in energy meters.
C236.4	Understand methods of extending the range of instruments & instrument transformers
C236.5	Explain the working of different electronic instruments
C236.6	Explain the working of different display and recording devices

Course Name: 15EEL37–Electrical Machines Lab

C237.1	Evaluate the performance of transformers from the test data obtained. •
C237.2	Connect and operate two single phase transformers of different KVA rating in parallel.
C237.3	Connect single phase transformers for three phase operation and phase conversion.
C237.4	Compute the voltage regulation of synchronous generator using the test data obtained in the laboratory.
C237.5	Evaluate the performance of synchronous generators from the test data and assess the performance of synchronous generator connected to infinite bus.
C237.6	Evaluate the performance of transformers from the test data obtained. •

Course Name: 15EEL38–Electronics Lab

C238.1	Design and test rectifier circuits with and without capacitor filters
C238.2	Determine h-parameter models of transistor for all modes

C238.3	Design and test BJT and FET amplifier and oscillator circuits.
C238.4	Realize Boolean expressions using gates
C238.5	Realize adders and subtractors using gates
C238.6	Design a sequential Circuits using gates

Course Name: 15EE42 – Power Generation and Economics

C242.1	Explain factors of site selection, arrangement of hydroelectric plant.
C242.2	Working of hydroelectric plant and major equipment of plant.
C242.3	Stem diesel and gas power plant operation.
C242.4	Nuclear power plants and site operation, components, factors of site selection.
C242.5	Substation components need, grounding methods.
C242.6	Economic aspects of power system operation and PF improvement

Course Name: Transmission and Distribution / 15EE43

C243.1	Understand the concepts of various methods of generation of power.
C243.2	Parameters associated with transmission line.
C243.3	Design and analyze the overhead transmission line for different configuration.
C243.4	Calculate the parameters of transmission line for different configuration.
C243.5	Understand the use of underground cable.
C243.6	Evaluate different types of distributors.

Course Name: Electric Motors / 15EE44

C244.1	Explain the constructional features of motors and drive for specific applications.
C244.2	Analysis the performance characteristic of DC motors.
C244.3	Explain the constructional features of 3-phase and single phase induction motors.
C244.4	Control the speed of induction motor by suitable method
C244.5	Explain the operation of synchronous motor and special motors.
C244.6	Control the speed of motor by suitable method.

Course Name: Field theory / 15EE45

C245.1	To study different coordinate systems for understanding the concept of gradient, divergence and curl of a vector.
C245.2	To study, apply coulomb's law and gauss laws for electric field produced by different charge configuration.
C245.3	To evaluate the energy and potential due to a system of charges.
C245.4	To study the behavior of electric field across a boundary between a conductor and dielectric and between two different dielectrics.
C245.5	To study the magnetic fields and magnetic materials.

C245.6	To study the time varying fields and propagation of wave of different media.

Course Name: Opamp / 15EE46

C246.1	Explain the representation, characteristics and equivalent circuit and application.
C246.2	Designing of first, second order filters, voltage regulators using OPAMP.
C246.3	Use of OPAMP in signal generation, comparator and converter circuits.
C246.4	Use of OPAMP in signal processing, A/D and D /A converter circuits.
C246.5	Discussion of PLL, its components and performance factors.
C246.6	Discussion of 555 timers an its application in signal generation.

Course Name: Electrical Machines Lab – 2 / 15EEL47

C247.1	Test dc machines to determine their characteristics
C247.2	Control the speed of dc motor
C247.3	Pre-determine the performance characteristics of dc machines by conducting suitable tests.
C247.4	Perform load test on single phase and three phase induction motor to assess its performance
C247.5	Conduct test on induction motor to pre-determine the performance characteristics
C247.6	Conduct test on synchronous motor to draw the performance curves.

Course Name: Opamp& LIC Laboratory / 15EEL48

C247.1	To conduct experiment to determine the characteristic parameters of OP-Amp
C247.2	To design test the OP-Amp as Amplifier, adder, subtractor, differentiator and integrator
C247.3	To design test the OP-Amp as oscillators and filters.
C247.4	Design and study of Linear IC's as multivibrator power supplies.
C247.5	Use of OPAMP in signal generation, comparator and converter circuits.
C247.6	Use of OPAMP in signal processing, A/D and D /A converter circuits.

Course Name: 15EE51 - MANAGEMENT & ENTREPRENEURSHIP

C351.1	Able to discuss Management & Administration with Early, Modern approaches and demonstrate the planning process & decision making
C351.2	Able to explain organizational concept & recruitment process and illustrate leadership, motivational theories & team work
C351.3	Able to describe and choose concepts of Entrepreneurship, small scale industry in economic development of a nation.

C351.4	Able to identify the institutional(financial and technical) supports agencies and prepare project report

Course Name: 15EE52 – Microcontroller

C352.1	Internal architecture, its feature and memory organization of 8051 microcontroller.
C352.2	Addressing modes, I/O port programming, Arithmetic and logical programs.
C352.3	C programs for time delay, I/O operations, data conversions.
C352.4	Hardware connections, timers, serial data communication and interfacing.
C352.5	8051 interrupts, interfacing with LCD's, ADC, DAC and sensors.
C352.6	Interface 8051 with 8255 chip, ports and relays, opto isolators and motors.

Course Name: 15EE53–POWER ELECTRONICS

C353.1	Explain application of power electronics, types, switching characteristics.
C353.2	Explain the types of power diodes, effects with RL circuits.
C353.3	Techniques for design, operation and analysis of single phase rectifier.
C353.4	Explain steady state, switching characteristics, gate circuit requirement.
C353.5	Discuss different types of Thyristors, characteristics.
C353.6	Design, analysis of Thyristor controlled rectifiers.

Course Name: 15EE54 – Signals and Systems

C354.1	Basic operations on signals and properties of system.
C354.2	Provide block diagram representation of linear time invariant systems.
C354.3	Evaluate response of given Linear time invariant system.
C354.4	Use convolution in C.T and D.T for the given impulse response.
C354.5	Represent C.T.F.T and D.T.F.T for linear time invariant system.
C354.6	Represent Z-transform for the analysis of D.T system.

Course Name: 15EE553 – Electrical Estimation & Costing

C355.1	Explain the purpose of estimation and costing.
C355.2	Discuss AE act and IE rules.
C355.3	Discuss energy distribution in a building, wiring, cable, fuses, lightning, points, circuits, sub circuits.
C355.4	Discuss types of service mains and estimation of service mains and power circuits.
C355.5	Discuss estimation of overhead transmission and distribution system and its components.
C355.6	Discuss main components of substation, preparation of single line diagram and ear thing of a substation.

Course Name: 15EE563 – Renewable Energy Sources

C356.1	Discuss energy scarcity, solution, availability of renewable energy.
C356.2	Explain about sun, earth relationship, types of solar collectors.
C356.3	Discuss solar cell components, characteristics, application and configuration.
C356.4	Discuss hydrogen, wind energy production, site selection, storage.
C356.5	Discuss biomass, biogas composition types, production, advantages and disadvantages.
C356.6	Discuss availability, generation, devices for tidal, sea wave and wave and ocean thermal energy.

Course Name: 15EEL57 – Microcontroller Lab

C357.1	Write assembly language programs for data transfer, arithmetic, Boolean and logical instructions.
C357.2	Write ALP for code conversions
C357.3	Write ALP using subroutines for generation of delays, counters, configuration of SFRs for serial communication and timers.
C357.4	Perform interfacing of stepper motor and dc motor for controlling the speed
C357.5	Generate different waveforms using DAC interface.
C357.6	Work with a small team to carryout experiments using microcontroller concepts and prepare reports that present lab work.

Course Name: 15EEL58 – Power Electronics Lab

C358.1	Obtain static characteristics of semiconductor devices to discuss their performance
C358.2	Trigger the SCR by different methods
C358.3	Verify the performance of single phase controlled full wave rectifier and AC voltage controller with R and RL loads.
C358.4	Control the speed of a dc motor, universal motor and stepper motors
C358.5	Verify the performance of single phase full bridge inverter connected to resistive load
C358.6	Perform commutation of SCR by different methods

Course Name: Control Systems / 15EE61

C361.1	Discuss the effect of feedback and types of control systems, evaluate the transfer function.
C361.2	Evaluate the stability of linear time invariant systems.
C361.3	Apply block diagram manipulation and signal flow graph.
C361.4	Demonstrate the model of control system using mathematical modelling.
C361.5	Determine the transient and steady state time response.

C361.6	Investigate the performance of the given system in time and frequency domain based design of controller or compensator configuration.

Course Name: Power System Analysis / 15EE62

C362.1	Can Explain Per unit, one line diagram.
C362.2	Can Perform short circuit analysis of Machines and Power systems.
C362.3	Can evaluate symmetrical components of voltages and currents.
C362.4	Can analyze sequence impedance and networks.
C362.5	Can analyze the dynamics of synchronous machines and stability.
C362.6	Can show the analysis of equal area criterion.

Course Name: Digital Signal Processing / 15EE63

C363.1	Compute the DFT of various signals using its properties.
C363.2	Use the DFT to compute the linear and circular convolution and linear filters of long sequence.
C363.3	Apply fat and efficient algorithm for computing DFT and IDFT.
C363.4	Design of IIR Butterworth digital filters using impulse invariant/BT.
C363.5	Design of IIR digital filter using Impulse invariant/Bilinear transformation.
C363.6	Design of FIR filters using wind functions and frequency sampling method and realization of IIR and FIR filters

Course Name: Electrical Machine Design / 15EE64

C364.1	To know the properties of electrical and magnetic materials.
C364.2	To design the machines as in modern trend.
C364.3	Selection of loading for various machines
C364.4	To discuss the main dimensions of machines.
C364.5	To discuss design of AC and DC machines.
C364.6	To know the short circuit ration and performance.

Course Name: Computer Aided Electrical Drawing / 15EE651

C365.1	Discuss the terminology and types of DC and AC armature windings.
C365.2	Develop armature winding diagram for AC and DC machines.
C365.3	Develop layout of substation using standard symbols.
C365.4	Draw sectional views of transformer using design data.
C365.5	Draw sectional views of assembled DC machine or its parts.
C365.6	Draw sectional views of assembled alternator or its parts.

Course Name: Sensors and Transducers / 15EE662

C366.1	Discuss need of transducers, classification, advantages, disadvantages, working.
C366.2	Discuss recent trends in sensor technologies of their selection.
C366.3	Discuss basics of signal codes equipment.
C366.4	Discuss configuration of DAS and data conversion.
C366.5	Show knowledge of data transmission &telemetry.
C366.6	Express measurement of non-electrical quantities.

Course Name: Control Systems Lab / 15EEL67

C367.1	Use software package or discrete components in assessing the time and frequency domain reposes of a given second order system
C367.2	Design and analyse Lead, Lag and Lag – Lead compensators for given specifications.
C367.3	Determine the performance characteristics of ac and dc servomotors and synchro-transmitter receiver pair used in control systems
C367.4	Simulate the DC position and feedback control system to study the effect of P, PI, PD and PID controller and Lead compensator on the step response of the system
C367.5	Write a script files to plot root locus, bode plot, Nyquist plots to study the stability of the system using a software package
C367.6	Work with a small team to carryout experiments and prepare reports that present lab work.

Course Name: Digital Signal Processing Lab / 15EEL68

C368.1	Give physical interpretation of sampling theorem in time and frequency domains
C368.2	Evaluate the impulse response of a system
C368.3	Perform convolution of given sequences to evaluate the response of a system
C368.4	Compute DFT and IDFT of a given sequence using the basic definition and/or fast methods
C368.5	Provide a solution for a given difference equation.
C368.6	Conduct experiments using software and prepare reports that present lab
	work

Course Name: 10EE71 – Computer Technique in Power Systems

C471.1	Formulate network matrices and models for solving load problems
C471.2	Perform steady state power flow analysis of power systems using numerical iterative methods

C471.3	Suggest a method to control voltage profile
C471.4	Show knowledge of optimal operation on busbar, optimal UC, optimal scheduling for hydro thermal
C471.5	Analyse short circuit faults in power system networks using zbus matrix.
C471.6	Perform numerical solution of swing equation for multi machine stability.

Course Name: 10EE72 – Electrical Power Utilization

C472.1	Discuss electric heating, air-conditioning and electric welding.
C472.2	Explain laws of electrolysis, extraction and refining of metals and electro deposition.
C472.3	Design interior and exterior lighting systems- illumination levels for factory lighting- flood lighting street lighting.
C472.4	Discuss systems of electric traction, speed time curves and mechanics of train movement.
C472.5	Explain the motors used for electric traction and their control and Discuss braking of electric motors, traction systems and power supply and other traction systems.
C472.6	Explain the working of electric and hybrid electric vehicles.

Course Name: 10EE73 – HIGH VOLTAGE ENGG

C473.1	Explain conduction and breakdown phenomenon in gases, liquid dielectrics.
C473.2	Explain breakdown phenomenon in solid dielectrics.
C473.3	Explain generation of high voltages and currents
C473.4	Discuss measurement techniques for high voltages and currents.
C473.5	Discuss overvoltage phenomenon and insulation coordination in electric power systems.
C473.6	Discuss non-destructive testing of materials and electric apparatus and high-voltage testing of electric apparatus

Course Name: Industrial Drives & Its Applications / 10EE74

C474.1	Explain the advantages and choice of electric drive.
C474.2	Explain dynamics and different modes of operation of electric drives.
C474.3	Analyze the performance of induction motor drives under different conditions.
C474.4	Control induction motor, synchronous motor and stepper motor drives.
C474.5	Suggest a motor for a drive and control of dc motor using controlled rectifiers
C474.6	Suggest a suitable electrical drive for specific application in the industry

Course Name: High Voltage DC Transmission Systems / 10EE751

C475.1	General Concepts of High Voltage DC & AC Transmission Systems

C475.2	Analyse the Operation and working of various Converters used for HVDC transmission
C475.3	Grid Converters , its operation & Characteristics
C475.4	Stability of Various converters
C475.5	Various Protection Circuits – operation & working
C475.6	Power Reversal concepts and its uses

Course Name: VLSI Circuits & Designs / 10EE764

C476.1	Demonstrate understanding of MOS transistor theory, CMOS fabrication flow and technology scaling
C476.2	Draw the basic gates using the stick and layout diagrams with the knowledge of physical design aspects
C476.3	Interpret Memory elements along with timing considerations
C476.4	Demonstrate knowledge of FPGA based system design
C476.5	Interpret testing and testability issues in VLSI Design
C476.6	Analyze CMOS subsystems and architectural issues with the design constraints

Course Name: 10EEL77-High Voltage &Relay Lab

C477.1	Experimentally verify the characteristics of over current, over voltage, under voltage and negative sequence relays both electromagnetic and static type
C477.2	Experimentally verify the characteristics of microprocessor based over current, over voltage, under voltage relays and distance relay. Show knowledge of protecting
C477.3	Analyze the spark over characteristics for both uniform and non-uniform configurations using High AC and DC voltages.
C477.4	Measure high AC and DC voltages and breakdown strength of transformer oil.
C477.5	Draw electric field and measure the capacitance of different electrode configuration models.
C477.6	Show knowledge of generating standard lightning impulse voltage to determine efficiency, energy of impulse generator and 50% probability flashover voltage for air insulation.

Course Name: 10EEL78-Power System Simulation Lab

C478.1	Develop a program in MATLAB to assess the performance of medium and long transmission lines.
C478.2	Develop a program in MATLAB to obtain the power angle characteristics of salient and non-salient pole alternator and assess the transient stability under three phase fault at different locations in a of radial power systems.

C478.3	Develop programs in MATLAB to formulate bus admittance and bus impedance matrices of interconnected power systems.
C478.4	Use Mi-Power package to solve power flow problem for simple power
	systems.
C478.5	Use Mi-Power package to study unsymmetrical faults at different locations in radial power systems
C478.6	Use of Mi-Power package to study optimal generation scheduling problems for thermal power plants

Course Name: 10EE81 – Electrical Design Estimation & Costing

C481.1	Explain the purpose of estimation and costing.
C481.2	Discuss AE act and IE rules.
C481.3	Discuss energy distribution in a building, wiring, cable, fuses, lightning, points, circuits, sub circuits.
C481.4	Discuss types of service mains and estimation of service mains and power circuits.
C481.5	Discuss estimation of overhead transmission and distribution system and its components.
C481.6	Discuss main components of substation, preparation of single line diagram and ear thing of a substation.

Course Name: Power System Operation and control / 10EE82

C482.1	Describe various levels of controls in power systems, the vulnerability of the system, components, architecture and configuration of SCADA and Solve unit commitment problems
C482.2	Explain issues of hydrothermal scheduling and solutions to hydro thermal problems
C482.3	Explain basic generator control loops, functions of Automatic generation control, speed governors
C482.4	Develop and analyse mathematical models of Automatic Load Frequency Control
C482.5	Explain automatic generation control, voltage and reactive power control in an interconnected power system.
C482.6	Explain reliability, security, contingency analysis, state estimation and related issues of power systems.

Course Name: 10EE836 – Renewable Energy Sources

C483.1	Discuss energy scarcity, solution, availability of renewable energy.
C483.2	Explain about sun, earth relationship, types of solar collectors.

C483.3	Discuss solar cell components, characteristics, application and configuration.
C483.4	Discuss hydrogen, wind energy production, site selection, storage.
C483.5	Discuss biomass, biogas composition types, production, advantages and disadvantages.
C483.6	Discuss availability, generation, devices for tidal, sea wave and wave and ocean thermal energy.

Course Name: 10EE842 – Energy Auditing & Demand Side Management

C484.1	Discuss energy scarcity, solution & Energy Scenario in India
C484.2	Explain and analysis of economics, energy concepts
C484.3	Energy auditing - Need and different concepts
C484.4	Study of Various Optimization methods in Energy consumption
C484.5	Various Electrical equipment's used, its power factor and other details
C484.6	Benefits, Techniques and methods of Demand Side Management

Course Name: Project Work/ 10EEP85

C485.1	Present the project and be able to defend it
C485.2	Make links across different areas of knowledge and to generate, develop and evaluate ideas and information so as to apply these skills to the project task
C485.3	Habituated to critical thinking and use problem solving skills
C485.4	Communicate effectively and to present ideas clearly and coherently in both the written and oral forms
C485.5	Work in a team to achieve common goal.
C485.6	Learn on their own, reflect on their learning and take appropriate actions to improve it

Course Name: Seminar/ 10EES86

C486.1	Attain, use and develop knowledge in the field of electrical and electronics engineering and other disciplines through independent learning and collaborative study
C486.2	Identify, understand and discuss current, real-time issues
C486.3	Improve oral and written communication skills
C486.4	Explore an appreciation of the self in relation to its larger diverse social and academic contexts.
C486.5	Apply principles of ethics and respect in interaction with others
C486.6	Work in a team to achieve common goal.

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Recognised by UGC Under Section 2(f))
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Department of Information Science

Vision of the Institute

To be a respected and most sought after engineering educational institution engaged in equipping individuals capable of building learning organizations in the new millennium.

Mission of the Institute

To develop competent students with good value systems and face challenges of the continuously changing world.

Vision of the Department

To meet the educational, research & service needs of the region through collaboration with academic, technical institutions, businesses, government agencies & cultural organizations, thereby, providing a platform that encourages students & faculty to continue their intellectual & professional growth.

Mission of The Department

To develop the best Information Science Professionals, who work creatively, communicate effectively & become technologically competent and also to mould them into good citizens by inculcating sense ethical values in them.

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Program Educational Objectives

1. Be capable of understanding, analyzing and applying current & emerging technologies to design and develop solutions to IT/ITES/Software/Telecom related problems and acquire value and employment.
2. To have sound foundation in mathematical, scientific and Information science engineering fundamentals necessary to formulate, solve and analyze practical problems and to prepare students for further studies and research.
3. Function effectively as individuals and team members in the workplace, growing into highly technical or project management and leadership roles, in various organizations.
4. Create an awareness of the life-long learning process, to communicate effectively, learn necessary tools to successfully identify and adapt to ever changing technologies, by ethical means and code of professional practice.

Program Specific Objectives

1. Provide effective and efficient real time solutions with the application of knowledge in IT, ITES, Networking and Software domains.
2. Demonstrate the ability to work in a team, with professional ethics, good communication and documentation skills in designing, implementation and management of software products and services, at optimal cost.
3. Proven capability to exchange views/concepts, incubate ideas and to carry out lifelong learning with zeal, to be aware of the state of art technologies and their development.

Program Outcomes

1. Engineering knowledge: Apply the knowledge of mathematics, science, engineering fundamentals, and an engineering specialization to the solution of complex engineering problems.

2. Problem analysis: Identify, formulate, review research literature, and analyze complex engineering problems reaching substantiated conclusions using first principles of mathematics, natural sciences, and engineering sciences.

3. Design/development of solutions: Design solutions for complex engineering problems and design system components or processes that meet the specified needs with appropriate consideration for the public health and safety, and the cultural, societal, and environmental considerations.

4. Conduct investigations of complex problems: Use research-based knowledge and research methods including design of experiments, analysis and interpretation of data, and synthesis of the information to provide valid conclusions.

5. Modern tool usage: Create, select, and apply appropriate techniques, resources, and modern engineering and IT tools including prediction and modelling to complex engineering activities with an understanding of the limitations.

6. The engineer and society: Apply reasoning informed by the contextual knowledge to assess societal, health, safety, legal and cultural issues and the consequent responsibilities relevant to the professional engineering practice.

7. Environment and sustainability: Understand the impact of the professional engineering solutions in societal and environmental contexts, and demonstrate the knowledge of, and need for sustainable development.

8. Ethics: Apply ethical principles and commit to professional ethics and responsibilities and norms of the engineering practice.

9. Individual and team work: Function effectively as an individual, and as a member or leader in diverse teams, and in multidisciplinary settings.

10. Communication: Communicate effectively on complex engineering activities with the engineering community and with society at large, such as, being able to comprehend and write effective reports and design documentation, make effective presentations, and give and receive clear instructions.

11. Project management and finance: Demonstrate knowledge and understanding of the engineering and management principles and apply these to one's own work, as a member and leader in a team, to manage projects and in multidisciplinary

environments.

12. Life-long learning: Recognize the need for, and have the preparation and ability to engage in independent and life-long learning in the broadest context of technological change.

Course Name: C202 Analog and Digital Electronics 17CS32

C202.1	Explain the operation of JFETs and MOSFETs , Operational Amplifier circuits and their application
C202.2	Explain Combinational Logic, Simplification Techniques using Karnaugh Maps, Quine McClusky technique.
C202.3	Demonstrate Operation of Decoders, Encoders, Multiplexers, Adders and Subtractors, working of Latches, Flip-Flops, Designing Registers, Counters, A/D and D/A Converters
C202.4	Design of Counters, Registers and A/D & D/A converters

Course Name:C203 Data Structures and Application 17CS33

C203.1	Explain different types of data structures, operations and algorithms
C203.2	Apply searching and sorting operations on files
C203.3	Make use of stack, Queue, Lists, Trees and Graphs in problem solving.
C203.4	Develop all data structures in a high-level language for problem solving.

Course Name:C204 Computer Organization 17CS34

C234.1	Explain the basic organization of a computer system.
C234.2	Demonstrate functioning of different sub systems, such as processor, Input/output, and memory.
C234.3	Illustrate hardwired control and micro programmed control. pipelining, embedded and other computing systems.
C234.4	Build simple arithmetic and logical units.

Course Name: C205 UNIX and Shell Programming 17CS35

C205.1	Explain UNIX system and use different commands.
C205.2	Compile Shell scripts for certain functions on different subsystems.
C205.3	Demonstrate use of editors and Perl script writing

Course Name:C206 Discrete Mathematical Structures

C206.1	Make use of propositional and predicate logic in knowledge representation and truth verification.

C206.2	Demonstrate the application of discrete structures in different fields of computer science.
C206.3	Solve problems using recurrence relations and generating functions.
C206.4	Apply different mathematical proofs, techniques in proving theorems.
C206.5	Compare graphs, trees and their applications.

Course Name: C212 Engineering Mathematics-IV 17MAT41

C212.1	Solve first and second order ordinary differential equation arising in flow
	problems using single step and multistep numerical methods.
C212.2	Illustrate problems of potential theory, quantum mechanics and heat conduction by employing notions and properties of Bessel's functions and Legendre's polynomials.
C212.3	Explain the concepts of analytic functions, residues, poles of complex potentials and describe

Course Name: C213 Object Oriented Concepts 17CS42

C213.1	Explain the object-oriented concepts and JAVA.
C213.2	Develop computer programs to solve real world problems in Java.
C213.3	Develop simple GUI int erfaces for a computer program to interact with users, and to comprehend the event-based GUI handling principles using Applets and swings.

Course Name: C214 Design and Analysis of Algorithms 17CS43

C214.1	Describe computational solution to well known problems like searching, sorting etc.
C214.2	Estimate the computational complexity of different algorithms.
C214.3	Develop an algorithm using appropriate design strategies for problem solving

Course Name: C215 Microprocessors and Microcontrollers 17CS44

C215.1	Differentiate between microprocessors and microcontrollers
C215.2	Develop assembly language code to solve problems
C215.3	Explain interfacing of various devices to x86 family and ARM processor
C215.4	Demonstrate interrupt routines for interfacing devices

Course Name: C216 Software Engineering 17CS45

C216.1	Design a software system, component, or process to meet desired needs within realistic constraints.

C216.2	Assess professional and ethical responsibility
C216.3	Function on multi-disciplinary teams
C216.4	Make use of techniques, skills, and modern engineering tools necessary for engineering

Course Name:C301 Data Communication 17CS46

C301.1	Illustrate basic computer network technology.
C301.2	Identify the different types of network topologies and protocols.
C301.3	List and explain the layers of the OSI model and TCP/IP model.
C301.4	Comprehend the different types of network devices and their functions within
	a network
C301.5	Demonstrate subnetting and routing mechanisms.

Course Name: Management and Entrepreneurship for IT Industry/ 15CS51

C351.1	Define management, organization, entrepreneur, planning, staffing, ERP and outline their importance in entrepreneurship
C351.2	Utilize the resources available effectively through ERP
C351.3	Make us of IPRs and institutional support in entrepreneurship

Course Name: Computer Networks / 15CS52

C352.1	Explain principles of application layer protocols
C352.2	Recognize transport layer services and infer UDP and TCP protocols
C352.3	Classify routers, IP and Routing Algorithms in network layer
C352.4	Understand the Wireless and Mobile Networks covering IEEE 802.11 Standard
C352.5	Describe Multimedia Networking and Network Management

Course Name: Database Management System / 15CS53

C353.1	Identify, analyze and define database objects, enforce integrity constraints on a database using RDBMS
C353.2	Use Structured Query Language (SQL) for database manipulation.
C353.3	Design and build simple database systems
C353.4	Develop application to interact with databases.

Course Name: Automata Theory and Computability / 15CS54

C354.1	Acquire fundamental understanding of the core concepts in automata theory and Theory of Computation
C354.2	Learn how to translate between different models of Computation (e.g., Deterministic and Non-deterministic and Software models).

C354.3	Design Grammars and Automata (recognizers) for different language classes and become knowledgeable about restricted models of Computation (Regular, Context Free) and their relative powers.
C354.4	Develop skills in formal reasoning and reduction of a problem to a formal model, with an emphasis on semantic precision and conciseness.
C354.5	Classify a problem with respect to different models of Computation.

Course Name: Advanced JAVA and J2EE / 15CS553

C355.1	Interpret the need for advanced Java concepts like enumerations and collections in developing modular and efficient programs
C355.2	Build client-server applications and TCP/IP socket programs
C355.3	Illustrate database access and details for managing information using the JDBC API
C355.4	Describe how servlets fit into Java-based web application architecture
C355.5	Develop reusable software components using Java Beans

Course Name: DOT NET Framework for Application Development/ 15CS564

C356.1	Build applications on Visual Studio .NET platform by understanding the syntax and semantics of C#
C356.2	Demonstrate Object Oriented Programming concepts in C# programming language
C356.3	Design custom interfaces for applications and leverage the available built-in interfaces in building complex applications.
C356.4	Illustrate the use of generics and collections in C#
C356.5	Compose queries to query in-memory data and define own operator behaviour

Course Name: Computer Network Laboratory / 15CSL57

C355.1	Analyze and Compare various networking protocols.
C355.2	Demonstrate the working of different concepts of networking.
C355.3	Implement, analyze and evaluate networking protocols in NS2 / NS3

Course Name: DBMS Laboratory with Mini Project /15CSL58

C355.1	Create, Update and query on the database.
C355.2	Demonstrate the working of different concepts of DBMS
C355.3	Implement, analyze and evaluate the project developed for an application

Course Name: Cryptography, Network Security and Cyber Law /15CS61

C361.1	Discuss cryptography and its need to various applications
C361.2	Design and develop simple cryptography algorithms
C361.3	Understand cyber security and need cyber Law

Course Name: File Structures /15IS62

C362.1	Choose appropriate file structure for storage representation.
C362.2	Identify a suitable sorting technique to arrange the data.
C362.3	Select suitable indexing and hashing techniques for better performance to a given problem.

Course Name: Software Testing / 15IS63

C363.1	Derive test cases for any given problem
C363.2	Compare the different testing techniques
C363.3	Classify the problem into suitable testing model
C363.4	Apply the appropriate technique for the design of flow graph.
C363.5	Create appropriate document for the software artefact.

Course Name: Operating Systems / 15CS64

C364.1	Demonstrate need for OS and different types of OS
C364.2	Apply suitable techniques for management of different resources
C364.3	Use processor, memory, storage and file system commands
C364.4	Realize the different concepts of OS in platform of usage through case studies

Course Name: Data Mining and Data Warehousing /15CS651

C365.1	Identify data mining problems and implement the data warehouse
C365.2	Write association rules for a given data pattern.
C365.3	Choose between classification and clustering solution.

Course Name: Mobile Application Development /15CS661

C366.1	Create, test and debug Android application by setting up Android development environment
C366.2	Implement adaptive, responsive user interfaces that work across a wide range of devices
C366.3	Infer long running tasks and background work in Android applications
C366.4	Demonstrate methods in storing, sharing and retrieving data in Android applications

C366.5	Analyze performance of android applications and understand the role of permissions and security
C366.6	Describe the steps involved in publishing Android application to share with the world

Course Name: Software Testing Laboratory / 15ISL67

C367.1	List out the requirements for the given problem
C367.2	Design and implement the solution for given problem in any programming language(C,C++,JAVA)
C367.3	Derive test cases for any given problem
C367.4	Apply the appropriate technique for the design of flow graph
C367.5	Create appropriate document for the software artefact

Course Name: FILE Structures Laboratory with Mini Project / 15ISL68

C368.1	Implement operations related to files
C368.2	Apply the concepts of file system to produce the given application.
C368.3	Evaluate performance of various file systems on given parameters.

Course Name: WEB Technology and Its Applications /15CS71

C371.1	Adapt HTML and CSS syntax and semantics to build web pages.
C371.2	Construct and visually format tables and forms using HTML and CSS
C371.3	Develop Client-Side Scripts using JavaScript and Server-Side Scripts using PHP to generate and display the contents dynamically
C371.4	Appraise the principles of object oriented development using PHP
C371.5	Inspect JavaScript frameworks like jQuery and Backbone which facilitates developer to focus on core features

Course Name: Software Architecture and Design Patterns /15IS72

C372.1	Design and implement codes with higher performance and lower complexity
C372.2	Be aware of code qualities needed to keep code flexible
C372.3	Experience core design principles and be able to assess the quality of a design with respect to these principles.
C372.4	Capable of applying these principles in the design of object oriented systems.
C372.5	Demonstrate an understanding of a range of design patterns. Be capable of comprehending a design presented using this vocabulary
C372.6	Be able to select and apply suitable patterns in specific contexts

Course Name: Machine Learning / 15CS73

C373.1	Identify the problems for machine learning. And select the either supervised,unsupersvised or reinforcement learning
C373.2	Explain theory of probability and statistics related to machine learning
C373.3	Investigate concept learning, ANN, Bayes classifier, k nearest neighbor, Q,

Course Name: Cloud Computing and Its Applications / 15CS742

C374.1	Explain cloud computing, virtualization and classify services of cloud computing
C374.2	Illustrate architecture and programming in cloud
C374.3	Describe the platforms for development of cloud applications and List the application of cloud.

Course Name: Storage Area Networks / 15CS754

C375.1	Identify key challenges in managing information and analyze different storage networking technologies and virtualization
C375.2	Explain components and the implementation of NAS
C375.3	Describe CAS architecture and types of archives and forms of virtualization
C375.4	Illustrate the storage infrastructure and management activities

Course Name: Machine Learning Laboratory / 15CSL76

C376.1	Understand the implementation procedures for the machine learning algorithms
C376.2	Design Java/Python programs for various Learning algorithms
C376.3	Apply appropriate data sets to the Machine Learning algorithms
	Identify and apply Machine Learning algorithms to solve real world problems.

Course Name: Web Technology Laboratory with Mini Project/ 15CSL77

C377.1	Design and develop dynamic web pages with good aesthetic sense of
	designing and latest technical know-how's
C377.2	Have a good understanding of Web Application Terminologies, Internet Tools other web services.
C377.3	Learn how to link and publish web sites

Course Name: Internet of Things Technology /15CS81

C481.1	Interpret the impact and challenges posed by IoT networks leading to new architectural models.
C481.2	Compare and contrast the deployment of smart objects and the technologies to connect them to network.

C481.3	Appraise the role of IoT protocols for efficient network communication.
C481.4	Elaborate the need for Data Analytics and Security in IoT.
C481.5	Illustrate different sensor technologies for sensing real world entities and identify the applications of IoT in Industry.

Course Name: Big Data Analytics /15CS82

C482.1	Master the concepts of HDFS and MapReduce framework
C482.2	Investigate Hadoop related tools for Big Data Analytics and perform basic Hadoop Administration
C482.3	Recognize the role of Business Intelligence, Data warehousing and Visualization in decision making
C482.4	Infer the importance of core data mining techniques for data analytics
C482.5	Compare and contrast different Text Mining Techniques

Course Name: System Modelling and Simulation / 15CS834

C483.1	Explain the system concept and apply functional modelling method to model the activities of a static system
C483.2	To classify various simulation models and give practical examples for each category.
C483.3	Generate and test random number variates and apply them to develop simulation models.
C483.4	Analyze output data produced by a model and test validity of the model.
C483.5	Describe the behavior of a dynamic system and create an analogous model for a dynamic system;
C483.6	Simulate the operation of a dynamic system and make improvement according to the simulation results.

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Department of Maths

Vision of the Institute

To be a respected and most sought after engineering educational institution engaged in equipping individuals capable of building learning organizations in the new millennium.

Mission of the Institute

To develop competent students with good value systems and face challenges of the continuously changing world.

Vision of the Department

We envision that our department will continue to grow as an intellectually stimulating environment that attracts engineers who have a knack for interdisciplinary research. We hope that the department will play a central role in bridging fundamental sciences and engineering

Mission of the Department

Our mission is educating our students to excel in their work as well as mentor the next generation of engineers. We provide engineering Mathematics with theoretical and application oriented technique and making them successful personally & professionally

Course Name: 17MAT11 (Engineering mathematics I)

CO1	Use partial derivatives to calculate rate of change multivariate functions.
CO2	Analyze position, velocity and acceleration in two or three dimensions using the calculus of vector valued functions.
CO3	Recognize and solve first order ordinary differential equations, Newton's law of cooling.
CO4	Use matrices technique for solving system of equations in the different areas of linear algebra
CO5	Apply and standard computation on parametric and polar curves, demonstrate by tracing the same the properties. and understanding towards nature of curves
CO6	Understanding and Applying the real-world problem through engineering techniques.

Course Name: 17MAT31 (Engineering mathematics III)

CO1	Know the use of periodic signals and Fourier series to analyze circuits and system communications.
CO2	Explain the general linear system theory for continuous- time signals and digital signals processing using the Fourier transform and Z-transform.
CO3	Employ appropriate numerical methods to solve algebraic and transcendental equations.
CO4	Apply Green's theorem, Divergence theorem and Stokes' theorem in various applications in the field of electro-magnetic and gravitational fields and fluid flow problems.
CO5	Determine the extremals of functional and solve the simple problems of the calculus of variations.
CO6	Understanding and applying the concepts of Z-transforms to the engineering problems and solve the second and higher order differential equations.

Course Name: 17MAT21(Engineering mathematics II)

CO1	Use partial derivatives to calculate rate of change multivariate functions.
CO2	Analyze position, velocity and acceleration in two or three dimensions using the calculus of vector valued functions.
CO3	Recognize and solve first order ordinary differential equations, Newton's law of cooling.
CO4	Use matrices technique for solving system of equations in the different areas of linear algebra

CO5	Apply and standard computation on parametric and polar curves, demonstrate by tracing the same the properties. and understanding towards nature of curves
CO6	Understanding and Applying the real-world problem through engineering techniques.

Course Name: 17MAT31 (Engineering mathematics III)

CO2	Explain the general linear system theory for continuous- time signals and digital signals processing using the Fourier transform and Z-transform.
CO3	Employ appropriate numerical methods to solve algebraic and transcendental equations.
CO4	Apply Green's theorem, Divergence theorem and Stokes' theorem in various applications in the field of electro-magnetic and gravitational fields and fluid flow problems.
CO5	Determine the extremals of functional and solve the simple problems of the calculus of variations.
CO6	Understanding and applying the concepts of Z-transforms to the engineering problems and solve the second and higher order differential equations.

Course Name: 17CS36 (Discrete mathematical structures)

CO1	Make use of propositional and predicate logic in knowledge representation and truth verification.
CO2	Demonstrate the applications of discrete structures in different fields of computer science.
CO3	Solve problems using recurrence relations and generating functions.
CO4	Apply different mathematical proofs and techniques in proving theorems.
CO5	Compare graphs trees and their applications.
CO6	Understand and analyze prefix code and design the algorithm.

Department of Mechanical Engineering

Vision of the Institute

To be a respected and most sought after engineering educational institution engaged in equipping individuals capable of building learning organizations in the new millennium.

Mission of the Institute

To develop competent students with good value systems and face challenges of the continuously changing world.

Vision of the Department

To become a center of excellence providing state of the art engineering education in mechanical engineering and making individual to be capable of building nation in the new millennium.

Mission of the Department

Mission 1: To provide an excellent teaching and learning process for the students to meet the needs and standards of the current industries and higher learning process.

Mission 2: To promote research and development activity in the recent emerging trends of the mechanical engineering department.

Mission 3: To provide the students with good communication skill, lifelong learning, team spirit and leadership qualities to face the current

Program Outcomes

1. Engineering knowledge: Apply the knowledge of mathematics, science, engineering fundamentals, and an engineering specialization to the solution of complex engineering problems.

2. Problem analysis: Identify, formulate, review research literature, and analyse complex engineering problems reaching substantiated conclusions using first principles of mathematics, natural sciences, and engineering sciences.

3. Design/development of solutions: Design solutions for complex engineering problems and design system components or processes that meet the specified needs with appropriate consideration for the public health and safety, and the cultural, societal, and environmental considerations.

4. Conduct investigations of complex problems: Use research-based knowledge and research methods including design of experiments, analysis and interpretation of data, and synthesis of the information to provide valid conclusions.

5. Modern tool usage: Create, select, and apply appropriate techniques, resources, and modern engineering and IT tools including prediction and modelling to complex engineering activities with an understanding of the limitations.

6. The engineer and society: Apply reasoning informed by the contextual knowledge to assess societal, health, safety, legal and cultural issues and the consequent responsibilities relevant to the professional engineering practice.

7. Environment and sustainability: Understand the impact of the professional engineering solutions in societal and environmental contexts, and demonstrate the knowledge of, and need for sustainable development.

8. Ethics: Apply ethical principles and commit to professional ethics and responsibilities and norms of the engineering practice.

9. Individual and team work: Function effectively as an individual, and as a member or leader in diverse teams, and in multidisciplinary settings.

10. Communication: Communicate effectively on complex engineering activities with the engineering community and with society at large, such as, being able to comprehend and write effective reports and design documentation, make effective presentations, and give and receive clear instructions.

11. Project management and finance: Demonstrate knowledge and understanding of the engineering and management principles and apply these to one's own work, as a member and leader in a team, to manage projects and in multidisciplinary

environments.

12. Life-long learning: Recognize the need for, and have the preparation and ability to engage in independent and life-long learning in the broadest context of technological change.

Course Name:17EME14/24 -Elements of Mechanical Engineering

C104.1	Understand the concept of non renewable and renewable energy and the working principles of different types of boilers and accessories.
C104.2	Learn the basic principles of operations of steam, water and gas turbines, IC Engines
C104.3	Understand the concept of refrigeration and air conditioning systems
C104.4	Gains knowledge on material joining processes, understands the concept of lubrication and different types of bearings.
C104.5	Get exposure to machining operations on lathe, milling, drilling and grinding machines
C104.6	Understands the principle of power transmissions through belt drives and gear trains

Course Name: 17WSL16/26- Workshop Practice

C108.1	Identify the fitting tools and instruments.
C108.2	Apply knowledge of fitting tools and measuring instruments for getting an object of required shape and size
C108.3	Acquire the skill required for carrying out the welding using electric arc welding process.
C108.4	Applying the skill acquired for preparing the different welding joints.
C108.5	Demonstrate the sheet metal working and joining by soldering processes.
C108.6	Understand the working of various power tools and its applications in mechanical engineering.

Course Name: 17CED14- Computer Aided Engineering Drawing

C112.1	Understand the importance of engineering drawing as language of engineers.
C112.2	Able to draw the front, top and side views of points and straight lines.
C112.3	Able to draw the orthographic projections of regular plane surfaces in different orientations.
C112.4	Develops skill to imagine and draw the projections of regular solids.
C112.5	Understand the concept of the development of lateral surfaces of regular solids.

C112.6	Develop skill to generate 3D views like isometric projection of different types of solids and combination solids.

Course Name: 17ME32A- Material Science & Metallurgy

C202.1	An understanding of the basic concepts of heat treatment process and its influences on properties of metal.
C202.2	An understanding of types of structures, imperfections in metals, diffusion mechanism, evaluation of mechanical properties by subjecting to various stresses and failure mechanism.
C202.3	An understanding of the basic concepts of phase transformation during solidification, phase diagrams, iron carbon equilibrium diagram, classifications of steel, iron, AL, CU and it's alloys.
C202.4	An understanding of the basic concepts of classification, fabrication and applications of composite materials.
C202.5	To understand the various processes for manufacturing of composites and obtain a knowledge of contemporary issues and an ability to use the skills and techniques in engineering practice
C202.6	An ability to use the techniques, skills and modern engineering tools necessary for engineering practice and lifelong learning.

Course Name: 17ME33- Basic Thermodynamics

C203.1	Understand the fundamentals of thermodynamics.
C203.2	Demonstrate the work and heat transfer in thermodynamic systems.
C203.3	Formulate the heat, work and energy of the system for various thermodynamic processes.
C203.4	Evaluate the performance of heat engines, heat pumps and refrigerators.
C203.5	Analyze the entropy changes for various thermodynamic processes and thermodynamic properties of pure substances.
C203.6	Impart the knowledge in thermodynamic relations and distinguish between ideal and real gases.

Course Name: 17ME34- Mechanics of Materials

C204.1	Learn basic concepts of simple stress and strain.
C204.2	Understand importance of stresses in composite sections, principal stresses and strains.
C204.3	Analyze the stresses in thick and thin cylinders.
C204.4	Draw shears force and bending moments.

C204.5	Gain knowledge on bending and shear stresses, deflection of beams.
C204.6	Impart knowledge of torsion of circular shafts and stability of columns.

Course Name: 17ME35- Manufacturing Process-I

C205.1	Understand basic concept of foundry technology and identify various types of patterns, binders, additives, core, molding machines.
C205.2	Analyze working principle of gating and risering systems, special molding processes
C205.3	Describe different furnaces used for melting of metals and special types of casting process.
C205.4	Demonstrate different methods of welding in the application of fabrication works, and joining of two metals/alloys.
C205.5	Apply the concept of special types of welding, brazing and soldering.
C205.6	Enhance the knowledge of metallurgical aspect in welding.

Course Name: 17ME36A- Computer Aided Machine Drawing

C206.1	Student will be able to sketch sections of solids of various polyhedrons, and also visualize and draw orthographic views of simple machine parts.
C206.2	Student is able to understand and draw various thread forms, standard keys,
C206.3	Understanding of various types riveted joints and their drawings, couplings using memorable drawing
C206.4	The students are able to visualize and prepare detailed drawing of a given part and draw
C206.5	CO-5 Read and interpret a given drawing and Create 2-D and 3-D models using solid edge software with manufacturing purposes.
C206.6	Producing detailed sectional views drawing of a 3-D models using solid edge Software with parts list.

Course Name: 17MEL37A- Metallography & Material Testing Lab

C207.1	dents will be able to demonstrate the knowledge and the skills required for the conduction of Tensile, Shear and Compression test.
C207.2	The students will be able to determine the torsional and bending strength of different materials.
C207.3	dents will learn Identification of metals based on Microstructures.
C207.4	dents will be capable of detecting the defects like cracks, flaws in materials by using different NDT methods.
C207.5	dents will know the material behaviour for impact and wear loads.

C207.6	dents will be capable of determining hardness of metals using different methods.

Course Name: 17MEL38A- Foundry & Forging Lab

C208.1	Demonstrate various skills of sand preparation, molding.
C208.2	Conduct tests on foundry sands to determine properties for different ingredient compositions.
C208.3	Apply knowledge of design and practices of mould and pattern making.
C208.4	Analyze the design of gating system.
C208.5	Demonstrate various skills of forging operations.
C208.6	Work as a team keeping up ethical principles.

Course Name: 17ME42B- Mechanical Measurements & Metrology

C210.1	Students shall demonstrate the knowledge associated with Comparators (Mech, Optical, and Electrical& Pneumatic), Use of Sine bar, Interferometer, and measurement of Screw threads & Gear tooth parameters.
C210.2	Students shall demonstrate the knowledge associated with Generalized Measurement system, Transducers, CRO, Oscillographs, and XY Plotters.
C210.3	Students shall demonstrate the knowledge associated with Measurement of Force, Torque, and Temperature& Strain measurement.
C210.4	Students shall demonstrate the knowledge associated with various Standards of length, use of slip gauges, and System of limits, fits and tolerance and Design of Gauges.
C210.5	Students will be able to work in Quality control and quality assurances divisions in industries.
C210.6	Students will be able to design a sensors and transducers used for stress analysis, design a measuring equipments for the measurement of temperature and flow, to maintain quality in engineering products.

Course Name: 17ME43- Applied Thermodynamics

C211.1	Describe the application; apply the concepts of combustion thermodynamics in engineering field.
C211.2	Analyze and implement various aspects of air standard cycles and basic concepts of gas power cycles.
C211.3	Evaluate the performance of various working aspects of internal combustion engines
C211.4	Understand the different concepts and implement various vapour power cycles, Analyze the concepts and functioning of reciprocating compressors.

C211.5	Apply knowledge of working procedure of gas turbine and Jet and Rocket Propulsion system.
C211.6	Describe the various psychometric processes; understand the working of air conditioning systems and refrigeration systems.

Course Name: 17ME44- Kinematics of Machines

C212.1	To identify and select the proper mechanisms for the application in real life situations.
C212.2	Calculate mobility for various mechanisms and enumerate rigid links and types of joints within mechanisms.
C212.3	Explain different mechanisms and conduct a velocity and acceleration analysis of the different mechanisms.
C212.4	Construct CAM profile for the specific follower motion.
C212.5	To identify different gear trains for various practical applications and solve simple problems.
C212.6	To classify gears and calculate the various spur gear dimensions.

Course Name: 17ME45- Manufacturing Process-II

C213.1	Understand metal cutting principles, cutting tool materials, properties and also fluid selection.
C213.2	Classify and understand the principle and constructional features, operations performed on Lathe & drilling machine.
C213.3	Understand and to operate the Milling machine and to know the concept of indexing mechanism and its methods.
C213.4	Understand the concept of Grinding machines and its constructional features. And also to know the selection of grinding wheel.
C213.5	Understand the principles, applications and features of super finishing, polishing and buffing operations, honing etc.
C213.6	Select the types of non-traditional machines and methods of operations along with applications.

Course Name: 17ME46B- Fluid Mechanics

C214.2	To made them understand the concept of Euler's equation and extracting Bernoullis's equation also to understand and analyze the Head losses in laminar and turbulent flow through pipes.
C214.3	To Contend the importance of flow measurement and use of dimensional analysis to design physical or numerical experiments and to apply dynamic similarity.

C214.4	Can understand the reasons for Major and minor loss of energy through pipe
C214.5	To understand and analyze the Head losses in laminar and turbulent flow through pipes.
C214.6	To learn the concept of Buoyancy and importance of continuity equation and can implement the compressible flow and flow around immersed bodies.

Course Name: 17MEL47B- Mech. Measurements & Metrology Lab

C215.1	Understand the basic measurement units and calibrate various measuring devices.
C215.2	Use various measuring tools such as Sine Bar, Sine Center, Bevel Protractor to find taper and included angles.
C215.3	Gain knowledge on Optical Microscope, Tool Maker Microscope to measure screw thread parameters.
C215.4	Learn basic concepts of measuring temperature, pressure and strain using different methods.
C215.5	Gain knowledge on various measuring equipments applied to engineering analysis in industries.
C215.6	Impart knowledge of error and correction factors of various measuring devices.

Course Name: 17MEL48B- Machine Shop

C216.1	Describe the knowledge and the skills required with respect to the operation, procedure, conduction and analyzing the results of experiments.
C216.2	Perform the operations in lathe machine.
C216.3	Analyze the operations in milling machine and it's mechanism.
C216.4	To know the concepts of grooving operations using Shaping machine.
C216.5	Demonstrate of operations on drilling machine.
C216.6	Impart the knowledge of Eccentric turning using four jaw chuck

Course Name: 17AL51- Management and Entrepreneurship

C301.1	Understand the basic concepts of management and development of effective planning process.
C301.2	Understand the principles of organization and Illustrate different organizational structures.
C301.3	Understand the staff selection process, recruitment process and project selection process as well as directing, motivating and controlling.
C301.4	To know how to motivate, directing and controlling the managers and management.
C301.5	Develop entrepreneurship and its concepts pertaining to small scale industries for sustainable development.

C301.6	Understand different schemes of government support to small scale industries and preparation of project report.

Course Name: 17ME52- Design of Machine Elements-I

C302.1	Apply the concept of mechanics of materials to estimate the stresses in a machine element & predict failure of components.
C302.2	Analyze failure of components using different theories of failure for static loadings
C302.3	Determine the stress concentration factor for different irregularities and strength of components under different impact loadings.
C302.4	Design the machine components for fatigue failure & also for threaded fasteners.
C302.5	Design of keys, Shafts, cotter & knuckle joint & couplings used for power transmission
C302.6	Design & Analyze the power screws and welded joints for different applications.

Course Name: 17ME53- Energy Engineering

C303.1	Describe the working principle of steam power plant and ability to solve problems involving height of chimney to produce a given draft.
C303.2	Apply knowledge of super heater, De-super heater, control of super heaters, economizer
C303.3	Evaluate the various methods of starting diesel engines and need for lubrication.
C303.4	Import the knowledge of Hydrograph, how to draw the hydrograph, flow duration and mass curve and its applications.
C303.5	Apply the knowledge of nuclear energy, solar energy and wind energy.
C303.6	Demonstrate the various energy conversion methods such as Tidal power energy, Ocean thermal energy conversion, geothermal energy and photosynthesis.

Course Name: 17ME54- Dynamics of Machines

C304.1	Students will be able to do static and dynamic analysis of different mechanisms subjected to forces using various principles.
C304.2	Students will be able to analyze the concept of friction in different bearings and belt drive.
C304.3	Students will be able to solve the problems on balancing of rotating masses in same and different planes.

C304.4	Analyze the concept of primary & secondary forces of reciprocating masses in different engines.
C304.5	Students will be able to determine the various parameters of governors and its usage.
C304.6	Course content helps the students to analyze gyroscopic effect on different vehicles and Analysis of Cams.

Course Name: 17ME55- Manufacturing Process-III

C305.1	Students will be able to understand necessity of forming process compared with other manufacturing techniques, and the knowledge of parameters effect on the processing of the wrought products.
C305.2	Students will be able to determine the process, load required and possible reasons for the formation of defects in forged components.
C305.3	Students will be able to identify the process, load calculations and reasons for defective rolled products.
C305.4	Students will be able to apply the knowledge of drawing and extrusion to find out defects and problems occurred in the processes.
C305.5	Students will be able to select the different process, related equipments, and parameters for the fabrication of various sheet metal components.
C305.6	Students will be able to select the different high energy rate forming process and powder metallurgy for the fabrication of bulk components.

Course Name: 17ME56- Turbo Machines

C306.1	Understanding the comparison of positive displacement machine and turbo machine.
C306.2	Gain the knowledge of working of centrifugal pumps.
C306.3	Study the performance of various hydraulic turbines.
C306.4	Impart the knowledge of performance of steam turbines.
C306.5	Sound knowledge of energy transfer in turbomachinery.
C306.6	Sound knowledge about stage efficiency, reheat factor and preheat factors in turbines and pumps, compression and expansion processes, the working of
	centrifugal and axial compressors.

Course Name: 17MEL57- Fluid Mechanics & Machines Lab

C307.1	Students will able to analyze fluid flow principles.
C307.2	Gain the knowledge in analyzing the performance of turbines and pumps.
C307.3	Able to determine coefficient of friction, minor losses in flow through the pipes.

C307.4	Students will be able to calibrate flow measuring devices such as orifice meter, venture meter and V- Notch and performance of centrifugal pumps.
C307.5	Students will have the ability to test the performance of turbines like Pelton wheel, Francis turbine and Kaplan turbine.
C307.6	Students will have the ability to test the performance of two stages reciprocating air compressor and air blower.

Course Name: 17MEL58- Energy Conversion Lab

C308.1	At the end of the course, students will be able to determine the Flash point, Fire point, calorific value and viscosity of various lubrication oils.
C308.2	Students will have the knowledge of engine operation through valve timing diagram.
C308.3	To conduct performance test on Two stroke Petrol Engine.
C308.4	To conduct performance test on 4 stroke Diesel Engine, Four Stroke Petrol Engines.
C308.5	Students able to draw valve timing and port timing diagram.
C308.6	Impart the knowledge of application of planimeter.

Course Name: 17ME61- Computer Integrated Manufacturing

C309.1	Understand basic concepts of computer integrated Manufacturing**,** utilization parameters of machine and their capabilities
C309.2	Apply different work transfer methods and mechanism for high volume production
C309.3	Design automated assembly systems for high volume production and analyzes single station, MultiTaction and automated guided vehicle system.
C309.4	Development of various types of computer aided manufacturing and planning systems
C309.5	Enhance various terminology, programming methods of robot and write part program in Robotics & CNC machine.
C309.6	Analyze flow lines and solve problems through line balancing methods for manufacturing

Course Name: 17ME62- Design of Machine Elements-II

C310.1	Demonstrate the fundamentals of stress analysis, different stress in curved beams and Design and select power transmission elements.

C310.2	Make proper assumptions with respect to material, size, static and dynamic loads for springs, clutches and brakes.
C310.3	To change the existing design with minimum effort for better result/performance of IC-Engine parts
C310.4	Design of spur and helical gears for different power transmission ratio and to find BHN.
C310.5	Design bevel and worm gears based on strength, dynamic and wear loads.
C310.6	Performance of the rotating components can be increased with better knowledge of lubrication

Course Name: 17ME63- Heat & Mass Transfer

C311.1	Provide sound understanding of the basic principles and laws, modes of heat transfer, different types of Fins and fin efficiency.
C311.2	Capability to analyze transient mode of heat transfer and use of Heiselers Charts.
C311.3	To know various heat transfer processes and heat exchangers.
C311.4	Able to analyze different regimes of boiling and condensation.
C311.5	To impart the knowledge of natural and forced convection and non dimensional numbers associated with it.
C311.6	Understand the concept of radiation heat transfer.

Course Name: 17ME64- Finite Element Methods

C312.1	Learn basic principles of finite element method for analysis of structures.
C312.2	Understand importance of principle of minimum potential energy, Raleigh's Ritz and Galerkin's method to solve engineering problems.
C312.3	Analyze the finite element formulation of 2-D elements and higher order elements.
C312.4	Get exposure the finite element analysis of bars in engineering field.
C312.5	Gain knowledge on the finite element analysis of trusses.
C312.6	Impart knowledge of finite element analysis of beams and heat transfer problems.

Course Name: 17ME65- Mechatronics & Microprocessor

C313.2	Understand importance of Transducers and Sensors.
C313.3	Gain knowledge on electrical actuation system and signal conditioning.
C313.4	Learn basic concepts of Microprocessor and number system, logic gates.
C313.5	Gain knowledge on logic function of INTEL 8085A Microprocessor.

C313.6	Impart knowledge of CPU, organization and programming of Microprocessor.

Course Name: 17ME66X- TOE

C314.1	Develop equations of equilibrium, Mohr's diagram & characteristic equation of principal stress for 2D & 3D stress systems
C314.2	Able to identify the possible strain field using compatibility equations. Reducing the complexity by assuming plane stress & plane strain condition.
C314.3	Derive the solutions for a two-dimensional problem in Cartesian coordinates using Airy's stress function method and to develop equations of equilibrium for 2D stress system in Polar co-ordinate system.
C314.4	Identify the stress distribution of different parts such as rotating disks & rotating cylinders. To derive equations for torsion of thin open sections & tubes.
C314.5	Derive equation for Radial & Circumferential stresses for disk, cylinders & sphere subjected to thermal loading.
C314.6	Understand the importance of basic theorems to solve practical problems.

Course Name: 17ME665- NTM

C314.1	To appreciate the importance of NTM methods and their advantages over conventional methods.
C314.2	To demonstrate the working of USM processes.
C314.3	To operate with the elements of AJM & WJM processes.
C314.4	To gain the knowledge of elements related to ECM & Chemical machining processes.
C314.5	To select an appropriate NTM process for the machining of the components and suitable electrodes of EDM.
C314.6	To correlate specific applications of PAM, LBM and EBM process.

Course Name: 17MEL67- Heat & Mass Transfer Lab

C315.1	Understand the concept and mechanism of forced, natural convection taking place in objects of different geometries, the various empirical correlations used in different fluid flow situations.
C315.2	Learn the thermal performance analysis of heat exchangers, their practical applications.
C315.3	At the end of the course, students will be able to understand conduction phenomenon thoroughly in objects of different geometries they can determine the thermal conductivity of composite wall, lagging material and critical heat flux.

C315.4	Understand the performance analysis of vapour compression refrigeration cycle and air conditioning system.
C315.5	Understand the concept of radiation heat transfer.
C315.6	To impart the knowledge non dimensional numbers associated with natural and forced convection.

Course Name: 17MEL68- CAMA Lab

C316.1	le to define the different element types, properties and material models to the different structures being analyzed.
C316.2	dents can able to do the stress analysis of bar, truss, beam and simple mechanical structures and validate the results with theoretical results.
C316.3	dents will carry out static and dynamic analysis of simple beams and bars.
C316.4	dents will be able to analyze the thermal problems like conduction and convection using ANSYS.
C316.5	dents will be able to do Air flow analysis of pipe and flat plate.
C316.6	Student will able to solve thermal and mechanical stress problems**.**

Course Name: 17ME71- Engineering Economics

C401.1	Students will be able to understand types of interest and its factors and use them in EMI and loan calculations.
C401.2	Students will be able to characterize different assets based on their Present, equivalent and future worth and judge the best alternative.
C401.3	Students will be able to appreciate depreciation, costing and estimation procedure. Perform tax analysis.
C401.4	Students will be able to Analyze the financial concepts and prepare financial statements for the company.
C401.5	Students will be able to use the knowledge of financial ratios for determining the firm's earning power.
C401.6	Students will be able to demonstrate the concepts of financial and profit planning through suitable budgeting.

Course Name: 17ME72- Mechanical Vibrations

C402.1	Understand basic concepts of vibrations & learns to use the Fourier series method to idealize any motion in terms of sine & cosine curves which can be used in vibration analysis
C402.2	Able to write a mathematical model of un damped systems and can deploy the proper method to obtain the natural frequency of the system, which is required in failure analysis.

C402.3	Gains insight into the damped, forced vibrations and develops the skill to utilize the over, under and critically damped systems in different applications
C402.4	Realize the importance of vibration measuring, condition monitoring and methods to avoid vibrations.
C402.5	Learn to idealize any physical system into two DOF systems and determine their natural frequencies & mode shapes
C402.6	Able to solve multi DOF system and obtain their natural frequencies by numerical methods which helps the engineer to design stable system

Course Name: 17ME73- Hydraulics and Pneumatics

C403.1	Describe the working principles of hydraulic and pneumatic system and its applications.
C403.2	Apply knowledge of pumps, motors and its application.
C403.3	Evaluate the various types of valves and its applications.
C403.4	Import the knowledge of circuit design, control valves and its applications
C403.5	Learn and apply multi-purpose cylinder applications
C403.6	Describe the working principles of hydraulic and pneumatic system and its applications.

Course Name: 17ME74- Operation Research

C404.1	Ability to understand and analyze solution for linear programming problems in industry so that they are able to use resources (capitals, men, machine and materials) more effectively.
C404.2	Students will have the knowledge of optimizing the transportation models, assignment and travelling sales man problems. **Solve** the problem of transporting the products from origins to destinations with least transportation cost.
C404.3	Students will have the analysis of optimizing the Integer Programming models and Queuing theory.
C404.4	Students will have the Understand of Project management techniques: PERT-CPM & crashing techniques to reduce the man, machine and material to increase the profits and reduce the losses.
C404.5	Students will have the knowledge of Game Theory analytical and graphical method problems solving for different types of Job's.
C404.6	Students will have the Describe the Sequencing of different types of Job's to reduce man, machine and material cost to increase the profit.

Course Name: 17ME754- Non Conventional Energy Sources

C405.1	Understand the present energy scenario and the available non-conventional energy sources.

C405.2	Describe the basics of solar radiation geometry and various measurement techniques.
C405.3	Analyze the knowledge gained in tapping the solar energy through solar thermal devices, PV conversion and their performance analysis.
C405.4	Demonstrate the various energy conversion methods such as Wind, Tidal, OTEC and Geothermal.
C405.5	Apply knowledge of Biomass and Hydrogen energy and their impact on environment and sustainability.
C405.6	Understand the present energy scenario and the available Non conventional energy sources.

Course Name: 17ME752- Theory of Plasticity

C405.1	Get exposed to concepts of theory of elasticity, importance of stress and strains which are needed to understand the theory of plasticity.
C405.2	They knew about types of strain and plastic deformation of ductile materials.
C405.3	Use different yield criteria and its importance.
C405.4	Realize the importance of experimental verification of stress- strain relationship and bending of beams and use it in design of mechanical components.
C405.5	They can analyze stress; shear and residual stresses are distributed on the different types of beam.
C405.6	Gain knowledge on torsion of circular & non circular shafts.

Course Name: 17ME761- Experimental Stress Analysis

C406.1	ility to brief about types, mounting and performance of strain gages and wheat stone bridge circuits.
C406.2	dents can aware of about different configurations of strain rosettes and its error minimization.
C406.3	dents can brief about concepts of Photoelasticity, polar scope and calibration of different models.
C406.4	get exposure on Two- and Three-Dimensional photoelasticity models and techniques
C406.5	ey will understand about Birefringent and Brittle coating methods used in ESA.
C406.6	They can use moiré techniques for finding stresses and displacements.

Course Name: 17MEL77- Design Lab

C407.1	Understand the concept of natural frequency and damping coefficient in a single DOF vibrating system.

C407.2	To analyze the balancing of rotating masses by using static and dynamic balance.
C407.3	To demonstrate the concept of stress concentration for photo- elastic materials.
C407.4	To determine pressure distribution in journal bearings.
C407.5	To find the principal stresses using strain gauges.
C407.6	Knowing the concepts of whirling of shaft, governor and gyroscope.

Course Name: 17MEL78- CIM & Automation Lab

C408.1	To practically relate to concepts discussed in Computer Integrated Manufacturing Course.
C408.2	To write CNC part programs for simulation of machining operations such as Turning, Drilling & Milling.
C408.3	Ability to identify the type of machining centre for the geometry given (cylindrical or prismatic), write the part program, explain the instructions,
	examine for the error in the program and choose right G and M codes to optimize the program and construct the final geometry by running the simulation using the software.
C408.4	To understand & write programs for Flexible Manufacturing Systems & Robotics.
C408.5	To understand the operating principles and practical applications of hydraulics, pneumatics and electro–pneumatic systems.
C408.6	To apply these learning's to automate & improve efficiency of manufacturing process.

Course Name: 17ME81- Operations Management

C409.1	Understand the history and development of Operation Management. Able to apply the Operation Management principles in manufacturing and service activities. Getting exposure to Environmental and contemporary issues. Understands the Importance of Productivity and able to apply mathematics to improve productivity.
C409.2	Gets exposure to Decision making process in an industry under different environments, importance of decision making. Able to apply Mathematical models like Break even analysis and tradeoffs.
C409.3	Understands about the importance of forecasting, different methods of Fore casting. Able to apply forecasting methods like qualitative or quantity. Getting exposed to Measure and controlling of forecasting. Understands the use of Aggregate and Master Scheduling Techniques.

C409.4	Learns about the importance of Purchasing and Supply Chain Management. Gets exposure to different Methods of Procurement, Tendering process, vendor development. Understands the importance of maintaining Transparency in Purchasing activity and able to apply Procurement methods in an Industry or Service Sector.
C409.5	Gets exposure to the various skills required finding out the Capacity requirement of Plant and Machinery, Plant location, and Plant lay out. Able to apply the acquired skill in an Industry or Service Sector.
C409.6	Gets exposure in the area of material requirement, inventory, importance of MRP and Able to apply the recent management techniques like MRP-1 and ERP in an industry or service sector. Able to apply different Inventory methods in a manufacturing or Service activity.

Course Name: 17ME82- Control Engineering

C410.1	Describe the concept of control action, types of controllers and its applications relevant to the system.
C410.2	Apply the many inter-relationships in mechanical and electrical models.
C410.3	Evaluate the concept of block diagram reduction technique and SFG.
C410.4	Import the knowledge the step, ramp and impulse input concepts by stability
	analysis
C410.5	apply the importance of root locus and bode plots
C410.6	Import the knowledge of lead-lag compensator and frequency response analysis.

Course Name: 17ME831- Power Plant Engineering

C411.1	derstand Types of fuels and Equipment used for burning of coal in steam power plant.
C411.2	ppose ash handling, coal handling method in a thermal power plant.
C411.3	ferentiate Diesel engine power plants and Gas turbine power plants.
C411.4	lculate performance of a hydro-electric plant.
C411.5	plain working principle of different types of nuclear power plant.
C411.6	ect the suitability of site for a power plant and Indicate safety aspects of power plant.

Course Name: 17ME831- TRIBOLOGY

C411.1	Describe the viscosity, Newton's law of viscosity.

C411.2	Apply knowledge of Hydrostatic and hydro dynamic lubrications.
C411.3	Evaluate the various types of bearing and its applications.
C411.4	Import the knowledge of oil flow and thermal equilibrium of journal bearing
C411.5	apply load carrying capacity and coefficient of friction
C411.6	Describe the wear, wear rate and its effects.

Course Name: 17ME838- Foundry Technology

C411.1	Students can able to demonstrate the Oxidation of liquid metals, gas dissolution in liquid metals, methods of degassing, fluidity, factors affecting fluidity, fluidity tests, hot tearing, shrinkage of liquid metals.
C411.2	Students can able to understand the concept of Crystallization and development of cast structure and concept of progressive and directional solidification, need of gating system and rise ring system in casting methods.
C411.3	Students can able to demonstrate the Special Molding Techniques for manufacturing different components by using different pattern, Developments in cupola melting–hot blast cupola, water cooled cupola, balanced blast cupola, coke less cupola, cupola charge calculations.
C411.4	Ferrous Foundry: Melting procedures, casting characteristics, production, specification, and properties of some ferrous metals.
C411.5	Students can able to demonstrate the Non-Ferrous Foundry: Melting procedures, casting characteristics, production, specification, and properties of some typical aluminium, copper and magnesium based alloy castings.
C411.6	Modernization and Mechanization in foundry techniques in molding, core, material handling equipment's.

Course Name: 17ME843- Bio Mass Energy System

C412.1	Knowledge about the various biomass resources and its energy content.
C412.2	Analyze the conversion of biomass to bio fuels for combustion process.
C412.3	Evaluate the performance of biomass-based steam power plant for power generation.
C412.4	Demonstrate the concepts of bio-Methanization process.
C412.5	Apply knowledge of biofuels in IC Engine Combustion.
C412.6	Know the biogas production.

Course Name: 17ME85L- Project Work

C413.1	Applying knowledge emerging areas of engineering and technology.
C413.2	Students able to apply engineering concepts with respect to different mechanical streams.

C413.3	Students focusing on more efficiency at most economically.
C413.4	Students improve communication skills, problem analyzing ability, design and development skills.
C413.5	Developing new ideas, creative thinking, improvement in reverse engineering in mechanical engineering related technology.
C413.6	Improve their skills to work in a team as a member, to manage project in interdisciplinary environment and to draw appropriate conclusion.

Course Name: 17ME86L- Seminar

C414.1	Enhancing knowledge in emerging area of technology.
C414.2	Students self learning through seminar which may enable in lifelong learning.
C414.3	Improve their skills to work in a team.
C414.4	Improve their knowledge in project management and brought out their concern for ethical valve.
C414.5	Develop new ideas, creative thinking, improve in reverse engineering in related technology.
C414.6	Reduce the stage fear in leadership qualities.

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Department of Mechatronics

Vision of the Institute

To be a respected and most sought after engineering educational institution engaged in equipping individuals capable of building learning organizations in the new

Mission of the Institute

To develop competent students with good value systems and face challenges of the continuously changing world.

Vision of the Department

To develop the Mechatronics Engineering Department as a leading educational and research department with innovation in the design and development of electro-mechanical systems, intelligent machines and products.

Mission of the Department

Mission 1. To provide an outstanding education in Mechatronics Engineering with a rich diversity of skills.

Mission 2. To contribute to the community prosperity through professional services andresearch.

Mission 3. To prepare graduates with ability to engage in life-long learning and capable of carrying out engineering practice with competence.

Program Educational Objectives

PEO 1.	Inculcate knowledge of basic engineering sciences and fundamentals of mechanical, electrical and computer systems.
PEO 2.	Create ability in graduates to design, develop product and applications in the field of Automation and Mechatronics and be able to use engineering tools that will enhance their productivity.
	Prepare graduates to be effective engineers with good analytical and problem-solving skill to innovate, research and develop in a multidisciplinary Mechatronics environment.

Program Specific Objectives

PSO 1 : An ability to understand the concepts of Mechatronics Engineering and to apply them to various areas like Mechanical, Electrical machines, Signal processing, Embedded systems, Communication Systems, Digital & Analog Devices, Computer fields etc

PSO 2: An ability to solve complex Mechatronics Engineering problems, using latest hardware and software tools, along with analytical skills to arrive cost effective and appropriate solutions

PSO 3: Excellent adaptability to changing work environment with good leadership qualities and zeal for social and environmental well-being.

Program Outcomes

1. Engineering knowledge: Apply the knowledge of mathematics, science, engineering fundamentals, and an engineering specialization to the solution of complex engineering problems.

2. Problem analysis: Identify, formulate, review research literature, and analyse complex engineering problems reaching substantiated conclusions using first principles of mathematics, natural sciences, and engineering sciences.

3. Design/development of solutions: Design solutions for complex engineering problems and design system components or processes that meet the specified needs with appropriate consideration for the public health and safety, and the cultural, societal, and environmental considerations.

4. Conduct investigations of complex problems: Use research-based knowledge and research methods including design of experiments, analysis and interpretation of data, and synthesis of the information to provide valid conclusions.

5. Modern tool usage: Create, select, and apply appropriate techniques, resources, and modern engineering and IT tools including prediction and modelling to complex engineering activities with an understanding of the limitations.

6. The engineer and society: Apply reasoning informed by the contextual knowledge to assess societal, health, safety, legal and cultural issues and the consequent responsibilities relevant to the professional engineering practice.

7. Environment and sustainability: Understand the impact of the professional engineering solutions in societal and environmental contexts, and demonstrate the knowledge of, and need for sustainable development.

8. Ethics: Apply ethical principles and commit to professional ethics and responsibilities and norms of the engineering practice.

9. Individual and team work: Function effectively as an individual, and as a member or leader in diverse teams, and in multidisciplinary settings.

10. Communication: Communicate effectively on complex engineering activities with the engineering community and with society at large, such as, being able to comprehend and write effective reports and design documentation, make effective presentations, and give and receive clear instructions.

11. Project management and finance: Demonstrate knowledge and understanding of the engineering and management principles and apply these to one's own work, as a member and leader in a team, to manage projects and in multidisciplinary

environments.

12. Life-long learning: Recognize the need for, and have the preparation and ability to engage in independent and life-long learning in the broadest context of technological change.

Course Name: 15MT32 - Material Science & Technology

C232.1	Appreciate the necessity of engineering materials, Smart Sensors and its applications in various fields.
C232.2	Identify possible cause of failure due to fatigue and Creep.
C232.3	Demonstrate the knowledge of nucleation, Crystal growth, Solid solution and Phase diagrams.
C232.4	Appreciate the significance and applications of Various heat treatment processes.
C232.5	Explain the definition and classification and fabrication processes of composite materials.
C232.6	Identify the role of Carbon content in the material and accordingly the type of material and properties of material changes like steel and cast iron

Course Name: 15 MT 33-Machanics Of Materials

C233.1	Analyze the normal stresses and strains for axially loaded members using Hooke's law
C233.2	Enumerate principal stresses and shear stresses for simple two dimensional loadings
C233.3	Elucidate the stresses and strains in thick and thin cylindrical pressure vessels.
C233.4	Perform analysis of beams for static loading.
C233.5	Design torsional shafts and structural columns
C233.6	Calculate and represent the stress diagrams in bars and simple structures

Course Name: 15 MT 34- Control Systems

C234.1	Apply modelling knowledge in implementation physical systems.
C234.2	Understand the reduction of block diagram & analyze using Signal flow graph.
C234.3	Comment on performance of a system by evaluating various parameters.
C234.4	Model a system by applying the concept of State Space analysis
C234.5	Determine the time and frequency-domain responses of first and second-order systems to step and sinusoidal (and to some extent, ramp) inputs.
C234.6	Apply root-locus technique to analyze and design control systems

Course Name: 15 MT 35 - Analog & Digital Electronics

C235.1	Analyze the Importance & Applications of Diode as Rectifiers, Filters, Zener Diode Regulators & Switching Circuits.

C235.2	With the Knowledge of Active Filters & Oscillators students can better understand the Real-time Communication Systems
C235.3	Students are prepared to Understand, Analyze & Design Various Analog Electronics circuits if recruited to Analog Electronics Industry.
C235.4	Students are prepared to Understand, Analyze & Design Digital Circuits, if interested to work in VLSI Industry
C235.5	Formulate and employ a Karnaugh Map to reduce Boolean expressions and logic circuits to their simplest forms.
C235.6	Design and implement combinational logic circuits using reprogrammable logic devices. Content

Course Name: 15MT36 - Computer Organization

C236.1	Define Basic structure of computers, machine instructions and assembly language programs
C236.2	Ability to differentiate Addressing modes, output operations, Stacks and Queues has been described
C236.3	Understand the role and responsibilities of OS in the computer system.
C236.4	I/O Devices, Interrupts, Direct Memory Access, Busses, Interface Circuits, and Standard I/O Devices has been described
C236.5	Analyze the working of the memory system and basic processing unit.
C236.6	Understand the interfacing concepts in input and output module.

Course Name: 15 MT 42 - Fluid Mechanics and Machines

C242.1	Appreciate the fluid mechanics fundamentals, including concepts of mass and energy conservation.
C242.2	Apply the fundamentals to flow measurement problems.
C242.3	Perform dimensional analysis for problems in fluid mechanics.
C242.4	Appreciate the understanding of turbo machines and principles of energy transfer in turbo machines.
C242.5	Apply the fundamentals for energy transfer problems in various turbo machines.
C242.6	Identify the role of Carbon content in the material and accordingly the type of material and properties of material changes like steel and cast iron

Course Name: 15 MT 43 – Microcontroller

C243.1	Understand the difference between microprocessor and microcontroller, operation of Peripherals of controller, and be able to program a microcontroller system in assembly code and C.

C243.2	Interface the system to switches, keypads, displays, A/D and D/A converters and build a microcontroller based Robot.
C243.3	Design and Develop a microcontroller based system.
C243.4	Understand of 8051 Microcontroller concepts, architecture, programming and application of Microcontrollers.
C243.5	Understand the basic idea about the data transfer schemes and its applications
C243.6	Impart the knowledge about the instruction set

Course Name: 15 MT 44 - Manufacturing Technology

C244.1	Understand the principles and techniques of casting, forging, rolling & drawing.
C244.2	Apply the knowledge of metal working process.
C244.3	To express the different techniques of joining process for metal & non metals.
C244.4	Understanding and applying knowledge to execute CNC machining programs
C244.5	Calculate and understand appropriate single-point machining relationships taking tool material and machine constraints into consideration.
C244.6	Understand the principles and appropriateness of non-traditional machining processes

Course Name: 15 MT 45 - Theory of Machines

C245.1	Explain the concepts of mechanism, machines, and types of motion, and calculate the mobility of a mechanism.
C245.2	Explain basic cam terminology, analyze various types of CAMS, and draw CAM profile diagrams.
C245.3	Determine the positions, velocities and accelerations of links of simple mechanisms by using graphical approach.
C245.4	Demonstrate the knowledge of various transmission mechanisms like gears and belts, and apply them for simple problems.
C245.5	Appreciate the principles of Balancing, Governors, and Gyroscope, and their applications
C245.6	Understand the fundamentals of machine design for desired kinematic or dynamic performance.

Course Name: 15 MT 46- Instrumentation and Measurements

C246.1	Measure various electrical parameters with accuracy, precision, resolution.
C246.2	Use AC and DC bridges for relevant parameter measurement.
C246.3	Select appropriate passive or active transducers for measurement of physical phenomenon.
C246.4	Understand the errors in measurements and their rectification
C246.5	Understand the various measurement techniques available

C246.6	Understand the basic working of instruments used for measurement

Course Name: 15 MT 51 -Design of Machine Elements

C351.2	Understand the technique of theories of failure, stress concentration, fatigue strength etc
C351.3	Calculate the stresses; parameters of machine elements subjected to various loads also make proper assumptions with respect to material, FOS for various machine components.
C351.4	Design machine elements like couplings, gears, bearings ad springs
C351.5	Design machine elements like power screws.
C351.6	Design machine elements like shafts, keys.

Course Name: 15 MT 52 - Virtual Instrumentation

C352.1	Gain knowledge of Virtual Instrumentation and Lab View domain on various I/O Module , Sensor, DAQ Devices ,Communication and Measurement System
C352.2	Understanding the basic programming concepts and various logical Instructions.
C352.3	Determine the extent and nature of electronic circuitry in Virtual Instrumentation
C352.4	Recognize the components of virtual instrumentation and use them for PC based Measurement.
C352.5	Publish Vis front panels on the web, view and control them remotely from LabVIEW or from a web
C352.6	Develop real time application using LabVIEW

Course Name: 15 MT 53-Hydraulics& Pneumatics

C353.1	Engineering applications of hydraulic system
C353.2	Engineering applications of pneumatic system
C353.3	Gain knowledge of basis of hydraulic system
C353.4	Gain knowledge of basis of pneumatic system
C353.5	Understanding the working principle of hydraulic system
C353.6	Understanding the working principle of pneumatic system

Course Name: 15 MT 54 Microandsmartsystemtechnology

C354.1	Know the basic concept of micro and smart system technology.
C354.2	Understand the need of micro size machines and devices.
C354.3	Know how this micro system technology is evolved in all fields of science amd technology

C354.4	Know the smart materials and their characteristics for the smart system applications.
C354.5	Understand the working of different sensors for smart system applications.
C354.6	Know how the different components of smart systems ate integrated with each other.

Course Name: 15 MT 551 wireless Network & Communication

C355.1	Have Knowledge of the fundamental concepts of wireless communication and networks.
C355.2	To understand the basics of wireless voice and data communication
C355.3	Differentiation between Wireless LAN, Wireless MAN, Wireless WAN
C355.4	Understand the working of modern network architectures from a design and performance perspective.
C355.5	Design requirements of network architectures
C355.6	Brief description regarding different wireless networks.

Course Name: 15 MT 562 - Automation in Manufacturing

C356.1	Know the fundamentals of automation in manufacturing
C356.2	Need of automation in manufacturing
C356.3	Types of automation process and its requirement
C356.4	Knowledge about quality control and its requirement
C356.5	Understand the techniques of automation in manufacturing
C356.6	Operations performed in manufacturing industry

Course Name: C481(10MT81- Automotive Electronics & Hybrid Vehicles

C481.2	Have knowledge of automotive electronics sensors and types of sensors
C481.3	Know the electronics domain of various engine parts sensors, actuators, communication and measurement system
C481.4	Understanding engine parameters and a critical awareness of current problems with in the automotive electronics domain using various measurement technology
C481.5	Determine the extent and nature of electronic circuitry in automotive system including monitoring and control circuits for engines transmissions, brakes, steering, suspension, climate control system
C481.6	Understand the monitoring and control circuits for engines and instrumentations and radios and accessories involved in automotive industry

Course Name: C482 (10 MT 82- Communication System)

C482.1	Know about communication systems, transmitter, receiver and modulation in communication system.
C482.2	Know concepts of amplitude modulation and its types, coherent detection of different signals.
C482.3	Gain knowledge on angle modulation and demodulation, FM and its types.
C482.4	Gain knowledge on phase locked loop, linear and nonlinear effects in FM systems.
C482.5	Know different waveform coding techniques.
C482.6	Gain knowledge on spread spectrum modulation, digital multiplexers and its types.

Course Name: C483(10 MT 83 –Artificial Intelligence)

C483.1	Understand the importance of Artificial systems, their domain details.
C483.2	Analyze the different Techniques used and algorithm applied to the system along with the system characteristics.
C483.3	Gain Knowledge of Artificial Intelligence, Production Rules, Search Algorithms, Expert System & its architectures, Machine Learning.
C483.4	Understand the working methodology of Search Algorithms, Expert System & Machine Learning.
C483.5	Ability to apply Artificial Intelligence techniques for problem solving.
C483.6	Explain the limitations of current Artificial Intelligence techniques.

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Department Of Physics

Vision of the Institute

To be a respected and most sought after engineering educational institution engaged in equipping individuals capable of building learning organizations in the new millennium.

Mission of the Institute

To develop competent students with good value systems and face challenges of the continuously changing world.

Vision of the Department

To inculcate interest in Physics and promote the understanding of it, and also to develop observational and computational skills, which will take the development intechnology to new heights.

Mission of the Department

The department has been working towards fulfilling its vision through a synergiccombination of teaching and research. The department also strives to promote excellence in technical education and scientific research through the effective use of Physics in real time engineering problems

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Program Specific Objectives

Course Name: 17CHE12/22 (Engineering Physics)

CO1	Learn & understand more about basic principles & to develop problem solving skills and implementation in technology
CO2	Gain knowledge about modern about modern physics and quantum mechanics will update the basic concepts to implement the skills.
CO3	Study of material properties and their applications is the prime role to understand and use in engineering applications and studies
CO4	Study lasers and optical fibers and its applications are to input knowledge and to develop skills and to use modern instruments in the engineering applications
CO5	Understand crystal structure and applications are to boost the technical skills and its applications
CO6	Expose shock waves concepts and its applications will bring latest technology to the students at the first year level to develop research orientation programs at higher semester level
CO7	Understand basic concepts of nano science and technology

PG Courses

Department Of MBA

Vision of the Institute

To be a respected and sought-after group of educational institutions, we are very much engaged in equipping individuals to be capable of building learning organization in the new millennium

Mission of the Institute

To develop competent students with good value systems and face challenges of the continuously changing world

Vision of the Department

To impart value-based management education to the students, to nurture and enhance their competencies and to prepare them to face the challenges of industry, society and country

Mission of the Department

To provide integrated knowledge and demonstrated ability to the students and to groom them towards building their careers as well equipped professional. To foster a passion for learning, creative thinking, leadership skills that helps in developing entrepreneurial abilitiesamong the students.

Program Educational Objectives

PEO1: To equip the students with necessary knowledge and managerial skills to occupy positions of management and administration in business, industry, public system and the government

PEO2: To inculcate appropriate ethical values and attitudes among students to function effectively in the work environment

Program Specific Objectives

PSO1.To attain sufficient theoretical knowledge in areas of General Management, Marketing, Finance, Human Resources, Economics, Statistics and its application to solve practical problems in business.

PSO2. An ability to demonstrate interpersonal skills, problem solving skills, and leadership qualities to facilitate management graduates to adapt to changes in the environment for self-sustenance and to enable lifelong learning

PSO3. To instil a practice of professional standards and ethics and a sense of social responsibility in every management graduate.

Course Name: 16/17MBA11 (Management & Organizational Behaviour)

C111.1	Comprehend & correlate all the management functions which are happening around with fundamental concepts and principles of management.
C111.2	Understand the overview of management, theory of management and practical applications of the same.
C111.3	Effectively use their skills for self-grooming, working in groups and to achieve organizational goals
C111.4	Demonstrate their acumen in applying managerial and behavioural concept in real world/situation.

Course Name: 16/17MBA12 (Economics for Managers)

C112.1	Equipped with the skill to apply the theory of demand, theory of production and cost in decision making
C112.2	Differentiate between various markets structure, functioning and pricing decisions.
C112.3	Acquire the knowledge of Indian Industrial Policies, its impact on industrial development so as to develop proper strategy in day-to-day management.

Course Name: 16/17MBA13(Accounts for Managers)

C113.1	Acquire the knowledge about the concepts and fundamental principles of accounting.
C113.2	Demonstrate theoretical knowledge and its application in real time accounting.
C113.3	Capable of preparing financial statement of sole trading concerns and companies.
C113.4	Independently undertake financial statement analysis and take decisions
C113.5	Comprehend emerging trends in accounting and taxation.

Course Name:16/17MBA14(Quantitative Methods)

C114.1	Understand and applying descriptive statistical tools in business situations.
C114.2	Exhibit the skills in developing and applying probability distribution concepts in business and real time scenario.
C114.3	Exhibit the skills in developing and applying probability distribution concepts in business and real time scenario.
C114.4	Develop mathematical models using Linear Programming technique.
C114.5	Illustrate the use of network techniques for successful project implementation

Course Name: 16/17MBA15(Marketing Management)

C115.1	Acquire knowledge regarding basic concepts and functions of Marketing Management.

C115.2	Apply various marketing concepts to solve day-to-day corporate problems.
C115.3	Learn various strategies which enable decision making process.
C115.4	Study ever-changing environment and use of appropriate models and techniques of Marketing
C115.5	Synthesize ideas into a viable marketing plan

Course Name: 16/17MBA16(Managerial Communication)

C116.1	Describe and develop written and oral communication.
C116.2	Independently prepare business letters and reports
C116.3	Exhibit, develop and apply negotiation strategies.
C116.4	Gain exposure to media management and demonstrate the skill in analysing business situation.

Course Name: 16/17MBA21(Human Resource Management)

C121.1	Synthesize information regarding the effectiveness of recruiting methods & selection procedures
C121.2	Identify the various training methods and design a training program
C121.3	Design a job description and job specification for various levels of employees
C121.4	List out the regulations governing employee benefit practices.

Course Name: 16/17MBA22(Financial Management)

C122.1	Understand the basic financial concepts
C122.2	Apply time value of money
C122.3	Evaluate the investment decisions
C112.4	Analyse the capital structure and dividend decisions.
C112.5	Estimate working capital requirements.

Course Name: 16/17MBA23(Research Methods)

C123.1	Understand various research approaches, techniques and strategies in the appropriate in business.
C123.2	Apply a range of quantitative / qualitative research techniques to business and day to day management problems
C123.3	Demonstrate knowledge and understanding of data analysis, interpretation and report writing
C123.4	Develop necessary critical thinking skills in order to evaluate different research approaches in Business.

Course Name:16/17MBA24(Business Law & Policy)

C124.1	Demonstrate awareness towards legal and regulatory context of business

C124.2	Recognize and appropriately respond to ethical, legal and strategic concerns relating to human resource and organizational management
C124.3	Gain insights into various acts and understand the significance of corporate governance

Course Name:16/17MBA25(Strategic Management)

C125.1	Formulate a strategic plan that operationalizes the goals and objectives of the firm.
C125.2	Use management concepts to analyse complex business situations
C125.3	Associate with various Strategic Management models for Business situations
C125.4	Ability to evaluate and critique theories and models in corporate environment.

Course Name:16/17MBA26(Entrepreneurship Development)

C126.1	Display keen interest and orientation towards entrepreneurship
C126.2	Develop a business plan
C126.3	Become aware about various sources of funding for an entrepreneur including financial institutions, venture capitalists and Angel Investors
C126.4	Gain consciousness towards social entrepreneurship and rural entrepreneurship opportunities

Course Name:16MBAMM301(Consumer Behaviour)

C231.1	Explain the background and concepts vital for understanding Consumer Behaviour.
C231.2	Identify the role of variables that determines Consumer Behaviour in Social & cultural domain
C231.3	Identifying the psychological and behavioural practices adopted by organizations to enhance the Consumer Behaviour.

Course Name: 16MBAMM302(Retail Management)

C232.1	Find out the contemporary retail management, issues, and strategies
C232.1	Evaluate the recent trends in retailing and its impact in the success of modern business.
C232.3	Relate store management and visual merchandising practices for effective retailing.

Course Name:16MBAMM303 (Services Marketing)

C233.1	Develop an understanding about the various concepts and importance of Services Marketing.

C233.2	Enhance knowledge about emerging issues and trends in the service sector.
C233.3	Learn to implement service strategies to meet new challenges.

Course Name:16MBAFM301(Principles & Practices of Banking)

C234.1	Understand the banking system in India
C234.2	Know the nature of banker – customer relationship
C234.3	Make use of Negotiable instruments practically
C234.4	Have familiarity in using banking technologies like internet banking, Mobile banking, NEFT, ECS etc.
C234.5	Understand the concept of international banking and management of asset and liability in banks

Course Name:16MBAFM302(Investment Management & Financial Services)

C235.1	Understand the functioning of Investment banking
C235.2	Be aware of operation connected with depositories and custodians
C235.3	Know how financial services likefactoring, venture capital, leasing and hire purchase are provided in the financial system.
C235.4	Understand the working of Housing finance and non-banking finance companies.
C235.5	Identify the developments happening in micro finance, credit rating and securitization system.

Course Name: 16MBAFM303(Investment Management)

C236.1	Understand the process of investments.
C236.2	Get an insight into functioning of stock markets in India and abroad.
C236.3	Have insight into the relationship of the risk and return.
C236.4	Have familiarity of the fundamental and technical analysis
C236.5	Learn the Theories of Portfolio management and also the tools and techniques for efficient portfolio management.

Course Name: 16MBAHR301(Industrial Relations & Legislations)

C237.1	Gain the insights of IR practices in the industry.
C237.2	Develop the knowledge related to employee-management relations
C237.3	Implementation of various industrial acts

Course Name:16MBAHR302(Recruitment & Selection)

C238.1	Learn the various recruitment policies and procedures.
C238.2	To provide a conceptual framework of Selection Procedure in the Industry.
C238.3	To understand the new concepts and techniques of recruitment and Selection in the Corporate

Course Name: 16MBAHR303(Compensation & Benefits)

C239.1	Gain insights of various conceptual aspects of Compensation and Benefits.
C239.2	Determine the performance-based compensation system for business excellence.
C239.3	Understand the Legal & Administrative Issues in Compensation Global Compensation.

Course Name:16MBAIN307(Internship Study)

C2310.1	Exposure to the working culture of the organisation
C2310.2	Application of theoretical culture to real life situation at the work place
C2310.3	Understanding of the various functions of the organisation
C2310.4	Use of McKinsey's 7S framework and Porter's five force model
C2310.5	Analysis of the financial statements

Course Name:16MBAMM401(Sales Management)

C241.1	Know the distinction between the skills required for selling and sales management
C241.2	Develop a plan for organising, staffing & training sales force.
C241.3	Organise sales territories to maximize selling effectiveness.
C241.4	Evaluate sales management strategies.

Course Name:16MBAMM402(Integrated Marketing Communication)

C242.1	Define and apply knowledge of various aspects of managerial decision making related to marketing communications strategy and tactics.
C242.2	Ability to create an integrated marketing communications plan which includes promotional strategies.
C242.3	Explain the role of IMC in the overall marketing &Use effectiveness measures to evaluate IMC strategies.

Course Name:16MBAMM403(E-Marketing)

C243.1	Recognize appropriate e-marketing objectives.
C243.2	Appreciate the e-commerce framework and technology.
C243.3	Illustrate the use of search engine marketing, online advertising and marketing strategies.

Course Name:16MBAFM401(Mergers, Acquisitions & Corporate Restructuring)

C244.1	Understand corporate merger and acquisition activity
C244.2	Analyse the mergers & acquisition deals that have taken place in the recent past

C244.3	Understand synergies of mergers & acquisition deals.
C244.4	Compute the valuation associated with M&A.
C244.5	Understand the human and cultural aspects of M&A's

Course Name:16MBAFM402(Risk Management and Insurance)

C245.1	Understand the process of identifying the risk
C245.2	Recognize the complexities involved in risk identification and measurement
C245.3	Be acquainted with the function of Insurance in risk management.
C245.4	Be aware of various types of insurance contracts.
C245.5	Understand working of insurance companies.

Course Name:16MBAFM403(Tax Management)

C246.1	Understand the process of computing residential status.
C246.2	Realize the complexities involved in tax liability of Individuals
C246.3	Know the corporate tax system.
C246.4	Be aware of deductions and exemptions of taxes
C246.5	Understand working of GST system in the country

Course Name:16MBAHR401(Public Relations)

C247.1	Gain the insights of Public relations principles and practices.
C247.2	Learn the various theories of mass communication
C247.3	Understand the various issues in crisis management

Course Name:16MBAHR402(Work Place Ethics & Value Systems)

C248.1	Learn the principles and practices of workplace ethics.
C248.2	Understand the concepts of corporate governance and ethics.
C248.3	Gain insights of Discrimination and Harassment at Workplace

Course Name:16MBAHR403(International Human Resource Management)

C249.1	Apply the concepts and knowledge about the range of Human Resource functions.
C249.2	Deploy the expatriate employees and expatriate failures on international assignments.
C249.3	Evaluate the effects of different Human Resource and International Industrial Relations strategies adopted by multinational organizations

Course Name:16MBAPR407(Project Work)

C2410.1	Exposure and to understand the working of the organization/Company/industry

C2410.2	To take up an in-depth study of an issue/problem in the area of Marketing/Finance/Human Resources
C2410.3	Ability to analyse using statistical tools and statistical packages
C2410.4	Knowledge of comprehending the data collected and editing, tabulating and presenting for analysis.

Department Of MCA

Vision of the Institute

To be a respected and most sought after engineering educational institution engaged in equipping individuals capable of building learning organizations in the new millennium

Mission of the Institute

To develop competent students with good value systems and face challenges of the continuously changing world

Vision of the Department

With a vision to be a respected and sought-after group of educational institutions, we are very much engaged in equipping individuals to be capable of building learning organization in the new millennium

Mission of the Department

Our mission is to develop competent students with good value systems to face challenges of the continuously changing world.

Program Educational Objectives

PEO1:	Exhibit their expertise in problem Solving skills through design, analysis, Implementation and evaluation of hardware and software systems.
PEO2:	Engage in the Computer Science and Applications related Profession locally and globally by contributing ethically to the competent and professional practices.
PEO3:	Effectively adapt as individuals and as team members in multidisciplinary projects involving technical, managerial, economical and social constraints.
PEO4:	Demonstrate Leadership and Entrepreneurship Skills by incorporating organizational goals and providing facilities for peer members with defined objective
PEO5:	Develop Communication Skills necessary to function productively to achieve successful professional career with integrity and societal commitments

Program Specific Objectives

PSO1:	The graduates of the Program will have firm foundation in understanding and applying the principles of mathematics, computing techniques and its applications.
PSO2:	The graduates of the Program will have skills to develop, deploy ad maintain applications for desktop, web, mobile, cloud and cross platforms using modern tools and technologies.
PSO3:	The graduates of the Program will be prepared to achieve their career goals in the software industry or pursue higher studies and enhance their professional knowledge.
PSO4:	The graduates of the program will practice the profession with ethics, integrity, leadership and social responsibility.

Program Outcomes (POs)

1.	Computational Knowledge: Apply knowledge of computing fundamentals, computing specialization, mathematics, and domain knowledge appropriate for the computing specialization to the abstraction and conceptualization of computing models from defined problems and requirements
2.	Problem Analysis: Identify, formulate, research literature, and solve complex computing problems reaching substantiated conclusions using fundamental principles of mathematics, computing sciences, and relevant domain disciplines.
3.	Design /Development of Solutions: Design and evaluate solutions for complex computing problems, and design and evaluate systems, components, or processes that meet specified needs with appropriate consideration for public health and safety, cultural, societal, and environmental considerations.
4.	Conduct Investigations of Complex Computing Problems: Use research-based knowledge and research methods including design of experiments, analysis and interpretation of data, and synthesis of the information to provide valid conclusions.
5.	Modern Tool Usage: Create, select, adapt and apply appropriate techniques, resources, and modern computing tools to complex computing activities, with an understanding of the limitations. Program Outcomes (POs) defined by NBA.
6.	Professional Ethics: Understand and commit to professional ethics and cyber regulations, responsibilities, and norms of professional computing practice.
7.	Life-long Learning: Recognize the need, and have the ability, to engage in independent learning for continual development as a computing professional.
8.	Project management and finance: Demonstrate knowledge and understanding of the computing and management principles and apply these to one's own work, as a member and leader in a team, to manage projects and in multidisciplinary environments.
9.	Communication Efficacy: Communicate effectively with the computing community, and with society at large, about complex computing activities by being able to comprehend and write effective reports, design documentation, make effective presentations, and give and understand clear instructions.
10.	Societal and Environmental Concern: Understand and assess societal, environmental, health, safety, legal, and cultural issues within local and global contexts, and the consequential responsibilities relevant to professional computing practice.
11.	Individual and Team Work: Function effectively as an individual and as a member or leader in diverse teams and in multidisciplinary environments.

12.	Innovation and Entrepreneurship: Identify a timely opportunity and using innovation to pursue that opportunity to create value and wealth for the betterment of the individual and society at large.

Course Name: Data Structures Using C(16MCA11)

CO1	Understand basics of C programming language Acquire knowledge of - Various types of data structures, operations and algorithms - Sorting and searching operations Acquire knowledge of
CO2	Acquire knowledge of - Various types of data structures, operations and algorithms - Sorting and searching operations
CO3	Analyse the performance of - Stack, Queue, Lists, Trees, Hashing, Searching and Sorting techniques
CO4	Implement all the applications of Data structures in a high-level language
CO5	Design and apply appropriate data structures for solving computing problems.

Course Name: UNIX Programming (16MCA12)

CO1	Understand and experience the UNIX environment, File system and hierarchy
CO2	Demonstrate commands to extract, interpret data for further processing.
CO3	Apply commands to perform different tasks on various applications
CO4	Analyse the usage of different shell commands, variables and AWK filtering.
CO5	Evaluate different commands with sample shell scripts

Course Name: Web Technologies(16MCA13)

CO1	Understand and experience the UNIX environment, File system and hierarchy Understand the fundamentals of web and thereby develop web applications using various development languages and tools.
CO2	Build the ability to select the essential technology needed to develop and implement web application
CO3	Use Scripting language utilities for static and dynamic environment
CO4	Design XML document with presentation using CSS and XSLT.
CO5	Develop CGI applications using PERL.

Course Name: Computer Organization(16MCA14)

CO1	Understand the Basics of Digital System
CO2	Understand the Basics of Computer System Organization
CO3	Apply the concepts of the number system in Designing Digital System.

CO4	Analyse the need of Logic circuits in digital system
CO5	Create logic circuits for real time requirement

Course Name: Discrete Mathematical Structures(16MCA15)

CO1	Use the logical notation to define and reason about fundamental mathematical concepts such as sets, relations, functions, and integers.
CO2	Calculate numbers of possible outcomes of elementary combinatorial processes
	such as permutations and combinations.
CO3	Calculate probabilities and conditional probabilities.
CO4	Apply graph theory models of data structures and state machines to solve problems of connectivity and constraint satisfaction, for example, scheduling.

Course Name: Data Structures Using C Laboratory (16MCA16)

CO1	Apply data structure concepts to develop interactive applications in C
CO2	Linear data structures and their applications such as Stacks, Queues and Lists
CO3	Non-Linear Data Structures and their Applications
CO4	Be fluent in the use of different types of sorting and searching techniques

Course Name: UNIX Programming Laboratory(16MCA17)

CO1	Understand the Unix programming environment.
CO2	Be fluent in the use of Vi editor
CO3	Be able to design and implement shell scripts to manage users with different types of permission and file-based applications
CO4	Be fluent to write Awk scripts

Course Name: Web Programming Laboratory(16MCA18)

CO1	Understand the concept and usages web-based programming techniques.
CO2	Learning and developing XHTML documents using JavaScript and CSS
CO3	To be familiar in the use of CGI and Perl programs for different types of server applications.
CO4	Design and implement user interactive dynamic web-based applications.

Course Name: Python Programming(16MCA21)

CO1	Understand and comprehend the basics of python programming.
CO2	Apply knowledge in real time applications.

CO3	Understands about files and its applications.

Course Name: Object Oriented Programming Using C++(16MCA22)

CO1	Differentiate between object-oriented programming and procedure-oriented programming & Disseminate the importance of Object-oriented programming
CO2	Apply C++ features such as Classes, objects, constructors, destructors, inheritance, operator overloading, and Polymorphism, Template and exception handling in program design and implementation.
CO3	Use C++ to demonstrate practical experience in developing object-oriented solutions.
CO4	Analyse a problem description and build object-oriented software using good coding practices and techniques.
CO5	Implement an achievable practical application and analyse issues related to object-oriented techniques in the C++ programming language.

Course Name: Database Management System(16MCA23)

CO1	Demonstrate the fundamentals of data models and conceptualize and depict a database system and Make use of ER diagram in developing ER Model
CO2	To Summarize the SQL and relational database design
CO3	Illustrate transaction processing, concurrency control techniques and recovery
CO4	Inference the database design in the real-world entities.

Course Name: Operating Systems(16MCA24)

CO1	Understand the Basics of Computer and Operating Systems Structure
CO2	Realize the concept of Process Management and Mutual Execution
CO3	Understand the concepts of the Deadlock and different approaches to memory management.
CO4	Learn the concepts of file system
CO5	Understand the concepts of Computer Security.

Course Name: System Software(16MCA25)

CO1	Understand the introductory concepts of system software, SIC and SIC/XE machine architecture.
CO2	Understand the design and implementation of Assemblers with implementation examples.
CO3	Design and implement the linkers and loaders, macro processors and respective implementation examples

CO4	Learn the basic design and working of compilers.

Course Name: Python Programming Laboratory(16MCA26)

CO1	Apply object-oriented programming concepts to develop dynamic interactive Python applications.
CO2	Use the procedural statements: assignments, conditional statements, loops, method calls and arrays
CO3	Design, code, and test small Python programs with a basic understanding of top-down Design
CO4	Learn how to create GUI and solve real-world problem using language idioms, data structures and standard library

Course Name: Object Oriented Programming Using C++ Laboratory(16MCA27)

CO1	Apply and implement major programming and object-oriented concepts like function overloading, operator overloading, Encapsulations, and inheritance, message passing to solve real-world problems.
CO2	Use major C++ features such as Virtual functions, Templates for data type independent designs and File I/O to deal with large data sets
CO3	Analyse, design and develop solutions to real-world problems applying OOP Concepts of C++.

Course Name: Database Management Systems Laboratory(16MCA28)

CO1	Understand, appreciate the underlying concepts of database technologies
CO2	Able to create database with different types of integrity constraints and use the SQL commands such as DDL, DML, DCL, TCL to access data from database objects.
CO3	Design and implement a database schema for a given problem domain
CO4	Perform embedded and nested queries. Take up real world problems independently

Course Name: Computer Networks(16MCA31)

CO1	Understand the types of Networks & Communication medias.
CO2	Identify the components required to build different types of networks
CO3	Understand the functionalities needed for data communication into layers
CO4	Choose the required functionality at each layer for given application
CO5	Understand the working principles of various application protocols

Course Name: Java Programming(16MCA32)

CO1	Understand the basic programming constructs of Java. Apply suitable OOP concepts to develop Java programs for a given scenario.
CO2	Illustrate the concepts of Generalization and run time polymorphism applications
CO3	Exemplify the usage of Packages, Interfaces, Exceptions and Multithreading
CO4	Demonstrate Enumerations, Wrappers, Auto boxing, Generics, collection framework and I/O operations
CO5	Implement the concepts of Networking using Java network classes

Course Name: Analysis and Design of Algorithms(16MCA33)

CO1	Categorize problems based on their characteristics and practical importance.
CO2	Develop Algorithms using iterative/recursive approach
CO3	Compute the efficiency of algorithms in terms of asymptotic notations
CO4	Design algorithm using an appropriate design paradigm for solving a given problem
CO5	Classify problems as P, NP or NP Complete. Implement algorithms using various design strategies and determine their order of growth.

Course Name: Software Engineering16MCA34)

CO1	Categorize problems based on their characteristics and practical importance.
CO2	Apply the correct process models for software development.
CO3	Apply the techniques, skills, and modern engineering tools necessary for engineering practice.
CO4	Define, formulate and analyse a problem as per the testing techniques.
CO5	Apply new Generation of Software Engineering Technology to Meet Current and Future Industrial Challenges of Emerging Software Trends.

Course Name: CYBER SECURITY (16MCA354)

CO1	Define and illustrate cyber security concepts and applications
CO2	Analyse the working of cyber security principles to system design
CO3	Illustrate appropriate techniques to solve cyber security threats
CO4	Evaluate and implement cyber security through network security protocols

Course Name: Computer Networks Laboratory(16MCA36)

CO1	Understand the basic terminologies used for computer networking.
CO2	Understand the functions of layers in the Internet Model.

CO3	Demonstrate application layer protocols used for process-to-process communication.
CO4	Demonstrate subnetting and routing mechanisms for a given network topology. Exemplify link layer functionalities.
CO5	Describe the components and working of wireless networks

Course Name: Java Programming Laboratory(16MCA37)

CO1	Understand Java programming language fundamentals and run time environment.
CO2	Acquire knowledge and skill necessary to write java programs.
CO3	Learn the object-oriented concepts and its implementation in Java
CO4	Implement the multithreading and client-side programming

Course Name: Analysis and Design of Algorithms Laboratory(16MCA38)

CO1	Implement the concepts of time and space complexity, divide-and-conquer strategy, dynamic programming, greedy and approximate algorithms.
CO2	Describe the methodologies of how to analyse an algorithm
CO3	Choose a better algorithm to solve the problems

Course Name: Advanced Java Programming(16MCA41)

CO1	Learn the concept of Servlet and its life cycle
CO2	Understand JSP tags and its services
CO3	Create packages and interfaces
CO4	Build Database connection
CO5	Develop Java Server Pages applications using JSP Tags. Develop Enterprise Java Bean Applications

Course Name: Advanced Web Programming(16MCA42)

CO1	Acquire knowledge of - Build the Web Applications using jQuery, PHP, Ruby and D3.js. - Model-View-Controller (MVC) Architecture.
CO2	Design the Web Pages using Ruby, Rails and Layouts.
CO3	Apply the knowledge gained in the Building a web portal.
CO4	Evaluate web site performance against user acceptance testing.
CO5	Develop Java Server Pages applications using JSP Tags. Develop Enterprise Java Bean Applications

Course Name: Software Testing and Practices(16MCA43)

CO1	Acquire knowledge of basic principles and knowledge of software testing and debugging and test cases.
CO2	Understand the perceptions on testing like levels of testing, generalized pseudo code and with related examples
CO3	Study the various types of testing.
CO4	Analyse the difference between functional testing and structural testing.
CO5	Analyse the performance of fault-based testing

Course Name: Data Warehousing and Data Mining(16MCA442)

CO1	Learn the concept of Data warehousing and OLAP.
CO2	Understand storage and retrieval technique of data from DATA CUBE.
CO3	Analyse different types of data and different pre-processing techniques.
CO4	Evaluate various Association algorithms and its applications. Apply different Classification technique.
CO5	Evaluate different types of classifiers. Analyse different clustering techniques and their applications

Course Name: Software Architecture(16MCA443)

CO1	Acquire knowledge of - working principles, characteristics and basic applications of Architectural patterns. - project life cycle context.
	- how the architecture is influenced. - the quality attributes of architecture.
CO2	Modelling quality attributes through - check lists. - experiments. - back-of-the envelope analysis.
CO3	Understand the techniques of requirements gathering through interviewing stake holders, etc.
CO4	Understand different types of design patterns.

Course Name: Big Data Analytics(16MCA452)

CO1	Understand the Map Reduce technique for solving Big Data problems
CO2	Understand algorithms for Big Data by deciding on the apt Features set
CO3	Analyse main memory consumption for Big Data analytics
CO4	Analyse main memory consumption for Big Data analytics

CO5	Understand and analyse the usage of map reduce techniques for solving big data problems

Course Name: Principles of User Interface Design(16MCA454)

CO1	Use the new technologies that provide interactive devices and interfaces.
CO2	Apply the process and evaluate UID.
CO3	Understand Direct Manipulation and Virtual Environment
CO4	Discuss the command, natural languages and issues in design for maintaining QoS
CO5	Persuade user documentations and information search.

Course Name: Advanced Java Programming Laboratory(16MCA46)

CO1	Designing HTML pages to demonstrate Java Servlets, JSP, Bean and EJB programs.
CO2	Implementing Dynamic HTML using Servlet and demonstration of service methods, auto web page refresh, Session tracking using cookie and Http Session in Servlet.
CO3	Learn the fundamental of connecting to the database.
CO4	Demonstrate JSP (page attributes, action tags and all basic tags) and types of EJB application

Course Name: Advanced Web Programming Laboratory(16MCA47)

CO1	Understand, analyse and apply the role of server-side scripting languages
CO2	Build web application using PHP, Ruby, jQuery, XML and store values in MYSQL.
CO3	Build web applications consisting of graphs using D3.JS.
CO4	Analyse a web project and identify its elements and attributes In comparison to traditional projects.

Course Name: Software Testing Laboratory16MCA48)

CO1	Analyse the performance of fault-based testing, planning and Monitoring the process, Documentation testing
CO2	This course provides to experience on software testing projects using software testing tools.
CO3	Understand the process to be followed in software development life cycle.JS.
CO4	Practical solutions to the problems. Define, formulate and analyse a problem.

Course Name: Object-Oriented Modelling and Design Patterns(16MCA51)

CO1	Acquire knowledge of - Basic UML Concepts and terminologies - Life Cycle of Object-oriented Development - Modelling Concepts
CO2	Identify the basic principles of Software modelling and apply them in real world applications
CO3	Produce conceptual models for solving operational problems in software and IT environment using UML
CO4	Analyse the development of Object-Oriented Software models in terms of - Static behaviour - Dynamic behaviour
CO5	Evaluate and implement various Design patterns

Course Name: Programming Using C# & .NET(16MCA52)

CO1	Understand C# and client-server concepts using .Net Frame Work Components
CO2	Apply delegates, event and exception handling to incorporate with ASP, Win Form, ADO.NET
CO3	Analyse the use of .Net Components depending on the problem statement.
CO4	Implement & develop a web based and Console based application with Database connectivity

Course Name: Mobile Applications(16MCA53)

CO1	Illustrate effective user interfaces that leverage evolving mobile device capabilities
CO2	Develop applications using software development kits (SDKs), frameworks and toolkits
CO3	Establish various methods to integrate database and server-side technologies
CO4	Design and develop open-source software based mobile applications
CO5	Build and deploy competent mobile development solutions

Course Name: Cloud Computing(16MCA542)

CO1	Understand the cloud computing delivery model and the enabling technologies.
CO2	Understand the cloud computing platforms, key technology drivers and cloud programming/software environments
CO3	Identify the need for cloud computing model and compare various key enabling technologies.

CO4	Analyse and choose an appropriate programming environment for building cloud applications.

Course Name: Internet of Things (IoT)(16MCA552)

CO1	Understand constraints and opportunities of wireless and mobile networks for Internet of Things.
CO2	Analyse the societal impact of IoT security events
CO3	Develop critical thinking skills.
CO4	Analyse, design or develop parts of an Internet of Things solution and map it toward selected business model(s)
CO5	Evaluate ethical and potential security issues related to the Internet of Things.

Course Name: Software Project Management(16MCA554)

CO1	Understand the practices and methods for successful software project management.
CO2	Identify techniques for requirements, policies and decision making for effective resource management
CO3	Apply the evaluation techniques for estimating cost, benefits, schedule and risk
CO4	Devise a framework for software project management plan for activities, risk, monitoring and control
CO5	Devise a framework to manage people

Course Name: Software Design Laboratory(16MCA56)

CO1	Understand the fundamental principles of Object-Oriented analysis, design, development and programming
CO2	Demonstrate and represent the UML model elements, to enable visual representation of the system being developed
CO3	Implement object-oriented design model with the help of modern tool, Rational software Architect
CO4	Analyse and differentiate the static and dynamic behavior of the system for achieving the intended functionalities of the system
CO5	Evaluate Various design patterns for applicability, reasonableness, and relation to other design criteria

Course Name: .Net Laboratory(16MCA57)

CO1	Understand C# and client-server concepts using .Net Frame Work Components

CO2	Apply delegates, event and exception handling to incorporate with ASP, Win Form, ADO.NET
CO3	Analyse the use of .Net Components depending on the problem statement
CO4	Implement & develop a web based and Console based application with Database connectivity

Course Name: Mini Project Mobile Applications(16MCA58)

CO1	Illustrate effective user interfaces that leverage evolving mobile device capabilities
CO2	Develop applications using software development kits (SDKs), frameworks and toolkits. Establish various methods to integrate database and server-side technologies
CO3	Design and develop open-source software based mobile applications
CO4	Build and deploy competent mobile development solutions

Course Name: Project Work(16MCA61), Seminar(18MCA62)

CO1	Identify the suitable problem making use of technical and engineering knowledge gained from previous courses with the awareness of impact of technology on the society and their ethical responsibilities
CO2	Ability to segregate work and execute/implement projects using appropriate tools
CO3	Develop skills to determine technical and general information by means of oral as well as written presentation and professional skills

Course Name: Project Work(16MCA61)

CO1	Illustrate effective user interfaces that leverage evolving mobile device capabilities
CO2	Develop applications using software development kits (SDKs), frameworks and toolkits. Establish various methods to integrate database and server-side technologies
CO3	Design and develop open-source software based mobile applications
CO4	Build and deploy competent mobile development solutions

CHILDREN'S EDUCATION SOCIETY (Regd.)
THE OXFORD COLLEGE OF ENGINEERING
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M. Tech in Digital Communication & Networking

Vision of the Institute

To be a respected and most sought after engineering educational institution engaged in equipping individuals capable of building learning organizations in the new millennium.

Mission of the Institute

To develop competent students with good value systems and face challenges of the continuously changing world.

Vision of the Department

To impart technical education par excellence and prepare leaders to serve the industries and society.

Mission of the Department

Mission 1. To Provide the world with a highly committed and quality conscious engineering workforce.

Mission 2. To Encourage the students to build self-help, Power of initiative, courage to change and create new things.

Mission 3. To inculcate the spirit of cooperation and capacity for organization with special emphasis on their self-reliance and sustainability to meet ever changing requirements of local and global industries.

Program Educational Objectives

PEO 1.	Graduates apply their knowledge of mathematics and science to identify, analyze and solve problems in the field of Electronics & communication to develop sophisticated communication systems.
PEO	Graduates to design and build up interdisciplinary systems by solving core engineering problems in communication systems which are technically sound, economically feasible and socially acceptable.
PEO	Graduates exhibit desire for life-long learning which directs them to obtain thorough knowledge in their chosen fields and motivate them for higher studies/research.

Program Specific Objectives

PSO 1: An ability to understand the basic core courses of Electronics & Communication Engineering and to relate them to various areas of application like Communication Systems, control system, Signal processing, VLSI and Embedded systems.

PSO 2: Should have capability to apply modern tools to analyse and solve complex designs with optimal solutions for various real-world applications.

PSO 3: Excellent adaptability to changing work environment with good leadership qualities and zeal for social and environmental well-being.

Course Name: C101 (Advanced Engineering Mathematics - 16ELD11)

C102.1	Understand vector spaces, basis, linear transformations and the process of obtaining matrix of linear transformations arising in magnification and rotation of images.
C102.2	Apply the techniques of QR and singular value decomposition for data compression in solving inconsistent linear systems.
C102.3	Apply the techniques of least square approximation in solving inconsistent linear systems.
C102.4	Utilize the concepts of functionals and their variations in the applications of communication systems, decision theory, synthesis and optimization of digital circuits.
C102.5	Learn the idea of random variables (discrete/continuous) and probability distributions in analyzing the probability models arising in control systems and system communications.
C102.6	Apply the idea of joint probability distributions and the role of parameter-dependent random variables in random process.

Course Name: C102 (Antenna Theory and Design - 16ELD11)

C202.1	Classify different types of antennas
C202.2	Define and illustrate various types of array antennas
C202.3	Design antennas like Yagi-Uda, Helical antennas and other broad band antennas
C202.4	Describe different antenna synthesis method
C202.5	Apply methods like MOM
C202.6	Describe different Resonant and Broadband antennas

Course Name: C103 (Advanced Embedded System - 16EVE13)

C203.1	Understand the basic hardware components and their selection method based on the characteristics and attributes of an embedded system.
C203.2	Explain the hardware software co-design approaches.
C203.3	Explain the firmware design approaches
C203.4	Acquire the knowledge of the architectural features of ARM CORTEX M3 32-bit microcontroller including memory map.
C203.5	Acquire the knowledge of the architectural features of ARM CORTEX M3, a 32-bit microcontroller including interrupts and exceptions.
C203.6	Apply the knowledge gained for Programming ARM CORTEX M3 for different applications.

Course Name: C104 (Advanced Digital Communication - 16ECS14)

C204.1	Acquire knowledge of application and practical implementation of various Digital Modulation techniques.
C204.2	Explain Inter symbol interference (ISI) and its channel modelling and different filtering algorithms for the ISI elimination.
C204.3	Explain different types spread spectrum system
C204.4	Identify the effect of signal characteristics on the choice of a channel model.
C204.5	Analyse the performance of Digital Modulation techniques
C204.6	Analyse the performance of Different filtering algorithms and Spread s communication system

Course Name:C105(Advanced Computer Networks - 16ECS151)

C205.1	Choose appropriate multiple access and multiplexing techniques as per the requirement.
C205.2	Choose standards for establishing a computer network
C205.3	Identify switching techniques based on the applications of the network
C205.4	Identify IP configuration for the network with suitable routing, scheduling, error and flow control
C205.5	Analyse and develop various network traffic management techniques
C205.6	Analyse and develop various control techniques

Course Name: C106 (Advanced Communication Lab- 16ECSL16)

C212.1	Plot the radiation pattern of some antennas using MATLAB and wave guide setup
C212.2	Obtain the S-parameters of Magic tee and directional couplers.
C212.3	Test the IC CD4051 for modulation techniques
C212.4	Study multiplexing techniques using OFC kit.
C212.5	Obtain the modes transit time, electronic timing range and sensitivity of Klystron source
C212.6	Obtain the VI characteristics of GUNN diode, and measurement of guide wave length, frequency, and VSWR.

Course Name: C110 (Advanced DSP - 16ECS21)

C216.1	Design adaptive filters for a given application
C216.2	Design multidate DSP Systems
C216.3	Implement adaptive signal processing algorithm
C216.4	Design active networks

C216.5	Understand advanced signal processing techniques, including multi-rate processing
C216.6	Understand advanced signal processing techniques, time-frequency analysis techniques

Course Name:C301 (Error Control Coding - 16ECS22)

C301.1	Analyse a discrete memoryless channel, given the source and transition probabilities
C301.2	Apply the concept of modern linear algebra for the error control coding technique.
C301.3	Construct and Implement efficient LBC encoder and decoders.
C301.4	Construct and Implement efficient Cyclic codes encoder and decoders.
C301.5	Apply decoding algorithms for efficient decoding of Block codes.
C301.6	Apply decoding algorithms for efficient decoding of Convolutional codes.

Course: C302(Wireless Communication - 16ECS23)

C302.1	Acquire knowledge of characteristics of mobile/wireless communication channels
C302.2	Apply statistical models of multipath fading
C302.3	Understand the multiple radio access techniques
C302.4	Understand the need of coding, diversity, interleaving and link techniques for mobile/wireless communications network
C302.5	Design receiver and transmitter diversity techniques
C302.6	Identify and describe modern techniques for high-rate wireless communications, using MIMO transmission

Course Name:C303(RF and Microwave Circuit Design - 16ECS24)

C303.1	Discuss and analyse waves propagation in Networks
C303.2	Apply the Smith Chart for finding various parameters in transmission lines
C303.3	Analyse the basic considerations in active networks
C303.4	Describe and design active networks
C303.5	Design RF/MW Frequency Mixers and phase shifters
C303.6	Design RF/MW control circuit design

Course Name:C304(Multimedia Over Communication links - 16ECS252)

C304.1	Understand basics of different multimedia networks and applications.
C304.2	Analyse media types like audio and video to represent in digital form.
C304.3	Understand different compression techniques to compress audio.
C304.4	Understand different compression techniques to compress audio video.

C304.5	Describe the basics of Multimedia Communication standards
C304.6	Describe the basics of Multimedia Communication Across Networks

Course Name: C306 (Advanced DSP Lab - 16ECSL26)

C306.1	Realize the Response of LTI systems using MATLAB
C306.2	Realize the DFT and DCT using MATLAB
C306.3	Realize the Decimation using MATLAB
C306.4	Realize Wavelet Transforms using MATLAB
C306.5	Implement the Response of LTI systems and convolution using 6713 processor
C306.6	Implement the FFT realization and DTMF generation using 6713 processor

Course Name: C210 (Wireless Broadband LTE 4G - 16ECS41)

C312.1	Understand the system architecture and the function standard specified components of the system of LTE 4G.
C312.2	Analyse the role of LTE radio interface protocols and EPS Data convergence protocols to set up, reconfigure and release data and voice from a number of users.
C312.3	Demonstrate the UTRAN handling processes from set up to release including mobility management for a variety of data call scenarios.
C312.4	Demonstrate the EPS handling processes from set up to release including mobility management for a variety of data call scenarios.
C312.5	Test the Performance of resource management and packet data processing and transport algorithms.
C312.6	Evaluate the Performance of resource management and packet data processing and transport algorithms.

Course Name:C211(Real Time Systems - 16ECS424)

C313.1	Analyse Real time operating systems.
C313.2	Describe the functions of Real time operating systems.
C313.3	Describe the multi resources services Real time operating systems.
C313.4	Demonstrate embedded system components
C313.5	Demonstrate embedded system applications.
C313.6	Design a Real Time operating system.

M. Tech in Digital Communication & Networking,

Course Name: C101 (Advanced Engineering Mathematics - 16ELD11)

C102.1	Understand vector spaces, basis, linear transformations and the process of obtaining matrix of linear transformations arising in magnification and rotation of images.
C102.2	Apply the techniques of QR and singular value decomposition for data compression in solving inconsistent linear systems.
C102.3	Apply the techniques of least square approximation in solving inconsistent linear systems.
C102.4	Utilize the concepts of functionals and their variations in the applications of communication systems, decision theory, synthesis and optimization of digital circuits.
C102.5	Learn the idea of random variables (discrete/continuous) and probability distributions in analyzing the probability models arising in control systems and system communications.
C102.6	Apply the idea of joint probability distributions and the role of parameter-dependent random variables in random process.

Course Name: C102 (Antenna Theory and Design - 16ELD11)

C202.1	Classify different types of antennas
C202.2	Define and illustrate various types of array antennas
C202.3	Design antennas like Yagi-Uda, Helical antennas and other broad band antennas
C202.4	Describe different antenna synthesis method
C202.5	Apply methods like MOM
C202.6	Describe different Resonant and Broadband antennas

Course Name: C103 (Advanced Embedded System - 16EVE13)

C203.1	Understand the basic hardware components and their selection method based on the characteristics and attributes of an embedded system.
C203.2	Explain the hardware software co-design approaches.
C203.3	Explain the firmware design approaches
C203.4	Acquire the knowledge of the architectural features of ARM CORTEX M3 32-bit microcontroller including memory map.
C203.5	Acquire the knowledge of the architectural features of ARM CORTEX M3, a 32-bit microcontroller including interrupts and exceptions.

C203.6	Apply the knowledge gained for Programming ARM CORTEX M3 for different applications.

Course Name: C104 (Advanced Digital Communication - 16ECS14)

C204.1	Acquire knowledge of application and practical implementation of various Digital Modulation techniques.
C204.2	Explain Inter symbol interference (ISI) and its channel modelling and different filtering algorithms for the ISI elimination.
C204.3	Explain different types spread spectrum system
C204.4	Identify the effect of signal characteristics on the choice of a channel model.
C204.5	Analyse the performance of Digital Modulation techniques
C204.6	Analyse the performance of Different filtering algorithms and Spread s communication system

Course Name:C105(Advanced Computer Networks - 16ECS151)

C205.1	Choose appropriate multiple access and multiplexing techniques as per the requirement.
C205.2	Choose standards for establishing a computer network
C205.3	Identify switching techniques based on the applications of the network
C205.4	Identify IP configuration for the network with suitable routing, scheduling, error and flow control
C205.5	Analyse and develop various network traffic management techniques
C205.6	Analyse and develop various control techniques

Course Name: C106 (Advanced Communication Lab- 16ECSL16)

C212.1	Plot the radiation pattern of some antennas using MATLAB and wave guide setup
C212.2	Obtain the S-parameters of Magic tee and directional couplers.
C212.3	Test the IC CD4051 for modulation techniques
C212.4	Study multiplexing techniques using OFC kit.
C212.5	Obtain the modes transit time, electronic timing range and sensitivity of Klystron source
C212.6	Obtain the VI characteristics of GUNN diode, and measurement of guide wave length, frequency, and VSWR.

Course Name: C110 (Advanced DSP - 16ECS21)

C216.1	Design adaptive filters for a given application

C216.2	Design multirate DSP Systems
C216.3	Implement adaptive signal processing algorithm
C216.4	Design active networks
C216.5	Understand advanced signal processing techniques, including multi-rate processing
C216.6	Understand advanced signal processing techniques, time-frequency analysis techniques

Course Name:C301 (Error Control Coding - 16ECS22)

C301.1	Analyse a discrete memoryless channel, given the source and transition probabilities
C301.2	Apply the concept of modern linear algebra for the error control coding technique.
C301.3	Construct and Implement efficient LBC encoder and decoders.
C301.4	Construct and Implement efficient Cyclic codes encoder and decoders.
C301.5	Apply decoding algorithms for efficient decoding of Block codes.
C301.6	Apply decoding algorithms for efficient decoding of Convolutional codes.

Course: C302(Wireless Communication - 16ECS23)

C302.1	Acquire knowledge of characteristics of mobile/wireless communication channels
C302.2	Apply statistical models of multipath fading
C302.3	Understand the multiple radio access techniques
C302.4	Understand the need of coding, diversity, interleaving and link techniques for mobile/wireless communications network
C302.5	Design receiver and transmitter diversity techniques
C302.6	Identify and describe modern techniques for high-rate wireless communications, using MIMO transmission

Course Name:C303(RF and Microwave Circuit Design - 16ECS24)

C303.1	Discuss and analyse waves propagation in Networks
C303.2	Apply the Smith Chart for finding various parameters in transmission lines
C303.3	Analyse the basic considerations in active networks
C303.4	Describe and design active networks
C303.5	Design RF/MW Frequency Mixers and phase shifters
C303.6	Design RF/MW control circuit design

Course Name:C304(Multimedia Over Communication links - 16ECS252)

C304.1	Understand basics of different multimedia networks and applications.

C304.2	Analyse media types like audio and video to represent in digital form.
C304.3	Understand different compression techniques to compress audio.
C304.4	Understand different compression techniques to compress audio video.
C304.5	Describe the basics of Multimedia Communication standards
C304.6	Describe the basics of Multimedia Communication Across Networks

Course Name: C306 (Advanced DSP Lab - 16ECSL26)

C306.1	Realize the Response of LTI systems using MATLAB
C306.2	Realize the DFT and DCT using MATLAB
C306.3	Realize the Decimation using MATLAB
C306.4	Realize Wavelet Transforms using MATLAB
C306.5	Implement the Response of LTI systems and convolution using 6713 processor
C306.6	Implement the FFT realization and DTMF generation using 6713 processor

Course Name: C210 (Wireless Broadband LTE 4G - 16ECS41)

C312.1	Understand the system architecture and the function standard specified components of the system of LTE 4G.
C312.2	Analyse the role of LTE radio interface protocols and EPS Data convergence protocols to set up, reconfigure and release data and voice from a number of users.
C312.3	Demonstrate the UTRAN handling processes from set up to release including mobility management for a variety of data call scenarios.
C312.4	Demonstrate the EPS handling processes from set up to release including mobility management for a variety of data call scenarios.
C312.5	Test the Performance of resource management and packet data processing and transport algorithms.
C312.6	Evaluate the Performance of resource management and packet data processing and transport algorithms.

Course Name:C211(Real Time Systems - 16ECS424)

C313.1	Analyse Real time operating systems.
C313.2	Describe the functions of Real time operating systems.
C313.3	Describe the multi resources services Real time operating systems.
C313.4	Demonstrate embedded system components
C313.5	Demonstrate embedded system applications.

C313.6	Design a Real Time operating system.

M.Tech in VLSI Design and Embedded System

Course Name: C101 (Advanced Engineering Mathematics-16ELD11)

C101.1	Understand vector spaces, basis, linear transformations and the process of obtaining matrix of linear transformations arising in magnification and rotation of images.
C101.2	Apply the techniques of QR and singular value decomposition for data compression, least square approximation in solving inconsistent linear systems.
C101.3	Learn the idea of random variables (discrete/continuous) and probability distributions in analysing the probability models arising in control systems and system communications.
C101.4	Utilize the concepts of functional and their variations in the applications of communication systems, decision theory, synthesis and optimization of digital circuits.
C101.5	Apply the idea of joint probability distributions and the role of parameter-dependent random variables in random process.

Course Name: C102 (DVD-16EVE12)

C102.1	Analyse issues of On-chip interconnect Modelling and Interconnect delay calculation.
C102.2	Analyse the Switching Characteristics in Digital Integrated Circuits.
C102.3	Use the Dynamic Logic circuits in state-of-the-art VLSI chips.
C102.4	Study critical issues such as ESD protection, Clock distribution, Clock buffering, and Latch phenomenon
C102.5	Use Bipolar and Bi-CMOS circuits in very high-speed design.

Course Name: C103 (Advanced Embedded systems-16EVE13)

C103.1	Understand the basic hardware components and their selection method based on the characteristics and attributes of an embedded system.
C103.2	Explain the hardware software co-design and firmware design approaches.
C103.3	Acquire the knowledge of the architectural features of ARM CORTEX M3, a 32 bit Microcontroller including memory map, interrupts and exceptions.
C103.4	Apply the knowledge gained for Programming ARM CORTEX M3 for different Applications.

Course Name: C104 (LPVD-16EVE14)

C104.1	Identify the sources of power dissipation in CMOS circuits.
C104.2	Perform power analysis using simulation-based approaches and probabilistic analysis.
C104.3	Use optimization and trade-off techniques that involve power dissipation of digital circuits.
C104.4	Make the power design a reality by making power dimension an integral part of the design process
C104.5	Use practical low power design techniques and their analysis at various levels of design abstraction and analyse how these are being captured in the latest design automation environments.

Course Name:C105(ASIC Design -16EVE153)

C105.1	Describe the concepts of ASIC design methodology, data path elements, logical effort and FPGA architectures
C105.2	Analyse the design of FPGAs and ASICs suitable for specific tasks, perform design entry and explain the physical design flow.
C105.3	Design data path elements for ASIC cell libraries and compute optimum path delay.
C105.4	Create floor plan including partition and routing with the use of CAD algorithms.

Course Name:C106 (VLSI and ES Lab1-16EVEL16)

C106.1	Develop Verilog Code for the design of digital circuits
C106.2	Use FPGA/CPLD board and Logic Analyzer or Chip scope to verify the results
C106.3	Develop Assembly language programs for different applications using ARM Cortex M3 Kit and Keil uVision-4 tool.
C106.4	Develop C language programs for different applications using ARM-Cortex M3 Kit and Keil uVision-4 tool

Course Name: C111 (Design of Analog and Mixed Mode VLSI Circuits-16EVE21)

C111.1	Use efficient analytical tools for quantifying the behaviour of basic circuits by inspection.
C111.2	Design high-performance, stable operational amplifiers with the trade-offs between speed, precision and power dissipation.
C111.3	Design and study the behaviour of phase-locked-loops for the applications.
C111.4	Identify the critical parameters that affect the analog and mixed-signal VLSI circuits 'performance
C111.5	Perform calculations in the digital or discrete time domain, more sophisticated data converters to translate the digital data to and from inherently analog world.

Course Name: C112 (VLSI Testing -16EVE22)

C112.1	Analyse the need for fault modelling and testing of digital circuits
C112.2	Generate fault lists for digital circuits and compress the tests for efficiency
C112.3	Create tests for digital memories and analyse failures in them
C112.4	Apply boundary scan technique to validate the performance of digital circuits
C112.5	Design built-in self-tests for complex digital circuits

Course Name: C113 (Advances in VLSI Design-16EVE23)

C113.1	Apply design automation for complex circuits using the different Implementation methodology like custom versus semi-custom, hardwired versus fixed, regular array versus ad-hoc.
C113.2	Use the approaches to minimize the impact of interconnect parasitic on performance, power dissipation and circuit reliability
C113.3	Impose the ordering of the switching events to meet the desired timing Constraints using synchronous, clocked approach.
C113.4	Infer the reliability of the memory

Course Name: C114 (Real Time Operating System-16EVE24)

C114.1	Develop programs for real time services, firmware and RTOS, using the fundamentals of Real Time Embedded System, real time service utilities, debugging methodologies and optimization techniques.
C114.2	Select the appropriate system resources (CPU, I/O, Memory, Cache, ECC Memory, and Microcontroller/FPGA/ASIC to improve the system performance.
C114.3	Apply priority based static and dynamic real time scheduling techniques for the given specifications.
C114.4	Analyse deadlock conditions, shared memory problem, critical section problem, missed deadlines, availability, reliability and QoS.
C114.5	Develop programs for multithreaded applications using suitable techniques and data structure

Course Name: C115 (System Verilog-16EVE251)

C115.1	Write test benches for moderately complex digital circuits
C115.2	Use System Verilog language
C115.3	Appreciate functional coverage
C115.4	Apply constrained random tests benches using System Verilog
C115.5	Analyse a verification case and apply System Verilog to verify the design

Course Name: C116 (VLSI and ES Lab-2-16EVEL26)

C116.1	Learn the various issues in Mixed signal designs basically data converters.
C116.2	Acquire hands-on skills of using CAD tools in VLSI design.
C116.3	Appreciate the design process in VLSI through a mini-project on the design of a CMOS sub-system.
C116.4	Select a suitable task switching technique in a multithreaded application.
C116.5	Implement different techniques of message passing and Inter task Communication.
C116.6	Implement different data structures such as pipes, queues and buffers in multithreaded programming.

Course Name: C211 (Synthesis and Optimization of Digital Circuits-16ELD41)

C211.1	Understand the process of synthesis and optimization in a top down approach for digital circuits models using HDLs.
C211.2	Understand the terminologies of graph theory and its algorithms to optimize a Boolean equation
C211.3	Apply different two level and multilevel optimization algorithms for combinational circuits
C211.4	Apply the different sequential circuit optimization methods using state Models and network models.
C211.5	Apply different scheduling algorithms with resource binding and without resource binding for pipelined sequential circuits and extended sequencing models.

Course Name: C212 (CMOS RF Circuit Design-16EVE421)

C212.1	Analyse the effect of nonlinearity and noise in RF and microwave design.
C212.2	Exemplify the approaches taken in actual RF products.
C212.3	Minimize the number of off-chip components required to design mixers and Low-Noise Amplifiers.
C212.4	Explain various receivers and transmitter topologies with their merits and drawbacks.
C212.5	Demonstrate how the system requirements define the parameters of the circuits and how the performance of each circuit impacts that of the Overall transceiver.

Course Name: C213 (Advances in Image Processing-16ECS422)

C213.1	Understand the representation of the digital image and its properties
C213.2	Apply pre-processing techniques required to enhance the image for its further analysis.

C213.3	Use segmentation techniques to select the region of interest in the image for analysis
C213.4	Represent the image based on its shape and edge information.
C213.5	Describe the objects present in the image based on its properties and Structure.

M.Tech in Power Electronics

Course Name: 16EEE11/ Applied Mathematics

C111.1	Employ numerical techniques in order to achieve more accurate values in the computation of roots of algebraic and non-linear equations
C111.2	Utilize analytical and numerical schemes to solve partial differential equations applicable to engineering problems.
C111.3	Understand vector spaces, basis, linear transformations and the process of obtaining matrix of linear transformations arising in magnification and rotation of images.
C111.4	Apply standard iterative methods to compute Eigen values and solve ordinary differential equations
C111.5	Employ linear and non-linear programming techniques in simulation of network systems and optimization of electrical circuits.

Course Name: 16EPE12/ Power Semiconductor Devices and Components

C112.1	Discuss power electronic concepts, electronic switches and semiconductor physics
C112.2	Explain representation of switches in P-spice and power computations.
C112.3	Explain the internal structure, the principle of operation, characteristics and base drive circuits of power semiconductor devices; power diodes, power BJT, power MOSFET
C112.4	Explain the internal structure, the principle of operation, characteristics and base drive circuits of power semiconductor devices; thyristors, power IGBT, power FET
C112.5	Design a heat sink to control the temperature rise of semiconductor devices
C112.6	Design magnetic components inductors and transformers used in the power electronic circuits

Course Name: 16EPE13 / Power Electronic Converters

C113.1	Use the knowledge of PWM techniques in controlling different power electronic converters
C113.2	Apply the knowledge of power electronics in design and analysis of DC –DC PWM converters
C113.3	Design and analyse DC –AC and AC – DC converters and control their operation using PWM techniques
C113.4	Design and analyse different resonant converters and their control circuits
C113.5	Design & Analyse of AC – AC converters
C113.6	Design & Analyse of multilevel converters.

Course Name: 16EPE14 / Modelling and Design of Controllers

C114.1	Describe the role of computer simulations in the analysis and design of power electronics systems
C114.2	Understand the functional modelling of static systems.
C114.3	Use sampling technique to determine a digital equivalent to a continuous time system
C114.4	Design digital controllers in discrete time and frequency domain
C114.5	Design optimal and robust controllers by different methods
C114.6	Explain essentials of discrete computation

Course Name: 16EPE154 / EMC in Power Electronics

C115.1	Describe Electromagnetic interference and its classification and measurement of conducted high frequency disturbance
C115.2	Survey electromagnetic interference specific to power electronic equipment
C115.3	Explain the characteristics of circuit elements used for noise suppression
C115.4	Explain EMI suppression methods used in semiconductor and electromechanical devices.
C115.5	Explain design of EMI filter circuits and filtering methods.
C115.6	Explain EMS reduction techniques for power electronic equipment

Course Name: 16EPEL16 / Power Electronics Laboratory-1

C116.1	Analyse the static and dynamic characteristics of various semiconductor devices.
C116.2	Apply the knowledge of converters in assessing the performance of single phase and three phases fully controlled and semi controlled converters for RL load for continuous current modes.
C116.3	Apply the knowledge of converters in assessing the performance of single phase and three phases fully controlled and semi controlled converters for RL load for discontinuous current modes.
C116.4	Assess the performance of single-phase bridge inverter for RL load and control the voltage by pulse width modulation
C116.5	Apply the knowledge of power electronics in performance analysis of chopper converter
C116.6	Apply the knowledge of power electronics in performance analysis of synchronous buck converter

Course Name: 16EPE17 / Seminar

C117.1	Attain, use and develop knowledge in the field of electrical and electronics engineering
C117.2	Identify, understand and discuss current, real-time issues
C117.3	Improve oral and written communication skills
C117.4	Explore an appreciation of the self in relation to its larger diverse social and academic contexts
C117.5	Apply principles of ethics and respect in interaction with others.
C117.6	Attain, use and develop knowledge in the field of other disciplines through independent learning and collaborative study

Course Name: 16EPE21 / Electric Drives

C121.1	Explain characteristics of DC motors, induction motors and synchronous motors
C121.2	Explain braking of electric motors.
C121.3	Classify electric drives
C121.4	Discuss dynamics conditions and stability considerations of Electric drive
C121.5	Suggest a drive for a specific application
C121.6	Explain using microprocessor in the control of an electric drive.

Course Name: 16EPE22 / Switched - Mode Power Supplies

C122.1	Explain a SMPS, its characteristics, new technologies, basic principles and control modes
C122.2	Suggest a suitable DC/DC converter for an SMPS.
C122.3	Explain the method of selecting key peripheral components of SMPS
C122.4	Design the power factor correction circuit of SMPS
C122.5	Explain selection of magnetic core and designing of high-frequency transformer
C122.6	Design protection and monitoring circuit for SMPS

Course Name: 16EPE23 / Modelling and Analysis of Electrical Machines

C123.1	Explain the basic concepts of modelling.
C123.2	Develop mathematical models for DC motors for transient state analysis.
C123.3	Use reference frame theory to transform three phases to two phases.
C123.4	Develop dynamic model for three phase induction motor in stator ad rotor reference frames.
C123.5	Model synchronous machine using Park's transformation for the analysis of steady state operation.
C123.6	Model synchronous machine to perform dynamic analysis under different conditions

Course Name: 16EPE24 / Facts Controllers

C124.1	Discuss the growth of complex electrical power networks, the lack of controllability of the active- and reactive-power flows in energized networks
C124.2	Describe the conventional controlled systems and the basic operating principles of FACTS
C124.3	Describe the various components of a general SVC, its control system, control characteristics and the design of the SVC voltage regulator
C124.4	Explain the use of SVC in stability enhancement, damping sub synchronous oscillations, improvement of HVDC link performance
C124.5	Explain the concepts of series compensation, TCSC controller and its operation, characteristics, modelling and applications.
C124.6	Explain the operation of voltage source converter-based FACTS

Course Name: 16EPE253 / Power Quality Problems and Mitigation

C125.1	Explain causes, effects of PQ problems and classification of mitigation techniques for PQ problems
C125.2	Explain PQ standards, terminology and monitoring requirements through numerical problems.
C125.3	Explain passive shunt and series compensation using lossless passive components
C125.4	Explain the design, operation and modelling of active shunt compensation equipment.
C125.5	Explain the design, operation and modelling of active series compensation equipment
C125.6	Discuss mitigation of power quality problems due to nonlinear loads

Course Name: 16EPEL26/ Power Electronics Laboratory-2

C126.1	Conduct experiments on single phase fully controlled converter fed separately excited DC motor to assess the performance in continuous and discontinuous current modes
C126.2	Conduct experiments to assess the performance of Chopper fed DC drives for class A and class C commutation in continuous current mode
C126.3	Conduct experiments on three phase fully controlled converter fed separately excited DC motor to assess the performance in continuous and discontinuous current modes
C126.4	Simulate different converters for analysing the waveform in continuous current modes
C126.5	Simulate different converters for analysing the waveform in discontinuous current modes

C126.6	Simulate forward converter, fly back converter and resonant converter to study their performance

Course Name: 16EPE27/ Technical Seminar

C127.1	Attain, use and develop knowledge in the field of electrical and electronics engineering
C127.2	Identify, understand and discuss current, real-time issues
C127.3	Improve oral and written communication skills
C127.4	Explore an appreciation of the self in relation to its larger diverse social and academic contexts
C127.5	Apply principles of ethics and respect in interaction with others.
C127.6	Attain, use and develop knowledge in the field of other disciplines through independent learning and collaborative study

Course Name: 16EPE31/ Seminar

C231.1	Attain, use and develop knowledge in the field of electrical and electronics engineering and other disciplines through independent learning and
	collaborative study
C231.2	Identify, understand and discuss current, real-time issues
C231.3	Improve oral and written communication skills
C231.4	Explore an appreciation of the self in relation to its larger diverse social and academic contexts.
C231.5	Apply principles of ethics and respect in interaction with others
C231.6	Work in a team to achieve common goal.

Course Name: 16EPE32 & 33/ Internship

C232.1	Gain practical experience within industry in which the internship is done
C232.2	Acquire knowledge of the industry in which the internship is done
C232.3	Develop a greater understanding about career options while more clearly defining personal career goals
C232.4	Develop and refine oral and written communication skills
C232.5	Identify areas for future knowledge and skill development
C232.6	Acquire the knowledge of administration, marketing, finance and economics

Course Name: 16EPE34/ Project Phase – I

C234.1	Present the project and be able to defend it
C234.2	Make links across different areas of knowledge and to generate, develop and evaluate ideas and information so as to apply these skills to the project task
C234.3	Habituated to critical thinking and use problem solving skills

C234.4	Communicate effectively and to present ideas clearly and coherently in both the written and oral forms
C234.5	Work in a team to achieve common goal.
C234.6	Learn on their own, reflect on their learning and take appropriate actions to improve it

Course Name: 16EPE41/ HVDC Power Transmission

C241.1	Explain importance of DC power transmission
C241.2	Describe the basic components of a converter, the methods for compensating the reactive power demanded by the converter.
C241.3	Explain the methods for simulation of HVDC systems and its control.
C241.4	Describe filters for eliminating harmonics and the characteristics of the system impedance resulting from AC filter designs
C241.5	Explain the protection of HVDC system and other converter configurations used for the HVDC transmission
C241.6	Explain the recent trends for HVDC applications.

Course Name: 16EPE421 / Digital Power Electronics

C242.1	Explain traditional parameters computation, multiple quadrant operation and choppers
C242.2	Explain the disadvantages of analog power electronics and conversion
	technology, energy factor and sub-sequential parameters
C242.3	Explain basic mathematics of digital control systems and mathematical modelling of digitally controlled power electronic devices such as rectifiers, inverters and converters
C242.4	Describe mathematical modelling of AC/DC rectifiers, DC/AC inverters, DC/DC converters and AC/AC (AC/DC/AC) converters are working in the discrete-time state
C242.5	Discuss DC/AC pulse-width-modulation (PWM) inverters and AC /AC converters modelled as a first order-hold (FOH) element in digital control systems
C242.6	To explain open loop and closed loop control of power electronic devices and energy factor application of AC and DC motor drives

Course Name: 16EPE43 & 16EPE44/ Evaluation of Project Phase - 2

C243.1	Present the project and be able to defend it
C243.2	Make links across different areas of knowledge and to generate, develop and evaluate ideas and information so as to apply these skills to the project task
C243.3	Habituated to critical thinking and use problem solving skills

C243.4	Communicate effectively and to present ideas clearly and coherently in both the written and oral forms
C243.5	Work in a team to achieve common goal.
C243.6	Learn on their own, reflect on their learning and take appropriate actions to improve it

M.Tech in Structural Engineering

Course Name: C101 Computational Structural Mechanics 16CSE11

C101.1	Formulate force displacement relation by flexibility and stiffness method
C101.2	Analyse the plane trusses, continuous beams and portal frames by transformation approach
C101.3	Analyse the structures by direct stiffness method

Course Name: C102 Advanced Design of RC Structures 16CSE12

C102.1	Achieve Knowledge of design and development of problem-solving skills
C102.2	Understand the principles of Structural Design.
C102.3	Design and develop analytical skills.
C102.4	Summarize the principles of Structural Design and detailing
C102.5	Understands the structural performance

Course Name: C103 Mechanics of Deformable Bodies 16CSE13

C103.1	Achieve Knowledge of design and development of problem-solving skills.
C103.2	Understand the principles of stress-strain behaviour of continuum
C103.3	Design and develop analytical skills.
C103.4	Describe the continuum 3- di in 2 and mensions
C103.5	Understand the concepts of elasticity and plasticity

Course Name:C105 Structural Dynamics 16CSE15

C105.1	Achieve Knowledge of design and development of problem-solving skills.
C105.2	Understand the principles of Structural Dynamics
C105.3	Design and develop analytical skills.
C105.4	Summarize the Solution techniques for dynamics of Multi-degree freedom systems
C105.5	Understand the concepts of damping in structures.

Course Name:C106 Research Methodology and IPR 16RMI17

C106.1	Discuss research methodology and the technique of defining a research problem
C106.2	Explain the functions of the literature review in research, carrying out a literature search, developing theoretical and conceptual frameworks and writing a review.

C106.3	Explain various research designs, sampling designs, measurement and scaling techniques and also different methods of data collections
C106.4	Explain several parametric tests of hypotheses, Chi-square test, art of
	interpretation and writing research reports
C106.5	Discuss various forms of the intellectual property, its relevance and business impact in the changing global business environment and leading International Instruments concerning IPR.

Course Name: C111 Advanced Design of Steel Structures 16CSE21

C111.1	Able to understand behavior of Light gauge steel members
C111.2	Able to understand design concepts of cold formed/unrestrained beams
C111.3	Able to understand Fire resistance concept required for present days
C111.4	Able to analyse beam column behavior

Course Name: C112finite Element Method of Analysis 16CSE22

C112.1	Explain the basic theory behind the finite element method.
C112.2	Formulate force-displacements relations for 2-D elements
C112.3	Use the finite element method to analyse real structures.
C112.4	Use a Finite Element based program for structural analysis

Course Name:C113earthquake Resistant Structures 16CSE23

C113.1	Achieve Knowledge of design and development of problem-solving skills. Understand the principles of engineering seismology
C113.2	Design and develop analytical skills.
C113.3	Summarize the Seismic evaluation and retrofitting of structures
C113.4	Understand the concepts of earthquake resistance of reinforced concrete buildings.

Course Name: C114 Analysis and Design of Plates and Shells 16CSE241

C114.1	Achieve Knowledge of design and development of problem-solving skills.
C114.2	Understand the principles of Analysis and Design
C114.3	Design and develop analytical skills.
C114.4	Summarize the performance of shells
C114.5	Understand the concepts of energy principle

Course Name: C114 Course Name DESIGN OF TALL STRUCTURES 16CSE254

C115.1	Achieve Knowledge of design and development of problem-solving skills.

C115.2	Understand the principles of Analysis and Design
C115.3	Design and develop analytical skills.
C115.4	Summarize the performance of shells
C115.5	Understand the concepts of energy principle

Course Name: C211 DESIGN OF BRIDGES 16CSE31

C**211**.1	Achieve Knowledge of design and development of problem-solving skills.
C**211**.2	Understand the principles of Analysis and Design
C**211**.3	Design and develop analytical skills.
C**211**.4	Summarize the performance of shells
C**211**.5	Understand the concepts of energy principle

Course Name: C212 Design of Masonry Structure 16CSE332

C**212**.1	Achieve Knowledge of design and development of problem-solving skills.
C**212**.2	Understand the principles of design and construction of masonry structures
C**212**.3	Design and develop analytical skills.
C**212**.4	Summarize the masonry Characteristics.
C**212**.5	Evaluate the strength and stability of the masonry structures

Course Name: C204 Reliability Analysis of Structures 16CSE324

C**212**.1	Understand the concepts of statistics for probabilistic analysis and importance
C**212**.2	of uncertainty (randomness) in structural analysis and design.
C**212**.3	Apply the theoretical principles of randomness of variables in structural
C**212**.4	engineering through density functions.
C**212**.5	Analyze components of structure to assess safety using concepts related to structural reliability by various methods.

Course Name: C213 16CSE31 Design of Bridges

C**213**.1	Describe historical growth, select ideal site and bridge, calculate values of design parameters of slab culvert at critical section as per IRC, design and detailing required for the execution of the project.
C**213**.2	Carry out analysis of box culvert as per IRC to obtain the values of design parameters and to design and detail the components following IS code procedure.

C**213**.3	Demonstrate the use of Pigeauds Method and Courbon's Method in the analysis of T beam bridge as per IRC, design to obtain the safe dimensions various components, optimum reinforcement required following IS code procedure
C**213**.4	Analysis a balanced cantilever bridge as per IRC and to obtain the safe values of design parameters and to design and detail the components as per IS code procedure
C**213**.5	Display the use of Courbon's Method in the analysis of PSC bridge as per IRC, design to obtain the safe value of prestressing force, obtain the dimensions of various components to keep the stresses within codal provisions following IS code procedure.

Course Name: C214 16CSE323 Stability of Structures

C**214**.1	AchieveKnowledgeofdesignanddevelopmentofproblemsolvingskills
C**214**.2	Understand the principles of strength and stability Design and develop analytical skills
C**214**.3	Appraise the Stability analysis by finite element approach.
C**214**.4	Understand the concepts of lateral buckling of beams

Course Name: C215 16CSE332 Design of Masonry Structures

C**215**.1	Achieve Knowledge of design and development of problem-solving skills.
C**215**.2	Understand the principles of design and construction of masonry
C**215**.3	Design and develop analytical skills.
C**215**.4	Summarize the masonry Characteristics.
C**215**.5	· Evaluate the strength and stability of the masonry structures.

M.Tech in Computer Science and Engineering

Course Name: C101 (Mathematical Foundation of Computer Science-16SCS11)

C101.1	Understand the numerical methods to solve and find the roots of the equations.
C101.2	Utilize the statistical tools in multi variable distributions.
C101.3	Use probability formulations for new predictions with discrete and continuous RV's.
C101.4	To understand various graphs in different geometries related to edges.
C101.5	Understand vector spaces and related topics arising in magnification and rotation of images.

Course Name: C102 (Advances in Operating Systems -16SCS12)

C102.1	Demonstrate the Mutual exclusion, Deadlock detection and agreement protocols of Distributed operating system
C102.2	Learn the various resource management techniques for distributed systems
C102.3	Identify the different features of real time and mobile operating system
C102.4	Modify existing open-source kernels in terms of functionality or features used
C102.5	Demonstrate the Mutual exclusion, Deadlock detection and agreement protocols of Distributed operating system

Course Name: C103 (Advances in Data Base Management Systems-16SCS13)

C103.1	Select the appropriate high-performance database like parallel and distributed database
C103.2	Infer and represent the real-world data using object-oriented database
C103.3	Interpret rule set in the database to implement data warehousing of mining
C103.4	Discover and design database for recent applications database for better interoperability

Course Name: C104 (Internet of Things-16SCS14)

C104.1	Develop schemes for the applications of IOT in real time scenarios
C104.1	Manage the Internet resources
C104.3	Model the Internet of things to business
C104.4	Understand the practical knowledge through different case studies
C104.5	Understand data sets received through IoT devices and tools used for analysis

Course Name:C105(Advances in Computer Networks-16SCS151

C105.1	List and classify network services, protocols and architectures, explain why they are layered.
C105.2	Choose key Internet applications and their protocols, and apply to develop
	their own applications (e.g., Client Server applications, Web Services) using the sockets API.
C105.3	Explain develop effective communication mechanisms using techniques like connection establishment, queuing theory, recovery Etc.
C105.4	Explain various congestion control techniques.

Course Name: C201 (Managing Big Data -16SCS21)

C201.1	Describe big data and use cases from selected business domains
C201.2	Explain NoSQL big data management
C201.3	Install, configure, and run Hadoop and HDFS
C201.4	Perform map-reduce analytics using Hadoop
C201.5	Use Hadoop related tools such as HBase, Cassandra, Pig, and Hive for big data Analytics

Course Name: C202 (Advanced Algorithms-16SCS22)

C202.1	Design and apply iterative and recursive algorithms.
C202.2	Design and implement optimization algorithms in specific applications.
C202.3	Design appropriate shared objects and concurrent objects for applications

Course Name: C203 (Cloud Computing-16SCS23)

C203.1	Compare the strengths and limitations of cloud computing
C203.2	Identify the architecture, infrastructure and delivery models of cloud computing
C203.3	Apply suitable virtualization concept.
C203.4	Choose the appropriate cloud player
C203.5	Address the core issues of cloud computing such as security, privacy and interoperability
C203.6	Design Cloud Services
C203.7	Set a private cloud

Course Name: C204 (Advances in Storage Area Networks-16SCS241)

C204.1	Identify the need for performance evaluation and the metrics used for it
C204.2	Apply the techniques used for data maintenance.

C204.3	Realize strong virtualization concepts
C204.4	Develop techniques for evaluating policies for LUN masking, file systems

Course Name: C205 (Object Oriented Software Engingeering-16SCS251)

C205.1	Apply Object Oriented Software Engineering Approach in Every Aspect Of Software Project
C205.2	Analyze the requirements from various domains
C205.3	Adapt appropriate object-oriented design aspects in the development process
C205.4	Implement and test the software projects using object-oriented approach
C205.5	Learn the issues and concepts relating to maintenance of software projects
C205.6	Adapt the concepts and tools related to software configuration management

Course Name: C301 (Machine Learning Techniques-16SCS31)

C301.1	Choose the learning techniques with this basic knowledge.
C301.2	Apply effectively neural networks and genetic algorithms for appropriate applications.
C301.3	Apply Bayesian techniques and derive effectively learning rules.
C301.4	Choose and differentiate reinforcement and analytical learning techniques

Course Name: C302 (Information and Network Security-16SCS322)

C302.1	Analyze the vulnerabilities in any computing system and hence be able to design a security solution.
C302.2	Identify the security issues in the network and resolve it.
C302.3	Evaluate security mechanisms using rigorous approaches, including theoretical.

Course Name: C303 (Application and Web Security -16SCS331)

C303.1	Achieve Knowledge of web application's vulnerability and malicious attacks.
C303.2	Understand the basic web technologies used for web application development
C303.3	Understands the basic concepts of Mapping the application.
C303.4	Able to illustrate different attacking illustrations
C303.5	Basic concepts of Attacking Data Stores.

M.Tech in SCN

Course Name: (Advances in Computer Networks/16SCN12)

C112.1	List and classify network services, protocols and architectures, explain why they are layered.
C112.2	Choose key Internet applications and their protocols, and apply to develop their own applications (e.g., Client Server applications, Web Services) using the sockets API.
C112.3	Explain develop effective communication mechanisms using techniques like connection establishment, queuing theory, recovery Etc.
C112.4	Explain various congestion control techniques.

Course Name: (Information and Network Security/16SCN13)

C113.1	Analyze the vulnerabilities in any computing system and hence be able to design a security solution.
C113.2	Identify the security issues in the network and resolve it.
C113.3	Evaluate security mechanisms using rigorous approaches, including theoretical.

Course Name: (Internet of Things/16SCN14)

C114.1	Develop schemes for the applications of IOT in real time scenarios
C114.2	Manage the Internet resources
C114.3	Model the Internet of things to business
C114.4	Understand the practical knowledge through different case studies
C114.5	Understand data sets received through IoT devices and tools used for analysis

Course Name: (Wireless Networks and Mobile Computing/16SCN151)

C115.1	Explain state of art techniques in wireless communication.
C115.2	Discover CDMA, GSM. Mobile IP, WiMAX
C115.3	Demonstrate program for CLDC, MIDP let model and security concerns

Course Name:(Multi-Core Architecture and Programming/16SCN152)

C115.1	Identify the limitations of ILP and the need for multicore architectures
C115.2	Define fundamental concepts of parallel programming and its design issues
C115.3	Solve the issues related to multiprocessing and suggest solutions

C115.4	Make out the salient features of different multicore architectures and how they exploit parallelism
C115.5	Demonstrate the role of OpenMP and programming concept

Course Name: (Social Network Analysis/16SCN153)

C115.1	Define notation and terminology used in network science.
C115.2	Demonstrate, summarize and compare networks.
C115.3	Explain basic principles behind network analysis algorithms.
C115.4	Analysing real world network.

Course Name: (Cloud Security/16SCN154)

C115.1	Demonstrate the growth of Cloud computing, architecture and different modules of implementation.
C115.2	Evaluate the different types of cloud solutions among IaaS, PaaS, SaaS.
C115.3	Access the security implementation flow, actions and responsibilities of stake holders.
C115.4	Generalize the Data Centre operations, encryption methods and deployment details.
C115.5	Provide recommendations for using and managing the customer's identity and choose the type of virtualization to be used.

Course Name: (Computer Networks and IOT Laboratory/16SCNL16)

C116.1	Apply key Internet applications and their protocols, and ability to develop their own applications (e.g., Client Server applications, Web Services) using the sockets API.
C116.2	Design and evaluate application layer protocol
C116.3	Analyze the vulnerabilities in any computing system and hence be able to design a security solution.
C116.4	Identify the security issues in the network and resolve it.
C116.5	Evaluate security mechanisms using rigorous approaches, including theoretical.

Course Name:(Multimedia Communications/16SCN21)

C121.1	Deploy the right multimedia communication models.
C121.2	Apply QoS to multimedia network applications with efficient routing techniques.
C121.3	Solve the security threats in the multimedia networks.
C121.4	Develop the real-time multimedia network applications

Course Name: (Network Programming/16SCN22)

C122.1	Develop applications that communicate with each other using TCP and SCTP.
C122.2	Identify the IPv4 and IPv6 compatibility.
C122.3	Evaluate socket programming APIs

Course Name: (Wireless Ad-Hoc Networks/16SCN23)

C123.1	Design their own wireless network
C123.2	Evaluate the existing network and improve its quality of service
C123.3	Choose appropriate protocol for various applications
C123.4	Examine security measures present at different level
C123.5	Analyse energy consumption and management

Course Name: (Advances in Storage Area Networks/16SCN241)

C124.1	Identify the need for performance evaluation and the metrics used for it
C124.2	Apply the techniques used for data maintenance.
C124.3	Realize strong virtualization concepts
C124.4	Develop techniques for evaluating policies for LUN masking, file systems

Course Name: (Switching & Statistical Multiplexing in Telecommunications/16SCN242)

C124.1	Explain basics of telecommunications and digital form
C124.2	Elaborate switching and multiplexing, telecommunication.
C124.3	Illustrate transmission control in telecommunication
C124.4	Design and develop switching, multiplexing and traffic control.

Course Name: (Ethernet Technology/16SCN243)

C124.1	Classify different types of Ethernet systems
C124.2	Contrast Ethernet Media systems
C124.3	Evaluate a complete Ethernet system

Course Name: (Mobile Application Development/16SCN244)

C124.1	Describe the requirements for mobile applications
C124.2	Explain the challenges in mobile application design and development
C124.3	Develop design for mobile applications for specific requirements
C124.4	Implement the design using Android SDK
C124.5	Implement the design using Objective C and iOS
C124.6	Deploy mobile applications in Android and iPhone marketplace for distribution

Course Name: (Wireless Sensor Networks/16SCN251)

C125.1	Explain existing applications of wireless sensor actuator networks

C125.2	Apply in the context of wireless sensor networks and explain elements of distributed computing and network protocol design
C125.3	Contrast Various hardware, software platforms that exist for sensor networks
C125.4	Summarize various network level protocols for MAC, routing, time synchronization, aggregation, consensus and distributed tracking

Course Name: (Managing Big Data/16SCN252)

C125.1	Describe big data and use cases from selected business domains
C125.2	Explain NoSQL big data management
C125.3	Install, configure, and run Hadoop and HDFS
C125.4	Perform map-reduce analytics using Hadoop
C125.5	Use Hadoop related tools such as HBase, Cassandra, Pig, and Hive for big data Analytics

Course Name: (Network Management/16SCN253)

C125.1	Analyze the issues and challenges pertaining to management of emerging network technologies such as wired/wireless networks and high-speed internets.
C125.2	Apply network management standards to manage practical networks
C125.3	Formulate possible approaches for managing OSI network model.
C125.4	Use on SNMP for managing the network
C125.5	Use RMON for monitoring the behavior of the network
C125.6	Identify the various components of network and formulate the scheme for the managing them

Course Name: (Advances in Operating Systems/16SCN254)

C125.1	Demonstrate the Mutual exclusion, Deadlock detection and agreement protocols of Distributed operating system.
C125.2	Learn the various resource management techniques for distributed systems
C125.3	Identify the different features of real time and mobile operating system
C125.4	Modify existing open-source kernels in terms of functionality or features used

Course Name: (Cloud Computing/16SCN31)

C231.1	Compare the strengths and limitations of cloud computing
C231.2	Identify the architecture, infrastructure and delivery models of cloud computing
C231.3	Apply suitable virtualization concept.
C231.4	Choose the appropriate cloud player

C231.5	Address the core issues of cloud computing such as security, privacy and interoperability
C231.6	Design Cloud Services

Course Name: (Computer Systems Performance Analysis /16SCN321)

C232.1	Identify the need for performance evaluation and the metrics used for it
C232.2	Implement Little's law and other operational laws
C231.3	Apply the operational laws to open and closed systems
C232.4	Use discrete-time and continuous-time Markov chains to model real world systems
C232.5	Develop analytical techniques for evaluating scheduling policies

Course Name: (Network Routing Algorithms/16SCN322)

C232.1	Given the network and user requirements and the type of channel over which
	the network has to operate, the student would be in a position to apply his knowledge for identifying a suitable routing algorithm, implementing it and analyzing its performance.
C232.2	The student would also be able to design a new algorithm or modify an existing algorithm to satisfy the evolving demands in the network and by the user applications.

Course Name: (Information Security Policies in Industry/16SCN323)

C232.1	Explain the content, need, and responsibilities of information security policies.
C232.2	Explain the standards, guidelines, Procedures, and key roles of the organization.
C231.3	Able to write policy document for securing network connection and interfaces.
C232.4	Explain the threats to the stored data or data in transit and able to write policy document.
C232.5	Able to write, monitor, and review policy document.

Course Name: (Machine Learning Techniques/16SCN324)

C232.1	Choose the learning techniques with this basic knowledge.
C232.2	Apply effectively neural networks and genetic algorithms for appropriate applications.
C231.3	Apply Bayesian techniques and derive effectively learning rules.
C232.4	Choose and differentiate reinforcement and analytical learning techniques

Course Name: (Analysis of Computer Networks/16SCN331)

C233.1	List and classify network services, protocols and architectures, explain why they are layered.
C233.2	Implement key Internet applications and their protocols, and will apply to develop their own applications (e.g., Client Server applications, Web Services) using the sockets API.

Course Name: (Protocol Engineering/16SCN332)

C233.1	Describe the requirements for protocol engineering systems
C233.2	Explain the challenges in designing protocol engineering systems
C233.3	Implement the design using SDL

Course Name: (Web Engineering/16SCN333)

C233.1	Ability to Model the requirements of a web application.
C233.2	Contrast technology-aware Web Application.
C233.3	Ability to analyse the performances of web applications

Course Name: (Web Mining/16SCN334)

C233.1	Identify the application areas for web content mining, web structure mining and webusage mining.
C233.2	Design to retrieval the web data
C233.3	Develop schemes to crawl the web data, organize and index
C233.4	Cluster the documents for fast access
C233.5	Develop algorithms used by web mining applications.
C233.6	Select between different approaches and techniques of web mining

M.Tech in Automobile Engineering

Course Name: C102 (Applied Mathematics -16MAU11)

C102.1	Employ numerical techniques in order to achieve more accurate values in the computation of roots of polynomials and non-linear equations.
C102.2	Understand vector spaces, basis, linear transformations and the process of obtaining matrix of linear transformations arising in magnification and rotation of images.
C102.3	Utilize standard numerical schemes to solve partial differential Equations applicable to mechanical engineering problems.
C102.4	Apply the numerical linear algebra techniques to solve algebraic, Transcendental and matrix Eigen value problems.
C102.5	Employ the idea linear transformations, inner product spaces and orthogonality

Course Name: C103 (Automotive Engine and Systems-18MAU12)

C103.1	Explain air fuel requirement for various operating conditions of engine, various layouts and working of various injection systems, engine cooling system, lubrication system, engine management systems, exhaust emission control techniques, recent development ins engines, etc.
C103.2	Analyse the combustion normal and abnormal combustion process, basic Principles for selection of combustion chambers.
C103.3	To calculate heat lost to the coolant, engine performance in terms of various performance parameters by conducting test on single cylinder and Multi cylinder engine.

Course Name: C104 (Noise, Vibration and Harshness- 16MAU13)

C104.1	Explain basics of NVH.
C104.2	Use different instruments and analyse the data for identification of Sources of noise and vibrations.
C104.3	Conduct testing of vehicle components for vibrations.
C104.4	Take necessary steps to reduce the levels of vibrations and noise in Automobiles.

Course Name: C105 (Advanced Machine Design- 16MAU14)

C105.1	Design machine components which are subjected to fluctuating loads.
C1085.2	Use LEFM approach for crack growth determination.

C105.3	Design machine components/parts based on creep criterions. They are able to implement the concept of reliability for designing a machine parts or machine.
C105.4	Explain the contact stresses and implementation of Hertz contact phenomenon to the real field problem. Identify failure modes and evolve
	design by analysis methodology.
C105.5	Design against fatigue failure is given explicit attention.

Course Name: C106 (Automatic Control Systems- 16MAU152)

C106.1	Have understanding of control system required for vehicles and basics of control system development. Also
C106.2	Gets the knowledge of control system being used in automotive vehicle.

Course Name: C202 (Automotive Powertrains-16MAU21)

C202.1	Explain layout and components of automotive transmission.
C202.2	Explain detailed concept, construction and principle of operation of various types of mechanical transmission components, hydrodynamic Devices and hydrostatic devices.
C202.3	Select of automatic transmission system.
C202.4	Select differential gear ratio, final drives and the design of other Transmission elements, gear shifting mechanism and synchronisers.
C202.5	Design bearings for transmission system and gear box.

Course Name: C203 (Automotive Body Engineering and Safety- 16MAU22)

C203.1	Chassis layouts of passenger and commercial vehicles.
C203.2	Select the appropriate dimensions for driver's seat, passenger seat, Drivers and passengers' cabin as per ergonomic requirements.
C203.3	Select appropriate body material
C203.4	To calculate aerodynamic forces and moments acting on vehicle body, can be able to select suitable flow visualization technique.
C203.5	Select suitable method for reduction in aerodynamic forces and moments in heavy vehicles.
C203.6	Calculate load distribution leading to ergonomics, stability and safety of the vehicle.
C203.7	Identify the various safety aspects in a given vehicle.

Course Name: C204 (Automotive Electrical and Electronic Systems -16MAU23)

C202.1	Explain principles of storage batteries used in Automobiles.
C202.2	Explain different charging and lighting systems.
C202.3	Select different Ignition systems and Engine Management Systems.
C202.4	Explain different advanced electrical and electronic systems.

Course Name: C205 (Vehicle Dynamics- 16MAU24)

C205.1	Explain basics of vibrations.
C205.2	Analyse forces acting and the performance characteristics of tyres and Brakes.
C205.3	Analyse vehicle dynamics and its influence on the vehicle handling Characteristics.
C205.4	Explain principles of Steady State Handling Characteristics of Road Vehicles.

Course Name: C206 (Manufacturing Techniques in Automotive Engineering - 16MAU253)

C206.1	Select sheet metal forming processes
C206.2	Explain Forging process 3. Explain Powder Metallurgy Processes
C206.3	Use different metal joining methods used in automobiles
C206.4	Use plastic joining methods
C206.5	Explain Forging process

Course Name: C401 (Alternative Fuels and Pollution Control - 16MAU41)

C401.1	Explain need for alternative fuels, various alternative fuels available and their suitability for automotive application.
C401.2	Explain sources of pollution from automobiles and effects of pollutants on living beings
C401.3	Select suitable means for controlling pollution from automobiles
C401.4	Select suitable method of sampling of pollutants
C401.5	Explain various techniques adopted for reduction of Pollution from Automobile.

Course Name: C402 (Two and Three-Wheeler Technology- 16MAU424)

C402.1	Describe construction and working of different type of internal combustion engines for two and three wheeled vehicles.
C402.2	Laydown wiring diagram for two-wheeler and three wheeled vehicles.
C402.3	Explain types of clutches, transmission and final drives used for two and three wheeled vehicles.

C402.4	Describe types of frames, brakes and tyres used for two and three wheeled vehicles.
C402.5	Laydown maintenance schedule for two and three wheeled vehicles.

CHILDREN'S EDUCATION SOCIETY (Regd.)
THE OXFORD COLLEGE OF ENGINEERING
(Recognised by the Govt. of Karnataka, Affiliated to Visvesvaraya Technological University, Belagavi.
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Academic Year 2018-19
Department of Automobile Engineering

Vision of the Institute

To be a respected and most sought after engineering educational institutions engaged in equipping individuals capable of building learning organizations in the new millennium.

Mission of the Institute

To develop competent students with good value systems and face challenges of the continuously changing world.

Vision of the Department

To establish the department as a renowned center of excellence in scientific education, research with industrial guidance and exploration of the latest advances in the rapidly changing field of Automobile Engineering.

Mission of the Department

Mission 1. The Department will serve its students, industry, and society by fulfilling the mission of learning, and engagement through the creation, dissemination, and application of engineering methods.

Mission 2. Encourage students to continuously challenge the existing methods in Automobile Engineering with an intention to align the students towards research.

Mission 3. Impart knowledge on practical aspects and professional standards relevant to the practice of Automobile Engineering in the many aspects of modern life where it plays a vital role.

Program Educational Objectives

PEO 1.	Graduates shall display technical knowledge in basic Mechanical and Automobile Engineering subject areas enabling them to find career opportunities in relevant government agencies, reputed private firms.
PEO 2.	Graduates shall gain practical knowledge in the working of Automobile Systems, capable of working on indigenous projects, ventures related to automotive discipline.
PEO 3.	Graduates shall be well versed with the academic learning material of the course syllabus and ready to take up further learning through higher education and scientific research. Graduates shall be well equipped with the requirements of the current industries to obtain job opportunities in Mechanical and Automotive sectors in the design, Manufacturing, Analysis domains.

Program Specific Objectives

PSO1. Graduate will demonstrate the knowledge to design, develop, implement, and use same into various domains to identify cause and hence provide solutions in the automotive field.

PSO2. Graduate to work in interdisciplinary environment to design systems with the future emission norms and safety standards in automobile sector.

PSO3. Graduate will be able to pursue of lifelong learning and professional development to face the challenging and emerging needs of our society.

Program Outcomes

1. Engineering knowledge: Apply the knowledge of mathematics, science, engineering fundamentals, and an engineering specialization to the solution of complex engineering problems.

2. Problem analysis: Identify, formulate, review research literature, and analyze complex engineering problems reaching substantiated conclusions using first principles of mathematics, natural sciences, and engineering sciences.

3. Design/development of solutions: Design solutions for complex engineering problems and design system components or processes that meet the specified needs with appropriate consideration for the public health and safety, and the cultural, societal, and environmental considerations.

4. Conduct investigations of complex problems: Use research-based knowledge and research methods including design of experiments, analysis and interpretation of data, and synthesis of the information to provide valid conclusions.

5. Modern tool usage: Create, select, and apply appropriate techniques, resources, and modern engineering and IT tools including prediction and modeling to complex engineering activities with an understanding of the limitations.

6. The engineer and society: Apply reasoning informed by the contextual knowledge to assess societal, health, safety, legal and cultural issues and the consequent responsibilities relevant to the professional engineering practice.

7. Environment and sustainability: Understand the impact of the professional engineering solutions in societal and environmental contexts, and demonstrate the knowledge of, and need for sustainable development.

8. Ethics: Apply ethical principles and commit to professional ethics and responsibilities and norms of the engineering practice.

9. Individual and team work: Function effectively as an individual, and as a member or leader in diverse teams, and in multidisciplinary settings.

10. Communication: Communicate effectively on complex engineering activities with the engineering community and with society at large, such as, being able to comprehend and write effective reports and design documentation, make effective presentations, and give and receive clear instructions.

11. Project management and finance: Demonstrate knowledge and understanding of the engineering and management principles and apply these to one's own work, as a member and leader in a team, to manage projects and in multidisciplinary environments.

12. Life-long learning: Recognize the need for, and have the preparation and ability to engage in independent and life-long learning in the broadest context of technological change.

Course Name:(Engineering Mathematics III-17MAT31)

CO-1	Know the use of periodic signals and Fourier series to analyze circuits and system communications.
CO-2	Explain the general linear system theory for continuous-time signals and digital signal processing using the Fourier Transform and z-transform.
CO-3	Employ appropriate numerical methods to solve algebraic and transcendental equations
CO-4	Apply Green's Theorem, Divergence Theorem and Stokes' theorem in various applications in the field of electro-magnetic and gravitational fields and fluid flow problems.
CO-5	Determine the extremals of functionals of the calculus of variations.
CO-6	Determine the extremals to solve the simple problems of the calculus of variations.

Course Name:(Material Science & Metallurgy-17AU32)

CO-1	Explain different types of material crystal structures and arrangement of atoms.
CO-2	Describe various mechanical properties of materials.
CO-3	Describe about different types of fractures and their importance in Engineering applications.
CO-4	Draw and Interpret TTT curves and Iron carbon diagram
CO-5	Identify various ferrous metals and nonferrous metals and alloys based on composition and properties
CO-6	Describe about different types of composite materials and their production and application in engineering field

Course Name:(Engineering Thermodynamics-17au33)

Co-1	Define and Explain Fundamental Thermodynamic Laws and Concepts, Work, Various Types Of Works And Heat And Its Applications, Entropy And Its Relations, Zeroth, First & Second Law Of Thermodynamics And Its Applications.
CO-2	Explain various thermodynamic relations, constants of gas and basics of ideal gas & its mixtures.
CO-3	Calculate load and IP, BP and other performance characteristics of I.C. engines.
CO-4	Explain the selection of air conditioning system; evaluate thermal performance of refrigeration cycles.
CO-5	Calculate efficiency and MEP of various gas power & vapor power cycles.
CO-6	Explain the principles of gas turbine & jet propulsion system and their fuels

Course Name:(Mechanics of Materials-17AU34)

CO-1	Explain the concepts of stress, strain; material properties.
CO-2	Explain the behavior of materials under different loading conditions
CO-3	Calculate SF and BM and draw the SF and BM diagrams types of beams carrying different types of loads.
CO-4	Explain the concepts of torque and calculate the diameter of hollow and solid shafts subjected to twisting moment.
CO-5	Stresses & angle of twist induced into the shaft due to twisting.
CO-6	Calculate Critical load for different types of columns using Euler's, Rankine's equations & limitations of these equations and explain the applications.

Course Name:(MMM=17AU35)

CO-1	Explain the significance of mechanical measurements and components of a generalized measurement system.
CO-2	Classify and explain principles of various types of transducers, modifying devices and terminating devices.
CO-3	Explain the working principle of instruments used for measurement of Force, Torque, Pressure, Temperature, Strain and Vibration
CO-4	Classify the comparators and explain their working principles.
CO-5	Explain the objectives of metrology and explain various standards of length such as line and end standards
CO-6	Explain the usage of instruments used for the measurement of screw thread and gear parameters.

Course Name:(Manufacturing Process-I--17AU36)

CO-1	Define various terminologies used in casting process.
CO-2	Explain basic concepts used in construction of various molds.
CO-3	Analyze the working of various molding machines.
CO-4	Select the appropriate molding machine and molding process depending on the type of raw material required to produce the desired product
CO-5	Select the appropriate joining process depending on the type of joint required to produce the desired product.
CO-6	Select the Non-Destructive Testing method for application

Course Name: (Dynamics of Machines-15AU52)

CO-1	Calculate static forces at various points in different types of mechanism

CO-2	Calculate fluctuation of energy in flywheel and dimensions of flywheel
CO-3	Balance rotating masses and of reciprocating masses in internal combustion engine, Vengine, radial engine and to solve analytically and graphically to balance the systems
CO-4	Describe gyroscopic couple and to understand effect of gyroscopic couple
CO-5	Calculate gyroscopic effect on stability of vehicles, ship, aircraft etc.
CO-6	Analyze effect of profile of cam on motion of followers

Course Name: (Design of Machine Elements 1 -15AU53)

CO-1	To know the Standards in Design, Selection of materials as per CODES &STANDARDS
CO-2	Analyze the various modes of failure of machine components under different static load conditions and use appropriate theories of failures
CO-3	To understand the Impact stresses for machine components, Fatigue stress analysis stress concentration
CO-4	To evaluate dimensions of shafts and other simple machine components
CO-5	Able to understand design of joints like welded and riveted joints
CO-6	Terminologies and Design of threaded joints and power screws

Course Name:(Automotive Fuels & Combustion-15AU54)

CO-1	Introduce understanding about available energy sources for ICE
CO-2	Distinguish between properties of difference fuels
CO-3	Determine the A/F ratio for complete combustion
CO-4	Explain and differentiate between multi fuel and dual fuel engines
CO-5	Design SI& CI engine combustion chambers
CO-6	Explain stages of combustion in S.I. & C.I. engines

Course Name:(AE & ES-15AU71)

CO-1	Explain the construction of battery used in automotive vehicles.
CO-2	Describe the construction and working of cranking motor, D. C. generator, alternator, ignition systems along with trouble shooting.
CO-3	Discuss the faults arising in automotive wiring and lighting system.
CO-4	Explain various chassis electrical systems.
CO-5	Describe transducers and sensors.
CO-6	Explain various aspects of electrical and Hybrid vehicles.

Course Name:(Automotive Engine Component Design & AS-15AU72)

CO-1	Calculate major dimensions of engine components like cylinder, piston, connecting rod, crankshaft, valve and valve operating mechanisms.
CO-2	Analyze working of two stroke engines.

CO-3	Select suitable scavenging process for two stroke engines.
CO-4	Select suitable lubricant and lubrication system for given engine
CO-5	Calculate amount coolant required and select suitable cooling system for given engine.
CO-6	Explain need for supercharger and modifications required in engine for supercharging.

Course Name:(Finite Element Modelling & Analysis-15AU73)

CO-1	The question paper will have ten questions
CO-2	Each full question consists of 16 marks
CO-3	There will be 2full questions (with a maximum of four sub questions) from each module.
CO-4	Each full question will have sub questions covering all the topics under a module.
CO-5	The students will have to answer 5 full questions, selecting one full question from each module.

Course Name:(Earth Moving Equipment & Tractors-15AU741)

CO-1	Gain the knowledge about various basic operations and applications of earth moving equipment.
CO-2	Acquire the knowledge of under carriage, hydraulics, steering of tractors.
CO-3	. Get the complete information about the earth moving equipment
CO-4	Select suitable machine depending on type of land, haul distance, climate, etc.

Course Name:(Two & Three Wheeled Vehicle-15AU754)

CO-1	Describe construction and working of different type of internal combustion engines for two and three wheeled vehicles.
CO-2	Laydown wiring diagram for two-wheeler and three wheeled vehicles.
CO-3	Explain types of clutches, transmission and final drives used for two and three wheeled vehicles.
CO-4	Describe types of frames, brakes and tires used for two and three wheeled vehicles.
CO-5	Laydown maintenance schedule for two and three wheeled vehicles.

Course Name:(Engineering Mathematics IV-17MAT41)

CO-1	Solve first and second order ordinary differential equation arising in flow problems using single step and multistep numerical methods.
CO-2	Illustrate problems of potential theory, quantum mechanics and heat conduction by employing notions and properties of Bessel's functions and Legendre's polynomials.
CO-3	Explain the concepts of analytic functions, residues, poles of complex potentials and describe conformal and Bilinear transformation arising in field theory and signal processing.

CO-4	Develop probability distribution of discrete, continuous random variables and joint probability distribution occurring in digital signal processing, information theory and design engineering.
CO-5	. Demonstrate testing of hypothesis of sampling distributions and illustrate examples of Markov chains related to discrete parameter stochastic process.

Course Name:(Fluid Mechanics-17AU42)

CO-1	Define fluid properties and distinguish between types of fluids. • Describe Pascal's law, Hydrostatic law & their application to solve engineering static fluid problems.
CO-2	Explain the concepts of Buoyancy and stability of floating objects.
CO-3	Explain the types of flows, application of continuity equations.
CO-4	Explain the forces acting when fluid is under motion & application of Bernoulli's equation for solving flow problems
CO-5	Estimate the various types of losses in pipes.
CO-6	Analyze various forces acting on submerged bodies in engineering flow problems.

Course Name:(Kinematics of Machine-17AU43)

CO-1	Define and explain the terms such as Link, Kinematic chain, Kinematic pair, types of pairs, degree freedom, Mechanism, Machine Mobility.
CO-2	Sketch and explain various types of mechanisms, and their inversions.
CO-3	Draw Velocity and Acceleration of simple mechanisms using Instantaneous center method, Analytical and Graphical methods.
CO-4	Explain the Gear terminology, Law of gearing, gear tooth systems
CO-5	Determine the velocity ratio of different types of gear trains using tabular and algebraic methods
CO-6	To draw cam profile and calculate the velocity and acceleration of cams at any given instant.

Course Name:(Automotive Engines-17AU44)

CO-1	Explain the constructional details of SI and CI engines and classify engines.
CO-2	Explain the construction and working of carburetors and fuel injection pumps.
CO-3	Explain the combustion process in SI and CI engines.
CO-4	Suggest an efficient cooling system for IC engines.
CO-5	Select a proper lubricant to be used in an automobile used in various environmental conditions.
CO-6	Select a proper lubricant to be used in an automobile used in various environmental conditions.

Course Name:(Computer Aided Machine Drawing-17AU45)

CO-1	Use the Solid Edge software for drawing and solid modeling.
CO-2	Sketch the solutions of the sections of solids, determine the inclination of the cutting plane when true shape of section of an object is given.
CO-3	Sketch and draw the orthographic views of simple machine parts (top view, front view, side view) using first angle projection. • Sketch and draw the sectional views of simple machine parts.
CO-4	Sketch and draw ISO metric threads, Square, ACME & BSW forms of threads using conventional representation.
CO-5	Distinguish between temporary and permanent joints and sketch and draw the different types of keys. • Sketch and draw two views of different types of riveted joints
C0-6	Create solid models of different parts and assemble them and draw their sectional views using Solid Edge software. • Prepare assembly drawings along with their bill of material.

Course Name:(Manufacturing Process-II-17AU46)

CO-1	Define various terminologies used in production technology.
CO-2	Explain basic concepts used in construction of various machine tools.
CO-3	Analyze the various mechanisms underlying the working of various machine tools.
CO-4	Select the appropriate machining process depending on the properties of the raw material required to produce the desired product.
CO-5	Select non-traditional machining process for given application.

Course Name:(Automotive Chasis & Suspension-15AU61)

CO-1	Explain different chassis layouts and frames and solve for stability and weight distribution and suitability cross sections for frames.
CO-2	Describe various Front Axles, factors of wheel alignment Steering Systems and Calculate dimensions of Front Axle.
CO-3	Describe various types of Propeller Shaft, Differential and Rear axles and can find dimensions of these components.
CO-4	Select type of brake required to given application and will be able to calculate basic dimension of brakes.
CO-5	Describe, About Various Types of Suspensions, Wheels, and Tires
Co-6	Calculate dimensions of different suspensions.

Course Name:(Heat and Mass Transfer-15AU62)

CO-1	Demonstrate fundamental principles and laws of conduction, convection, and radiation modes of heat transfer.
CO-2	Analyze one dimensional steady state heat transfer. Analyze one dimensional one-dimensional unsteady state heat transfer
CO-3	Analyze one dimensional forced convection heat transfer problems.

CO-4	Analyze one dimensional application like flow over flat plate etc.
CO-5	Introduce basic principle of heat exchanger analysis and thermal design.
Co-6	Apply laws of radiation heat transfer to solve engineering problems.

Course Name:(Design of Machine Elements-II-15AU63)

CO-1	Design the curved beams using the equations of stress.
CO-2	Design helical spring and leaf spring using the equations of stress and deflection.
CO-3	Design the spur gears and helical gears using different parameters and check the gears for dynamic and wear load.
CO-4	Design sliding contact and rolling contact bearings to find coefficient of friction, heat generated, heat dissipated and average life of bearings.
CO-5	Design the various types of bevel gears and worm gears for dynamic and wear load using various parameters.
Co-6	Analyze and design given machine components and present their designs in the form of a Report.

Course Name:(Automotive Transmission-15AU64)

CO-1	. Explain the Constructional, design and working principles of different types of clutches.
CO-2	Explain the constructional and working principle of different types of fluid flywheel, torque converter and one-way clutches.
CO-3	Explain the constructional and working principle of different types of gear box.
CO-4	Determine the gear ratio, speed of vehicle and number of teeth on driving and driven gears.
CO-5	Explain the necessity and advantages of automatic transmission.
Co-6	Explain the constructional and principle of operation of different types of automatic transmissions and hydraulic control.

Semester: VI (Composite Materials-15AU653)

CO-1	Describe basic concepts of composite materials and application of composite materials in various engineering fields.
CO-2	Describe various FRP processing.
CO-3	Describe selection, requirements for production and application of MMCs.
CO-4	Describe concepts of nano materials, nano technology and use of nano materials.
CO-5	Use various techniques used for MMCs production.
Co-6	Analyze micro mechanical properties of lamina using various approaches.

Course Name:(Vehicle Body Engineering & Safety-15AU81)

CO-1	Classify the vehicles and define basic terms.

CO-2	Select appropriate body material. 3. Calculate various aerodynamic forces and moments acting on vehicle.
CO-3	Calculate load distribution in vehicle body.
CO-4	Explain the ergonomics, stability the vehicle.
CO-5	Identify the various safety aspects in a given vehicle.
Co-6	Identify various sources of noise and methods of noise separation

Course Name:(Mechanical Vibration-15AU82)

CO-1	Classify different types of vibration / damping associated with systems and vibration measuring instruments.
CO-2	Calculate natural frequency, damping, logarithmic decrement, and other parameters of single degree of freedom un-damped / damped free vibrating systems
CO-3	Compute the response of single degree of freedom damped vibrating systems to different excitation forces.
CO-4	Determine the natural frequencies and the modes of two degree of freedom free vibrating systems
CO-5	Compare the natural frequencies / modes of multi-degree of freedom free vibrating systems using numerical methods

Course Name:(Total Quality Management-15AU831)

CO-1	Explain basic concepts of TQM.
CO-2	Describe leadership qualities, different factors of customer satisfaction and benefits of involvement of employee in quality management
CO-3	Describe various techniques for continuous process improvement and to understands its benefits
CO-4	Apply various tools and techniques in industries to achieve the higher productivity
CO-5	Describe importance of HR dept. recruitment process, importance of training of employees
Co-6	Understand use of various graphical representation of process behavior in TQM

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Approved by A.I.C.T.E. New Delhi.
Recognised by UGC Under Section 2(f))
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Department of Biotechnology

Vision of the Department

Aspiring to be recognized as a premier source of outstanding graduates, who in turn will help their enterprise attain and sustain industrial and societal competitiveness.

Mission of the Department

To create and disseminate knowledge by being accountable for developing and motivating our pupils to attain academic excellence and industrial competency. With our focus on teaching, learning & research, we engage in helping our students to face challenges in the field of Biotechnology

Detailed Mission

M1	To embrace and disseminate fundamental and applied knowledge of Biotechnology Engineering to attain academic excellence and industrial competency
M2	To empower the students for enhanced performance through continuous learning and research capabilities in multidisciplinary domains
M3	To create awareness about professional conduct and socio-ethical implications of potentials of biotechnology
M4	To equip the students to interrelate biotechnological solutions for present day challenges

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PROGRAM SPECIFIC OBJECTIVES

1: Graduates will gain and apply knowledge of Science, Biotechnology and Engineering concepts in order to design and perform the experiments followed by validating the data to solve complex problems in the multidisciplinary research fields of Biotechnology.

2: Graduates will be able to analyze, appraise and develop technologies to address the Biotechnology Engineering problems while keeping in mind safety & ethical factors to safeguard the environment and society at large.

Program Educational Objectives

1. To endow students with basics of mathematics, life sciences and engineering necessary to analyze and solve scientific problems.
2. To provide students with the necessary instructions and relevant practical experience combined with exposure to and adequate training to face basic challenges in Biotechnology.
3. To inculcate scientific temperament in students to pursue and engage in research projects related to health, food, and environment.
4. To prepare students with efficient communication skills, team spirit and leadership qualities and awareness of professional conduct and mould them into responsible and competent engineers.
5. To empower students to work in scientific environment with ethical values and social responsibilities.

Program Outcomes

1. Engineering knowledge: Apply the knowledge of mathematics, science, engineering fundamentals, and an engineering specialization to the solution of complex engineering problems.

2. Problem analysis: Identify, formulate, review research literature, and analyze complex engineering problems reaching substantiated conclusions using first principles of mathematics, natural sciences, and engineering sciences.

3. Design/development of solutions: Design solutions for complex engineering problems and design system components or processes that meet the specified needs with appropriate consideration for the public health and safety, and the cultural, societal, and environmental considerations.

4. Conduct investigations of complex problems: Use research-based knowledge and research methods including design of experiments, analysis and interpretation of data, and synthesis of the information to provide valid conclusions.

5. Modern tool usage: Create, select, and apply appropriate techniques, resources, and modern engineering and IT tools including prediction and modeling to complex engineering activities with an understanding of the limitations.

6. The engineer and society: Apply reasoning informed by the contextual knowledge to assess societal, health, safety, legal and cultural issues and the consequent responsibilities relevant to the professional engineering practice.

7. Environment and sustainability: Understand the impact of the professional engineering solutions in societal and environmental contexts, and demonstrate the knowledge of, and need for sustainable development.

8. Ethics: Apply ethical principles and commit to professional ethics and responsibilities and norms of the engineering practice.

9. Individual and team work: Function effectively as an individual, and as a member or leader in diverse teams, and in multidisciplinary settings.

10. Communication: Communicate effectively on complex engineering activities with the engineering community and with society at large, such as, being able to comprehend and write effective reports and design documentation, make effective presentations, and give and receive clear instructions.

11. Project management and finance: Demonstrate knowledge and understanding of the engineering and management principles and apply these to one's own work, as a member and leader in a team, to manage projects and in multidisciplinary environments.

12. Life-long learning: Recognize the need for, and have the preparation and ability to engage in independent and life-long learning in the broadest context of technological change.

Course Name: C202 (Unit Operations -17BT32)

C202.1	State and describe the nature and properties of the fluids
C202.2	Classify fluid systems and understand its behavior and derive equations governing fluid flow
C202.3	Study the different flow measuring instruments and demonstrate applications of Bernoulli's theorem in venturi meter, orifice meter and pumps.
C202.4	Illustrate the working of size reduction, sedimentation, and mixing equipment's.
C202.5	Understand the working of mass transfer operations and distinguish them
C202.6	Design and operate the heat exchange equipment

Course Name: C203(Biochemistry -17BT33)

C203.1	Able to understand the basic concepts of biochemical reaction mechanisms, pH, buffer systems and stereochemistry
C203.2	Able to describe the structural and functional properties of biomolecules, their three-dimensional organization and structure function relationships
C203.3	Able to comprehend the importance of cell membranes, transport mechanisms and the principles of molecular recognition and communication
C203.4	Able to interpret principles of bioenergetics of high energy compounds and the principles of photosynthetic machinery.
C203.5	Able to outline metabolic pathways of various biomolecules
C203.6	Able to evaluate the importance of the enzymes responsible for the homeostasis of biochemical reactions

Course Name: C204(Microbiology -17BT34)

C204.1	Describe the structure and function of typical prokaryotic and eukaryotic cell structure like bacteria, algae, yeast & molds, protozoa, viruses, etc.
C204.2	lity to isolate, grow, identify the microorganisms.
C204.3	Study of equipment's like LAF, hot air oven, autoclave microscope etc. and their role in sterilization and understanding the mechanism of chemical based sterilization
C204.4	Learning to disinfect the microbes and to work in sterile environment.

C204.5	Define the role of microorganisms towards environmental protection, industrial applications, and infectious diseases their diagnosis and control of the spread of the disease.
C204.6	Out-line industrial fermentation processes leading to the production of antibiotics, organic acids, enzymes, vitamins, and therapeutic products.

Course Name: C205(Cell Biology and Genetics -17BT35)

C205.1	Able to summarize and recollect the concepts of cell biology and understand the cell organelles and functions
C205.2	To analyze the knowledge of cell division and importance of cell cycle regulation and cell locomotion
C205.3	Explain the concepts of hematology and Growth factors
C205.4	understand the structure of genetic material, classical experiments, and Mendelian laws of Inheritance
C205.5	Illustrate the gene interactions, linkage, mapping, and the structure of chromosome.
C205.6	To interpret the knowledge of population genetics in brief &apply the fundamental aspects of genetics in biotechnology

Course Name: C206(Basics of Computer Applications -17BT36)

C206.1	Gain knowledge on implementation of programming languages to develop biological software tools.
C206.2	Able to develop their own web pages, databases, and data mining.
C206.3	Students will be able to implement SQL and HTML in biological databases
C206.4	Graduates will be able to design Biological databases using ontology terms
C206.5	Students will be able to apply programming skills using MATLAB and excel in biological problems.
C206.6	Students will be designing programming protocols using C. C++ for Biological and Health care problems.

Course Name: C207(Unit Operations Laboratory -17BTL37)

C207.1	Arrive at required results based on experimental observations recorded systematically.
C207.2	Study and illustrate the working of different flow measuring instruments
C207.3	Understand and estimate the shape and size of irregular particles by sieve analysis

C207.4	Demonstrate the experimental procedure for mass transfer operation though distillation and diffusion studies.
C207.5	Study heat transfer operation in double pipe heat exchanger and compare flow patterns of double pipe heat exchanger
C207.6	Understand operation of centrifugal and reciprocating pumps by varying flow rates

Course Name: C208(Microbiology Laboratory-17BTL38)

C208.1	To use different laboratory equipment and instruments such as Microscope, Laminar Air Flow Station, Autoclave, oven, incubators
C208.2	Prepare the media and use for the cultivation of the microorganisms.
C208.3	Perform laboratory experiments for the isolation, identification, and characterization of microorganisms
C208.4	Carry-out experiments for the enumeration, staining and control.
C208.5	Understanding the biochemical characterization of microbes to establish taxonomic classification.
C208.6	Ability to interpret the growth pattern and mechanism and correlation w.r.t industrial microbiology

Course Name: C209(Biostatistics and Biomodelling -17BT41)

C209.1	The students will be able to explain the concepts of data collection, presentation of charts, graphs & data
C209.2	The students will be able to describe different laws of probability
C209.3	The students will be able to apply concepts of analysis of variance in inferring the statistical data
C209.4	The students will be able to analyze different methods in design of experiments
C209.5	The students will be able to evaluate the case studies of lung cancer, endangered plants species
C209.6	The students will be able to recognize how data illuminate ethical, political, scientific, economic, and overall public health issues

Course Name: C210(Biochemical Thermodynamics -17BT42)

C210.1	State & describe the concepts of system, surrounding, process, laws of thermodynamics & entropy

C210.2	Explain the PVT behavior of pure fluids and derive equations of state for real gases
C210.3	Distinguish between various equations of state & their applications and analyze the thermodynamic diagrams
C210.4	Determine the importance of partial molar properties, activity co-efficient of solution & the concepts of phase equilibrium.
C210.5	Summarize vapor liquid equilibrium data for ideal solutions
C210.6	Illustrate the phase rule for reacting systems and effect of temperature, pressure on equilibrium constants

Course Name: C211(Molecular Biology -17BT43)

C211.1	Explain replication, transcription, and translation processes with underlying differences in prokaryotic and eukaryotic systems
C211.2	Recognize and explain the role of enzymes and factors involved in replication, transcription, and translation
C211.3	Describe the regulation of gene expression in prokaryotes and eukaryotes and interpret its importance
C211.4	Elaborate importance of genetic recombination with special reference to bacterial system
C211.5	Categorize DNA damage occurring in living system and outline repair mechanisms
C211.6	Apply the knowledge of molecular biology in biotechnological applications

Course Name: C212(Bioprocess Principles & Calculations -17BT44)

C212.1	To understand the concept of unit conversions and basic chemical calculations
C212.2	To understand and calculate material balances around steady- state multi-unit processes with and without chemical reactions
C212.3	To understand and solve energy balances around multi-unit processes with and without chemical reactions
C212.4	To explain the various unit operations involved in bioprocess engineering
C212.5	To apply the calculations involving fuels and combustion
C212.6	To implement Stochiometric requirements of reactants and products in biochemical reactions

Course Name: C213(Bioprocess Principles & Calculations -17BT45)

C213.1	Apply the principles of macromolecular structure and function
C213.2	Identify the development of recent methods available for molecular function
C213.3	Ability to analyze the structural difference & similarity in bimolecular structure
C213.4	Ability to understand the concept of biomolecules identification technique or method
C213.5	Evaluate theoretical and computational skills of biophysical aspects in structure activity studies.
C213.6	Formulate complete and logical plan for data analysis of structure activity studies in drug design, molecular docking, and other applications

Course Name: C214(Clinical Biochemistry -17BT46)

C214.1	Able to discuss the biochemistry and pathophysiology associated with various disorders of cellular metabolism and inborn errors of metabolism.
C214.2	Able to describe the structure and function of metabolic pathways for carbohydrates, amino acids and lipids and their corresponding clinical conditions.
C214.3	Able to analyze the medical problems associated with abnormal lipoprotein and enzyme levels and therapeutic agents used to treat such disorders.
C214.4	Able to assess the clinical manifestations of renal, hepatic, pancreatic, gastric and intestinal functions.
C214.5	Able to understand and outline the significance of hormonal systems and their corresponding disturbances.
C214.6	Able to evaluate the biochemical and clinical aspects of hematology including measurement of coagulation and thrombosis.

Course Name: C215(Cell & Molecular Biology Laboratory -17BTL47)

C215.1	Acquire knowledge about cell division & identify the stages of mitosis & meiosis
C215.2	Analyze and select a suitable method for DNA, RNA & protoplast related experiments
C215.3	Perform gene transformation using the appropriate method
C215.4	Understand and apply method of competent cells, protoplast preparation and protoplast fusion for biotechnological applications

C215.5	Analyze and select a suitable method for separation of DNA by electrophoretic method
C215.6	Understand and analyze the principle of thermal cycler

Course Name: C216(Clinical Biochemistry Laboratory -17BTL48)

C216.1	Able to understand and use many of the techniques and tools of biochemistry
C216.2	Able to explain the basic concepts of pH, buffers, and colorimeter
C216.3	Able to comprehend fundamental principles of biochemical research and conduct qualitative and quantitative analysis of biological samples for constituents like glucose, urea, phosphate, iron & cholesterol
C216.4	Able to evaluate the properties of important biomolecules like carbohydrates, amino acids, proteins & lipids
C216.5	Able to implement experimental protocols, and adapt them to plan and carry out simple clinical investigations to identify biomolecules based on their color reactions
C216.6	Able to develop basic laboratory skills and use apparatus to obtain reproducible data from biochemical experiments and analyze, interpret, and report the results of clinical investigations.

Course Name: C301(Bio-Kinetics and Bio-Reaction Engineering -15BT51)

C301.1	Understand the theories of chemical reaction and analyze experimental reaction kinetics data
C301.2	Distinguish ideal reactor systems and develop performance/design equations for
	conversion and space velocity
C301.3	Understand the non-ideal behavior of reactor systems and residence time distribution of reactant molecules
C301.4	Define concepts involved in enzyme-catalyzed reaction and develop equations for enzyme substrate reaction and describe regulatory enzymes
C301.5	Compare media and sterilization techniques for industrial fermentation process and understand kinetics of microbial growth
C301.6	Design a system, component, or process to meet desired needs within realistic constraints.

Course Name: C302(Genetic Engineering and Applications -15BT52)

C302.1	Able to explain the basic concepts of gene cloning and of applications recombinant DNA technology
C302.2	Able to categorize vectors, enzymes, and nucleic acid purification strategies important for transgenic technology, gene manipulation concepts and transgene methods.
C302.3	Able to outline and assess specific techniques like PCR, hybridization & construction of libraries used in genetic engineering
C302.4	Able to appraise the different gene/DNA transfer techniques to produce transgenic organisms
C302.5	Able to comprehend various methods of producing transgenic plants and animals and engineering microbes to produce useful products like enzymes and antibiotics
C302.6	Able to formulate specific applications of genetic engineering for the welfare of mankind & society.

Course Name: C303(ImmunoTechnology -15BT53)

C303.1	Classify the immune system and summarize their functions
C303.2	Outline the molecular and cellular mechanisms involved in the development of the immune response
C303.3	Explain the regulatory mechanism involved in development of immune response
C303.4	Describe the cause, challenges, and treatment for Immune System Pathologies
C303.5	Describe the cause, challenges, and treatment for Immune System Dysfunctions
C303.6	Apply the major immunological laboratory techniques and their application to both clinical analysis and experimental research

Course Name: C304(Bioinformatics -15BT54)

C304.1	Students will use basic biological concepts, grounded in foundational theories, to interpret relationships among living things and to analyze and solve biological problems.
C304.2	To know the relevant online resources, databases, and software tools
C304.3	To understand the underlying concepts of Bioinformatics in disease understanding
C304.4	To be able to design for engineering proteins and genetic engineering.
C304.5	Analyze biological data using modeling, predictive and drug design methods
C304.6	The students will be familiar with tools and techniques of bioinformatics and they can apply these techniques to Health care and pharmacy industry.

Course Name: C305(Bioinstrumentation & Biosensors -15BT554)

C305.1	Understand the concept of transduction and methods of extracting information from biosensors.
C305.2	Gain knowledge in the state of the art of biological and medical sensors both in research and commercial products.
C305.3	Be familiar with a wide range of sensors and instrumentation from electrochemical to optical.
C305.4	Understand typical electronic instrumentation for biosensors and important concepts such as calibration and references.
C305.5	Gain knowledge of actuators for biological and medical applications from drug delivery devices to microfluidic systems
C305.6	Analyze sensor outputs with signal processing and analogue circuit concepts

Course Name: C306(Bioinstrumentation & Biosensors -15BT563)

C306.1	Apply reasoning to identify the components of environmental eco systems and effect of pollutant on environment.
C306.2	Characterize the various parameters for treatment of water, wastewater and solid waste from their sources to provide valid conclusions.
C306.3	Identify major air pollutants and the methods to quantify it.
C306.4	Understand the impact of recovery, recycle of the useful resources from the wastes by adopting advanced techniques
C306.5	Able to demonstrate the need for sustainable development.
C306.6	Identify and demonstrate the knowledge to use suitable equipment for abatement and control of air & noise pollution

Course Name: C307(Genetic Engineering and ImmunoTechnology Laboratory -15BTL57)

C307.1	Categorize the blood group and analyze the sample for diagnosis of typhoid.
C307.2	Measure the concentration of antigen or antibody present in the sample by selecting the appropriate immunochemical technique and infer the results
C307.3	Choose a suitable experimental method to isolate, quantify & measure the concentration of DNA& RNA
C307.4	Demonstrate the use of PCR and prepare amplified DNA using thermal cycler
C307.5	Perform gene transformation using the appropriate method

C307.6	Analyze and identify the DNA & protein by suitable technique

Course Name: C308(Bioinformatics Laboratory -15BTL58)

C308.1	The students will be gaining expertise on practical data analytics, Data mining, machine learning.
C308.2	Utilize the biological information from public databases for given problem in biotechnology, medicine, or biology.
C308.3	To gain foundational knowledge about molecular evolution, protein structure and gene expression using computational tools.
C308.4	Ability to write computer programs in various programming techniques to analyze bioinformatics data
C308.5	To apply the tools to address important problems of biotechnology and to verify the capability in handling a research project.
C308.6	The students will be able to visualize data and will apply this knowledge towards analysis of data related to graphical interfaces in the fields of systems biology, functional genomics, and biomedicine

Course Name: C309(Bio-Business and Entrepreneurship -15BT61)

C309.1	To understand analyze and explore entrepreneurship opportunity in biotechnology
C309.2	To Analyze societal problems and derive biotech based scientific solutions.
C309.3	To accelerate innovation and conservation of IPR
C309.4	To Explore funding opportunity for innovations and startups.
C309.5	To Exploit business opportunity through expired patent, technology learning and licensing.
C309.6	To illustrate scientific problem into a project proposal.

Course Name: C310(Bioprocess Control and Automation -15BT62)

C310.1	Able to describe the Instrumentation of flow, pressure, temperature.
C310.2	Able to determine the transient response and to derive the transfer functions of first order systems and first order systems in series and to solve problems of response of first order systems for different types of input.
C310.3	Able to determine the transient response and to derive the transfer functions of second order systems.
C310.4	To Understand the parameters to be measured and controlled in the bioreactor.
C310.5	Able to apply the design aspects for block diagrams and use the concept of stability for solving the problems.
C310.6	Able to analyze online data and understand the dynamics and control of bioreactors.

Course Name: C311(Enzyme Technology & Biotransformation -15BT63)

C311.1	Classify and identify the enzymes based on the biochemical reaction catalyzed by them
C311.2	Compare enzymes and catalyst, and explain the mechanism of enzyme catalysis
C311.3	Recognize & Interpret the importance of enzymes in medicine
C311.4	Explain the methods involved in study of enzyme kinetics, standardization, and optimization of enzyme catalyzed reactions
C311.5	Compare immobilized enzymes over conventional enzymes, apply the knowledge of immobilized enzymes in bioprocess industry
C311.6	Summarize the applications of enzymes in medicine and industry

Course Name: C312(Bioprocess Equipment Design & CAED -15BT64)

C312.1	To define the notations and terminology for welding and pipe joints.
C312.2	To draw various values and joints.
C312.3	To calculate the no of tubes, diameter, and different parameter of double pipe heat exchanger.
C312.4	To calculate the dimensions of shell and tube heat exchangers.
C312.5	To apply the design aspects by solving the problems.
C312.6	To evaluate the no of plates & height of packing in distillation column and to design the fermenter.

Course Name: C313(Cell Culture Techniques -15BT653)

C313.1	Ability to understand the importance of equipment a, their sterilization and usage aspects
C313.2	Able to Differentiate between the various sources of cells to be used in cell culture techniques
C313.3	Ability to Correlate between different biological samples and understand the importance of different media in tissue culture
C313.4	Ability to Comprehend the applications of plant tissue culture and their utilization.
C313.5	Ability to Comprehend the applications of animal and microbial cell culture in industry, healthcare, and environment.
C313.6	Appraise the role of biotechnology in plant, animal, and microbial sciences for sustainable eco-system & human welfare

Course Name: C315(Biological Data Management -15BT661)

C315.1	To understand the types of databases and their data formats.
C315.2	To analyze biological data.
C315.3	To elaborate the use of microarray-based data analysis.
C315.4	To study the importance of various Omics experiments, data generation techniques, data management strategies and their effective utilization
C315.5	To analyze omics-based data for effective usage in biotechnology.
C315.6	To comprehend the nature of Clinical Data its management & related basic operations data integration, data

Course Name: C316(Bioprocess Control & Automation Laboratory -15BTL67)

C316.1	To understand the characteristics of transducers of temperature, pressure & flow
C316.2	To understand determine the oxygen demand required for biological degradation of pollutant
C316.3	To analyze the response of first order systems for step and impulse input
C316.4	To interpret the response of first order systems.
C316.5	Describe the principles of controllers
C316.6	To explain the concept of control of DO& agitation

Course Name: C317(Biokinetics And Enzyme Technology Laboratory -15BTL68)

C317.1	Able to apply principles of protein chemistry and enzymology for analysis and study of enzymes as biocatalysts
C317.2	Able to investigate various methods available for isolation, purification, and characterization of enzymes
C317.3	Able to apply the principles and methods of immobilization of enzymes useful in a
	diverse range of industries
C317.4	Able to assess biokinetics parameters using different reactors
C317.5	Able to implement experimental protocols, and adapt them to plan and carry out investigations to relate experimental data with fundamental theories of enzyme kinetics
C317.6	Able to use basic laboratory skills and apparatus to obtain reproducible data from biochemical experiments and analyze, interpret, and report the results.

Course Name: C401(Fermentation Technology -15BT71)

C401.1	To Describe the factors affecting secondary metabolite production and its industrial importance.
C401.2	To Describe the basic requirements of downstream processing for biochemical product recovery.
C401.3	To Identify and summarize the effect of change in unit's operations and its impact on the process.
C401.4	To Illustrate how emerging technologies would benefit the biochemical product recovery and show the likely benefits it would have over the traditional operations.
C401.5	To Analyzing both analytical and process validation issues that are critical to successful manufacturing
C401.6	To Outline the processes involving large-scale, high-purity protein production.

Course Name: C402(Genomics & Proteomics -15BT72)

C402.1	The students will be able to apply DNA/genome sequencing techniques to various genome projects.
C402.2	The students will be able to analyze genomes of various organisms and genome annotation importance.

C402.3	The students will be able to correlate the relationship between genome, transcriptome, proteome, and metabolome.
C402.4	To engineer proteins for therapeutic and clinical applications.
C402.5	The students will be able to apply the knowledge of the major web-resources and the notion about how the methods are applied in real-life scientific research.
C402.6	The students will be able to understand how to perform simple analysis of this data and remember examples of how the research tools are applied in published investigations.

Course Name: C403(Plant Biotechnology -15BT73)

C403.1	To apply tissue culture techniques for the large-scale production of various plantlets with economically useful traits
C403.2	Analyze the developments of crop production by using plant breeding and hybridization techniques.
C403.3	Apply genetically engineered concepts to induce biotic and abiotic stresses in plants
C403.4	Develop & create genetically modified plants with genes from microbial and animal origin that have diagnostic application
C403.5	Utilize the technique for the development and production of pharmaceutically important molecules as edible drugs
C403.6	Utilize and implement knowledge of mass production of plants to meet the societal demand for food

Course Name: C404(Lab to Industrial Scaling -15BT743)

C404.1	Analyze the various parameters for bioreactor design.
C404.2	Identify appropriate qualitative and quantitative analysis methods depending upon the chemical nature of analyze.
C404.3	Enhance product output by selection of appropriate method of enrichment operation
C404.4	Enhance product quality by appropriate method of purification operation
C404.5	Analyze industrial problems in fermentation process and solving.
C404.6	Designing Bioreactors using computer programming skills

Course Name: C405(Molecular Diagnostics -15BT753)

C405.1	Outline the basic concepts of health diagnostics.

C405.2	Explain the role & importance DNA-based and PCR-based diagnostic methods.
C405.3	Describe the diagnosis of disorders such as haemoglobinopathies, mucopolysaccharidoses, lipidoses, amyloidosis using biochemical & cell-based assays.
C405.4	Identify the different immunodiagnostics & imaging diagnostic techniques.
C405.5	Explain the different ways of product & assay development methods.
C405.6	Describe the application of biosensors in diagnostics.

Course Name: C406(Fermentation Technology Laboratory -15BTL76)

C406.1	Analyze and select appropriate unit operations for isolation and purification of bio molecules.
C406.2	Evaluate the bio-product using appropriate qualitative and quantitative analysis
	methods depending upon the chemical nature of analyte.
C406.3	Analyze, compare, and select a technique for concentrating biological products like extraction, drying, filtration, precipitation, membrane separation.
C406.4	Acquire the basic principles and techniques of chromatography to purify the biological products.
C406.5	Describe the basic principles of fermentation preparation and the requirements of downstream processing for biochemical product recovery.
C406.6	Analyze the kinetics and estimation of product produced using fermenter

Course Name: C407(Plant Biotechnology Laboratory -15BTL77)

C407.1	To explain the basic concepts of plant biotechnology in plant tissue culture
C407.2	To describe the various components of plant tissue culture media, like minerals, growth factors, hormones, and their significance
C407.3	To relate the various steps taken to establish and optimize media for purposes
C407.4	Explain and perform some of the more advanced techniques, e.g., embryo culture and protoplast isolation and regeneration
C407.5	To establish and maintain plants in tissue culture and micro propagation, including morphogenesis
C407.6	To adapt and apply plant tissue culture techniques to research problems in plant biology

Course Name: C408(Clinical & Pharmaceutical Biotechnology -15BT81)

C408.1	To Explain the significance of pharmaco-kinetic models
C408.2	To Explain the significance of pharmaco-dynamic principles
C408.3	To understand various dosage forms and formulation
C408.4	To Understand the specific techniques used in biotherapy & clinical Biotechnology
C408.5	Comprehend specific applications of pharmaceutical & clinical Biotechnology
C408.6	Able to implement experimental protocols, and adopt to plan and carry out pre-clinical& clinical investigations

Course Name: C409(Regulatory Affairs in Biotech Industry -15BT82)

C409.1	To educate students about regulatory rules governing biotech industry
C409.2	To create awareness about guidelines that specify parameters of the safety and quality standards in the biotech industry
C409.3	Outline the importance of the quality and compliance in the biotech industry
C409.4	Comprehend the various regulatory guidelines and rules as well as the organizations governing the same.
C409.5	To learn the documentation process pertaining to quality management, QA, quality policy and marketing.
C409.6	To understand the importance of quality auditing, process designing, validating master plans & commissioning

Course Name: C410(Metabolic Engineering -15BT832)

C410.1	To empower the students with the knowledge on metabolic engineering.
C410.2	To understand the basic concepts about enzymology
C410.3	Outline and understand the basics followed in primary and secondary metabolites biosynthesis.
C410.4	Understand the importance of bioconversions of substances into products.
C410.5	Understand the concepts involved in regulation of enzyme production
C410.6	Understand the technique involved in strain improvement with interest to develop it for industrial fermentation use

Course Name: C411(PROJECT WORK -15BT85)

C411.1	Identify a topic in relevant areas of Biotechnology
C411.2	Illustrate literature review to identify gaps and define objectives & scope of the work.
C411.3	Formulate the problem to meet the objectives of the proposed work
C411.4	Develop a prototypes/models, fabrication, experimental set-up/software systems necessary to meet the objectives
C411.5	Develop the work with a concern for society, environment, and ethics
C411.6	Analyze and discuss the results to draw valid conclusions.

Course Name: C412(SEMINAR -15BT86)

C412.1	Enables to update with present technologies and trends in real world
C412.2	Enables to improve ability of data collection and presentation
C412.3	Enables to overcome stage fear and improve communication skills
C412.4	Enables to face spontaneous queries
C412.5	Prepare and write the report as per recommended format.
C412.6	Help to develop vocabulary & demonstrate efforts put in comprehensive analysis & interpretation of data

CHILDREN'S EDUCATION SOCIETY (Regd.)
THE OXFORD COLLEGE OF ENGINEERING
(Recognised by the Govt. of Karnataka, Affiliated to Visvesvaraya Technological University, Belagavi.
Approved by A.I.C.T.E. New Delhi.
Recognised by UGC Under Section 2(f))
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Department of Chemistry

Vision of the Institute

To be a respected and most sought after engineering educational institution engaged in equipping individuals capable of building learning organizations in the new millennium.

Mission of the Institute

To develop competent students with good value systems and face challenges of the continuously changing world.

Vision of the Department

Our vision is to give our students an in-depth exposure to the latest developments in Chemistry made by reputed scientists and experts in this field. To equip individuals capable of earning in the new millennium.

Mission of the Department

Our mission is to provide a contemporary foundation for addressing problems in Chemistry. Also, to develop competent engineers with good values and to equip them to face the challenges of the continuously changing world.

Program Educational Objectives

PEO 1. Mater the basic knowledge of Engineering Chemistry for building technical Competence in industries, research, and development.

PEO 2. To develop knowledge in the fields of use of free energy in chemical Equilibrium, electrochemistry and energy storage systems, corrosion, and metal finishing.

PEO 3. To understand the importance of the energy systems, environmental pollution, waste management, water chemistry, Instrumental methods of analysis and nano-materials.

Program Specific Objectives

PSO 1: Understand the principles of electrochemistry & battery technology.

PSO 2: Apply the knowledge of Corrosion and metal finishing in solving environmental issues.

PSO 3: Utilize the knowledge of fuels and solar energy for various Engineering applications.

PSO 4: Utilize the knowledge of water technology for various engineering applications as wellas in daily life.

PSO 5: Develop solutions for problems associated with Nano technology.

Course Name: 18CHE12/22 (Engineering Chemistry)

CO_1	Understanding the concept of free energy in equilibrium, rationalize bulk properties and processes using thermodynamic considerations.
CO_2	Apply the k knowledge of corrosion and electrochemical energy systems to modify surface properties of metals, to develop resistance to corrosion, wear, tear, impact etc. by electroplating and electroless plating.
CO_3	Understanding the difference between electrochemical cell, concentration cell, batteries, and fuel cell, and know its applications for the industrialization of country. Water chemistry and problems and types of water and various ways to make it
CO_4	Applying the knowledge of environmental pollution and waste management in controlling pollution.
CO_5	Understanding the different techniques of instrumental analysis.
CO6	To know the fundamental principles of Nanomaterials for building technical competence in industries and research.

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E-mail: engprincipal@theoxford.edu Web: www.theoxfordengg.org

Department of Civil Engineering

Vision of the Institute

To be a respected and most sought after engineering educational institution engaged in equipping individuals capable of building learning organizations in the new millennium.

Mission of the Institute

To develop competent students with good value systems and face challenges of the continuously changing world.

Vision of the Department

To impart very high-quality education to the students to make them do innovative sustainable engineering relevant to industry and people at large.

Mission of the Department

Mission 1. To emphasize on basics of engineering as well as their applications relevant to the industry.

Mission 2. To serve the society with due consideration of economy, ecology and ethical issues of nation.

Mission 3. To sensitize the students and faculty to take up research and consultancy to be on par with international standards.

Program Educational Objectives

PEO 1.	Apply fundamental concepts of civil engineering in developing economically viable and sustainable sound solutions.
PEO 2.	To work collaboratively on multidisciplinary problems.
PEO 3.	To achieve their professional aims keeping good ethics.

Program Specific Objectives

PSO 1: To apply technical skills and modern engineering tools for civil engineering day to day practice.

PSO 2: To participate in critical thinking and problem solving of civil engineering field that needs analytical and design requirements.

PSO 3: To pursue lifelong learning and professional development to face the challenging and emerging needs of our society.

Program Outcomes

1. Engineering knowledge: Apply the knowledge of mathematics, science, engineering fundamentals, and an engineering specialization to the solution of complex engineering problems.

2. Problem analysis: Identify, formulate, review research literature, and analyze complex engineering problems reaching substantiated conclusions using first principles of mathematics, natural sciences, and engineering sciences.

3. Design/development of solutions: Design solutions for complex engineering problems and design system components or processes that meet the specified needs with appropriate consideration for the public health and safety, and the cultural, societal, and environmental considerations.

4. Conduct investigations of complex problems: Use research-based knowledge and research methods including design of experiments, analysis and interpretation of data, and synthesis of the information to provide valid conclusions.

5. Modern tool usage: Create, select, and apply appropriate techniques, resources, and modern engineering and IT tools including prediction and modeling to complex engineering activities with an understanding of the limitations.

6. The engineer and society: Apply reasoning informed by the contextual knowledge to assess societal, health, safety, legal and cultural issues and the consequent responsibilities relevant to the professional engineering practice.

7. Environment and sustainability: Understand the impact of the professional engineering solutions in societal and environmental contexts, and demonstrate the knowledge of, and need for sustainable development.

8. Ethics: Apply ethical principles and commit to professional ethics and responsibilities and norms of the engineering practice.

9. Individual and team work: Function effectively as an individual, and as a member or leader in diverse teams, and in multidisciplinary settings.

10. Communication: Communicate effectively on complex engineering activities with the engineering community and with society at large, such as, being able to comprehend and write effective reports and design documentation, make effective presentations, and give and receive clear instructions.

11. Project management and finance: Demonstrate knowledge and understanding of the engineering and management principles and apply these to one's own work, as a member and leader in a team, to manage projects and in multidisciplinary environments.

12. Life-long learning: Recognize the need for, and have the preparation and ability to engage in independent and life-long learning in the broadest context of technological change.

Course Name:232.1 (Strength of Materials-17CV32)

C232.1	To understand the basic material properties of structural materials such as steel, aluminum, wood and their combinations under axial tension and compression.
C232.2	To learn methods of stress analysis after determining the internal forces under axial tension and compression, bending, shear and torsion.
C232.3	To evaluate the behavior and strength of structural elements under the action of compound stresses and thus understand failure criteria.
C232.4	To understand the methods of analyses of design of structural frames such as pin jointed trusses and portal frames both determinate and indeterminate.
C232.5	To understand the basic concept of instability analyses of structural elements such as columns and struts.
C232.6	To understand the basic concepts of torsion developed in circular shaft.

Course Name: 233.1 (Fluids Mechanics-17CV32)

C233.1	Possess a sound knowledge of fundamental properties of fluids and fluid continuum
C233.2	Compute and solve problems on hydrostatics, including practical applications
C233.3	Apply principles of mathematics to represent kinematic concepts related to fluid flow
C233.4	Apply fundamental laws of fluid mechanics and the Bernoulli's principle for practical applications
C233.5	Compute the discharge through pipes and over notches and weirs

Course Name: 234.1 (Basic Surveying -17CV34)

C234.1	Possess a sound knowledge of fundamental principles Geodetics[L1] [PO1]
C234.2	Measurement of vertical and horizontal plane, linear and angular dimensions to arrive at solutions to basic surveying problems.
C234.3	Capture geodetic data to process and perform analysis for survey problems
C234.4	Analyze the obtained spatial data and compute areas and volumes. Represent 3D data on plane figures as contours

Course Name: 235.1 (Engineering Geology -17CV35)

C235.1	Students will be able to apply the knowledge of geology and its role in Civil Engineering
C235.2	Students will effectively utilize earth's materials such as mineral, rocks and water in civil engineering practices.
C235.3	3. Analyze the natural disasters and their mitigation.

C235.4	Assess various structural features and geological tools in ground waterexploration, Natural resource estimation and solving civil engineering problems
C235.5	Apply and asses use of building materials in construction and asses their properties

Course Name:236.1 (Building Materials and Construction**-17CV36)**

C236.1	Select suitable materials for buildings and adopt suitable construction techniques.
C236.2	Adopt suitable repair and maintenance work to enhance durability of buildings.

Course Name: C242 (Analysis of Determinate Structures(17CV42)

C242.1	To evaluate the forces in determinate trusses by method of joints and sections.
C242.2	To evaluate the deflection of cantilever, simply supported and overhanging beams by different methods
C242.3	To understand the energy principles and energy theorems and their applications to determine the deflections of trusses and bent frames.
C242.4	To determine the stress resultants in arches and cables.
C242.5	To understand the concept of influence lines and construct the ILD diagram for the moving loads
C242.6	To know the comparison between moment area and conjugate beam method.

Course Name: C243(applied hydraulics 17CV43)

C243.1	Apply dimensional analysis to develop mathematical modeling and compute the parametric values in prototype by analyzing the corresponding model parameters
C213.2	Design the open channels of various cross sections including economical channel sections
C213.3	Apply Energy concepts to flow in open channel sections, Calculate Energy dissipation,
C213.4	Compute water surface profiles at different conditions
C213.5	Design turbines for the given data, and to know their operation characteristics under different operating conditions
C213.6	The working principles of the hydraulic machines for the given data and analyzing the performance of Turbines for various design data.

Course Name:C244 (concrete technology17CV44)

C244.1	Relate material characteristics and their influence on microstructure of concrete.
C244.2	Distinguish concrete behavior based on its fresh and hardened properties
C244.3	Illustrate proportioning of different types of concrete mixes for required fresh and hardened properties using professional codes.
C244.4	Adopt suitable concreting methods to place the concrete based on requirement.

C244.5	Select a suitable type of concrete based on specific application.
C244.6	Describe the physical & mechanical properties of aggregates

Course Name: C245 (Applied geotechnical Engineering 17CV45)

C245.1	Will acquire an understanding of the procedures to determine index properties of any type of soil, classify the soil based on its index properties
C245.2	Will be able to determine compaction characteristics of soil and apply that knowledge to assess field compaction procedures
C245.3	Will be able to determine permeability property of soils and acquires conceptual knowledge about stresses due to seepage and effective stress; Also acquire ability to
	estimate seepage losses across hydraulic structure
C245.4	Will be able to estimate shear strength parameters of different types of soils using the data of different shear tests and comprehend Mohr-Coulomb failure theory.
C245.5	Ability to solve practical problems related to estimation of consolidation settlemen deposits also time required for the same.
C245.6	To implement the knowledge attained in solving civil engineering problems of making roads, townships etc.

Course Name: C246 (Advanced Surveying 17CV46)

C246.1	Apply the knowledge of geometric principles to arrive at surveying problems
C246.2	Use modern instruments to obtain geo-spatial data and analyze the same to appropriate engineering problems.
C246.3	Capture geodetic data to process and perform analysis for survey problems with the use of electronic instruments
C246.4	Design and implement the different types of curves for deviating type of alignments.
C246.5	To apply basic principles in analyzing position of celestial bodies
C246.6	To implement the knowledge attained in solving civil engineering problems of making roads, townships etc.
C245.1	Will acquire an understanding of the procedures to determine index properties of any type of soil, classify the soil based on its index properties
C245.2	Will be able to determine compaction characteristics of soil and apply that knowledge to assess field compaction procedures
C245.3	Will be able to determine permeability property of soils and acquires conceptual knowledge about stresses due to seepage and effective stress; Also acquire ability to estimate seepage losses across hydraulic structure
C245.4	Will be able to estimate shear strength parameters of different types of soils using the data of different shear tests and comprehend Mohr-Coulomb failure theory.
C245.5	Ability to solve practical problems related to estimation of consolidation settlemen deposits also time required for the same.

C245.6	To implement the knowledge attained in solving civil engineering problems of making roads, townships etc.

Course Name: C351 (Design of RC Structural Elements) 15CV52)

C252.1	Determine the moment in indeterminate beams and frames having variable moment of inertia and subsidence using slope defection method
C252.2	Determine the moment in indeterminate beams and frames of no sway and sway using moment distribution method.
C252.3	Construct the bending moment diagram for beams and frames by Kani's method.
C252.4	Construct the bending moment diagram for beams and frames using flexibility method
C252.5	Analyze the beams and indeterminate frames by system stiffness method

Course Name: C253: Applied Geotechnical Engineering-(15CV53)

C253.1	To evaluate the forces in determinate trusses by method of joints and sections.
C253.2	To evaluate the deflection of cantilever, simply supported and overhanging beams by different methods
C253.3	To understand the energy principles and energy theorems and their applications to determine the deflections of trusses and bent frames.
C253.4	To determine the stress resultants in arches and cables.
C253.5	To understand the concept of influence lines and construct the ILD diagram for the moving loads

Course Name: C254 Computer Aided Building Planning and Drawing(15CV54)

C254.1	Ability to plan and execute geotechnical site investigation program for different civil engineering projects
C254.2	Understanding of stress distribution and resulting settlement beneath the loaded footings on sand and clayey soils
C254.3	Ability to estimate factor of safety against failure of slopes and to compute lateral pressure distribution behind earth retaining structures
C254.4	Ability to determine bearing capacity of soil and achieve proficiency in proportioning shallow isolated and combined footings for uniform bearing pressure
C254.5	Capable of estimating load carrying capacity of single and group of piles

Course Name: C355(Air pollution and Control (15CV551)

C355.1	Identify the major sources of air pollution and understand their effects on health and environment.
C355.2	Evaluate the dispersion of air pollutants in the atmosphere and to develop air quality models.

C355.3	Ascertain and evaluate sampling techniques for atmospheric and stack pollutants.
C355.4	Choose and design control techniques for particulate and gaseous emissions.

Course Name: C356(Traffic Engineering-(15CV561)

C356.1	Understand the human factors and vehicular factors in traffic engineering design.
C356.2	Conduct different types of traffic surveys and analysis of collected data using statistical concepts.
C356.3	Use an appropriate traffic flow theory and to comprehend the capacity & signalized intersection analysis.
C356.4	Understand the basic knowledge of Intelligent Transportation System.

Course Name: C361 (Construction Management & Entrepreneurship 15CV61)

C361.1	Understand the construction management process.
C361.2	Understand and solve variety of issues that are encountered by every professional in
	discharging professional duties.
C361.3	Fulfil the professional obligations effectively with global outlook
C361.4	Create a construction project and safety plan
C361.5	Apply construction management skills as a member of a multi-disciplinary team.
C361.6	To make them understand the concept of project management for planning and execution.

Course Name: C262 (Design of Steel Structural Elements 15CV62)

C362.1	Possess knowledge of Steel Structures Advantages and Disadvantages of Steel structures, steel code provisions.
C362.2	Possess knowledge of Plastic behavior of structural steel.
C362.3	Understand the Concept of Bolted and Welded connections,
C362.4	Understand the Concept of Design of compression members, built-up columns and columns splices.
C362.5	Understand the Concept of Design of tension members, simple slab base and gusseted base.
C362.6	Understand the Concept of Design of laterally supported and un-supported steel beams.

Course Name:C263 (Highway Engineering 15CV63)

C363.1	Acquire knowledge of different modes of transportation systems, history, development of highways and the organizations associated with research and development of the same in INDIA.
C363.2	Acquire the capability of proposing a new alignment or re-alignment of existing roads, conduct necessary field investigation for generation of required data.
C363.3	Evaluate the engineering properties of the materials and suggest the suitability of the same for pavement construction.
C363.4	Design road geometrics, structural components of pavement
C363.5	Design of highway drainage structural elements
C363.6	Evaluate the highway economics by few select methods and will have a basic knowledge of various highway financing concepts.

Course Name: C264 (Water Supply and Treatment Engineering 15CV64)

C364.1	Estimate average and peak water demand for a community.
C364.2	Evaluate available sources of water, quantitatively and qualitatively and make appropriate choice for a community.
C364.3	Evaluate water quality and environmental significance of various parameters and plan suitable treatment system.
C364.4	Design a comprehensive water treatment and distribution system to purify and distribute water to the required quality standards.
C364.5	Study drinking water quality standards and to illustrate qualitative analysis of water
C364.6	Design physical, chemical and biological treatment methods to ensure safe and potable water Supply. Revise

Course Name:C265 (Solid Waste Management 15CV651)

C365.1	Analyze existing solid waste management system and to identify their drawbacks
C365.2	Evaluate different elements of solid waste management system.
C365.3	Suggest suitable scientific methods for solid waste management elements.
C365.4	Design suitable processing system and evaluate disposal sites.
C365.5	Analyze different processing technologies and to study conversion of municipal solid waste to compost or biogas.
C365.6	Evaluate landfill site and to study the sanitary landfill reactions.

Course Name:C261 (Water Resources Management 15CV661)

C3661.1	Assess the potential of groundwater and surface water resources.
C3661.2	Address the issues related to planning and management of water resources.

C3661.3	Know how to implement IWRM in different regions.
C3661.4	Understand the legal issues of water policy.
C3661.5	Select the method for water harvesting based on the area.
C3661.6	Understand the importance of water and manage the water resources effectively.

Course Name: C471 (MIWW-(15CV71) Year of Study: 2018-19

C471.1	Acquires capability to design sewer and Sewerage treatment plant.
C471.2	Evaluate degree of treatment and type of treatment for disposal, reuse and recycle.
C471.3	Identify waste streams and design the industrial wastewater treatment plant.
C471.4	Manage sewage and industrial effluent issues.

Course Name: C472 Design of RCC and Steel Structures15CV72)

C472.1	Understand the importance of hydrology and its components.
C472.2	Measure precipitation and analyze the data and analyze the losses in precipitation.
C472.3	Estimate runoff and develop unit hydrographs.
C472.4	Find the benefits and ill-effects of irrigation.
C472.5	Find the quantity of irrigation water and frequency of irrigation for various crops. loads.
C472.6	Find the canal capacity, design the canal, and compute the reservoir capacity.

Course Name: C473 Hydrology and Irrigation Engineering(15CV73)

C473.1	Understand the importance of hydrology and its components.
C473.2	Measure precipitation and analyze the data and analyze the losses in precipitation.
C473.3	Estimate runoff and develop unit hydrographs.
C473.4	Find the benefits and ill-effects of irrigation.
C473.5	Find the quantity of irrigation water and frequency of irrigation for various crops. loads.
C473.6	Find the canal capacity, design the canal, and compute the reservoir capacity.

Course Name: C 474 Ground Water & Hydraulics (15CV74)

C474.1	Find the characteristics of aquifers.
C474.2	Estimate the quantity of ground water by various methods.
C474.3	Locate the zones of ground water resources.

C474.4	Select well and augment the ground water storage.

Course Name:475 (Urban Transportation and Planning-15CV755)

C475.1	Design, conduct and administer surveys to provide the data required for transportation planning.
C475.2	Supervise the process of data collection about travel behavior and analyze the data for use in transport planning.
C475.3	Develop and calibrate modal split, trip generation rates for specific types of land use developments.
C475.4	Adopt the steps that are necessary to complete a long-term transportation plan.

course Name:C481(Quantity Surveying and Contracts Management 15CV81)

C481.1	Prepare detailed and abstract estimates for roads and building.
C481.2	Prepare valuation reports of buildings
C481.3	Interpret Contract documents of domestic and international construction works
C481.4	Estimate the quantities of work, develop the bill of quantities, and arrive at the Cost of civil engineering Project
C481.5	Understand and apply the concept of Valuation for Properties
C481.6	Understand, Apply and Create the Tender and Contract document

Course Name:C482 Design of Pre-Stressed Concrete Elements 15CV82)

C482.1	Understand the requirement of PSC members for present scenario
C482.2	Analyze the stresses encountered in PSC element during transfer and at working
C482.3	Understand the effectiveness of the design of PSC after studying losses
C482.4	Capable of analyzing the PSC element and finding its efficiency.
C482.5	Design PSC beam for different requirements
C482.6	learn Design of Pre-Stressed Concrete Element

Course Name: C483 (Pavement Design 15CV833)

C483.1	Gain knowledge about the process of collecting data required for design, factors affecting pavement design, and maintenance of pavement.
C483.2	Systematically generate and compile required data for design of pavement (Highway & Airfield).
C483.3	Analyse stress, strain and deflection by bossiness's, bur mister's and Vestergaard's theory.
C483.4	Design rigid pavement and flexible pavement conforming to IRC58-2002 and IRC37-2001.
C483.5	Understand the requirements of various types of joints in pavements, which are provided to take care of climatic variations.

C483.6	Evaluate the performance of the pavement and develops maintenance statement based on site specific requirements.

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Department of Computer Science Engineering

Vision of the Institute

To be a respected and most sought after engineering educational institution engaged in equipping individuals capable of building learning organizations in the new millennium.To produce technocrats with creative technical knowledge and intellectual skills to sustain and excel in the highly demanding world with confidence.

Mission of the Institute

To develop competent students with good value systems and face challenges of the continuously changing world.

Vision of the Department

To produce technocrats with creative technical knowledge and intellectual skills to sustain and excel in the highly demanding world with confidence.

Mission of the Department

Mission 1. The department's aim is to develop the best computer science professionals who work creatively, communicate effectively & become technologically competent, and to mould them into good citizens by inculcating sense of ethical values in them.

Mission 2. To Encourage the students to build self-help, Power of initiative, courage to change and create new things.

Mission 3. To inculcates the spirit of cooperation and capacity for organization with special emphasis on their self-reliance and sustainability to meet ever changing requirements of local and global industries.

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PROGRAM EDUCATIONAL OBJECTIVES

PEO To create graduates equipped with life-long learning skills and have a successful professional career in IT industry.

PEO To prepare graduates to pursue higher education and get inclined towards research & development in computer science engineering.

PEO To provide adequate training and opportunities, with exposure to emerging cutting-edge technologies and to work in teams on multidisciplinary projects with effective communication skills and leadership qualities.

PROGRAM SPECIFIC OBJECTIVES

PSO 1: To design efficient algorithms and develop effective code for real-time computations.

PSO 2: To apply software engineering principles in developing optimal software solutions.

Course Name:C231 (Engineering Mathematics-III -17MAT31)

C231.1	Acquire the knowledge of periodic signals and Fourier series to analyze circuits and system communications
C231.2	Apply the concept of general linear system theory for continuous-time signals and digital signal processing using the Fourier Transform and z-transform.
C231.3	Explore the concept of appropriate numerical methods to solve algebraic and transcendental equations
C231.4	Apply Green's Theorem, Divergence Theorem and Stokes' theorem in various applications in the field of electro-magnetic and gravitational fields and fluid flow problems.

Course Name:C232 (Analog and Digital Electronics-17CS32)

C232.1	Apply the principles of Field Effect Transistors, Operational Amplifiers and gates, and ADE tools in analog circuits.
C232.2	Apply the analytical principles of ADE in data processing circuits.
C232.3	Analyze the suitability of various ADE tools in building familiardataprocessing circuits.
C232.4	Analyze the applicability of various tools of ADE for a given problem under study.

Course Name:C233 (Data Structure in C-17CS33)

C233.1	Use different types of data structures, algorithms, and their operations.
C233.2	Apply searching, sorting operation on files.
C233.3	Design solution for problems solving by making use of appropriate data structures.
C233.4	Implement the application of Data structures in a high-level language-C.

Course Name:C234 (UNIX and Shell Programming-17CS34)

C234.1	Apply the knowledge of basic structure of computers and its working to address known queries.
C234.2	Apply arithmetic and logical operations to solve problems
C234.3	Analyze the memory systems performance
C234.4	Design of computer organization for data transferring and data processing

Course Name:C235 (Discrete Mathematicalstructures-17CS35)

C235.1	Apply the knowledge of Unix Architecture, File systems and process management using system calls to address known queries.
C235.2	Apply Unix utilities to manage simple file operation and vi-editor.
C235.3	Analyze Simple Filters and Regular expression to performpatternmatching.
C235.4	Evaluate the suitability of shell programming and Perl script to solve a given problem.

Course Name:C236 (Discrete Mathematical Structures-17CS35)

C236.1	Identify the correctness of an argument using propositional and predicate logic and truth tables. Prepare for a background in abstraction, notation, and critical thinking
	for the mathematics most directly related to computer science
C236.2	Apply the Knowledge to solve problems using counting techniques and combinatorics in the context. Construct proofs using direct proof, proof by contradiction, and proof by cases, or mathematical induction.
C236.3	Understand and apply mathematical induction, combinatorics, discrete probability recursion, sequence, and recurrence
C236.4	Acquire the knowledge and identify the various type's graphs and trees.

Course Name:C241 (Engineering Mathematics-IV-17CS41)

C241.1	Understand the basic concept of complex variables, distribution and special functions to solve mathematical problems.
C241.2	Apply the knowledge of numerical methods, sampling distribution to solve complex engineering problems.
C241.3	Analyze the probability distribution, sampling distribution and complex Variable through analytic function, Cauchy-Riemann equations, residues, Bilinear transformation for signal processing.
C241.4	Evaluate first and second order ordinary differential equations through single and multi-step method problems.

Course Name:C242 (Object Oriented Concepts-17CS42)

C242.1	Understand and Apply Object Oriented Programming concepts of C++ and java.
C242.2	Apply Object oriented concepts of C++ and java to solve simple problems.
C242.3	Analyze event driven simple GUI programs using java applets and swings.

Course Name:C243 (Design and Analysis Of Algorithms-17CS43)

C243.1	Understand the analysis framework and computational solution to well-known problems with suitable data structure.
C243.2	Apply appropriate design strategies for problem solving.
C243.3	Analyze the performance of different algorithms.
C243.4	Design an efficient algorithm using appropriate design strategies for problem solving.

Course Name:C244 (Microprocessor and Microcontroller-17CS44)

C244.1	Understand the architecture and ARM processor and apply instruction set to process data.

C244.2	Apply suitable addressing modes, instructions, and interrupt functions for data processing.
C244.3	Analyze memory and Input Output interfacing for data transferring.
C244.4	Design memory address decoders and assembly language program for simple applications.

Course Name:C245 (Software Engineering-17CS45)

C245.1	Understand the software engineering technologies and apply in software development.
C245.2	Apply software engineering practice over the entire software system life cycle.
C245.3	Analyze process activities for different software process models and system models.
C245.4	Evaluate high-level and low-level design of an application from the identified software requirements.

Course Name:C246 (Data Communication-17CS46)

C246.1	Understand and apply the basic concepts of Data Communication and technologies
C246.2	Apply the appropriate methods and protocol suites to address the different data communication issues
C246.3	Analyze the significance of data network components
C246.4	Evaluate the functionalities of various layer protocols and network devices

Course Name:C351 (Management, Entrepreneurship for It Industry-17CS51)

C351.1	Understand the basic concepts of management functions, projects, ERP and outline their importance in entrepreneurship.
C351.2	Analyze the business opportunities, appropriate leadership styles, motivation theories, communications, coordination and controlling methods.
C351.3	Evaluate the importance of SSIs in economic development and its institutional support provided by government of India.
C351.4	Estimate the importance of IPRs and cyber-law to protect infringement of secret document.

Course Name:C352 (Computer Networks-17CS5)

C352.1	Understand the fundamentals of application layer, transport layer, network layers and apply the various protocols for data communication.
C352.2	Apply mobile, multimedia networking and network management mechanisms for data transfer.
C352.3	Analyze the difference between various rulership address classes, Routing Algorithms, and compute shortest paths.

C352.4	Evaluate the suitability of data transfer protocols for transport layer services.

Course Name:C353 (Database Management System-17CS53)

C353.1	Apply the physical structure of the database to handle data, to define a problem at the view level.
C353.2	Apply the basics knowledge of relation algebra and SQL to construct queries.
C353.3	Analyze the concepts of Normalization and Transaction Management to structure the database.
C353.4	Examine Functional Dependencies, concurrency control, recovery, and security in
	formulating a familiar database for real world problem.

Course Name:C354 (Automata Theory and Computability-17CS54)

C354.1	Understand and apply the fundamental concepts of Automata theory and Computability.
C354.2	Apply analytical principle and fundamentals for different language classes.
C354.3	Analyze models of computation like Deterministic, Non-deterministic and software models for a given problem.
C354.4	Analyze the problem under study through formal reasoning and reduction techniques

Course Name:C355 (Object Oriented Modeling and Design-17CS55)

C355.1	Understand and apply the concepts of Object Oriented (OO) models and Design Pattern.
C355.2	Analyze the application Domain and Prepare models from different viewpoints.
C355.3	Design and draw class diagram, sequence diagrams and interaction diagrams for any software systems.
C355.4	Choose and apply design pattern for software applications

Course Name:C356 (.Net Framework for Application Devt-17CS56)

C356.1	Understanding visual studio .NET platform, syntax, and semantics of c# and applying framework tools efficiently.
C356.2	Analyze the object-oriented programming concepts in c# programming language.
C356.3	Design custom interfaces for windows form applications by using controls.
C356.4	Develop window form applications using c# programming language to resolve a given problems.

Course Name:C361 (Cryptography, Network Security and Cyber Law-17CS61)

C361.1	Understand the fundamentals of cryptography, network security, cyber laws and apply the cryptographic techniques for various ciphers.
C361.2	Apply principal concepts to solve a given problem under study.

C361.3	Investigate malwares, file infectors to check for viruses and bugs to eliminate the same.
C361.4	Evaluate the performance of different cryptographic techniques.

Course Name:C362 (File Structures-17CS62)

C362.1	Identify the appropriate concept of file structure design and secondary storage devices.
C362.2	Apply appropriate designs for storage and data manipulation with object-oriented programming.
C362.3	Analyze sorting, indexing, and hashing technique for data handling.
C362.4	Identify the appropriate concept of file structure design and secondary storage devices.

Course Name:C363 (Software Testing-17CS63)

C363.1	Understand the concepts of testing and apply to derive different testcases
C363.2	Apply the different testing techniques
C363.3	Analyze the appropriate testing techniques in classifying the problems
C363.4	Create appropriate document for the software artifact

Course Name:C364 (Operating Systems-17CS64)

C364.1	Understand fundamentals of operating systems and applying algorithms to solve given problems.
C364.2	Analyze process scheduling and process synchronization
C364.3	Apply suitable techniques for management of different resources.
C364.4	Compare various operating system platforms through case studies.

Course Name:C365 (Data Mining and Data Warehouse-17CS65)

C365.1	Understand the applicability of fundamental concepts of Datawarehouse and data mining
C365.2	Apply classification and clustering algorithms for various problems
C365.3	Analyze the suitability of association rules for a given data pattern

Course Name:C366 (Python Application Programming-17CS66)

C366.1	Understand and apply the fundamentals of python programming language.
C366.2	Apply procedure and object-oriented concepts of python to solve simple problems.
C366.3	Analyze python program for Network Programming, Web services and Database applications.
C366.4	Understand and apply the fundamentals of python programming language.

Course Name:C371 (Web Technology and Its Applications-17CS71)

C371.1	Understand and apply the syntax, semantics of HTML and CSS.
C371.2	Apply basics to create forms and tables.
C371.3	Analyze JavaScript frameworks jQuery, Backbone MVC, AJAX and web services.
C371.4	Evaluate dynamic web pages using JavaScript and PHP.

Course Name:C372 (Software Architecture and Design Pattern-17CS72)

C372.1	Understand the range of design patterns and applying appropriate patterns to solve the given problem.
C372.2	Analyze various components of object-oriented system and patterns.
C372.3	Apply design principles in the design of object-oriented systems and distributed systems.
C372.4	Design and model object-oriented systems using different types of pattern.

Course Name:C373 (Machine Learning-17CS73)

C373.1	Understand the applicability of fundamental concepts, algorithms, and associated procedures of machine learning.
C373.2	Apply the basic concepts of mathematics and machine learning to understand Supervised, unsupervised and reinforcement learning algorithms.
C373.3	Analyze the usage of neural networks, Bayes classifier and k nearest neighbor for given problem under study to infer its efficacy.
C373.4	Evaluate the statistics to infer the correctness of the written machine learning algorithm for a given application.

Course Name:C374 (Unix System Programming-17CS74)

C374.1	Understand UNIX, ANSI, POSIX standards and apply file APIs to process files.
C374.2	Apply process concepts to demonstrate inter-process communications.
C374.3	Analyze Signal and Daemon processes for process controlling.

Course Name:C375 (Storage Area Networks-17CS75)

C375.1	Understand the fundamentals and applications of Storage area Network including storage architectures and storage networking techniques.
C375.2	Apply different techniques to provide business continuity capabilities and disaster recovery.
C375.3	Identify key challenges in virtualization and cloud computing.
C375.4	Analyze the suitable RAID technology for different application environments.

Course Name:C381 (Internet of Things Technology-17CS81)

C381.1	Apply the fundamental concepts of IOT architectural models, IOT network protocols and hardware and software tools
C382.2	Apply suitable IOT protocols for given network under study.
C383.3	Analyze the data Analytics in IOT to infer the security issue related to the IOT network.
C384.4	Evaluate the correctness of the chosen hardware and software tools to be used in constructing IOT model.

Course Name:C382 (Object System Simulation and Modeling-17CS82)

C382.1	Understand the basic concepts of warehousing, mining and apply Hadoop Distributed File System commands to manage data.
C382.2	Apply algorithms of warehousing, mining, and Hadoop Distributed File System for data analysis.
C382.3	Analyze Regression, Clustering, Artificial Neural Networks and Decision tree techniques for decision making.
C382.4	Evaluate different techniques of Mining, Association and MapReduce framework.

Course Name:C383 (Big Data Analytics-17CS83)

C383.1	Describe the role of important elements of discrete event simulation and apply modeling paradigm.
C383.2	Apply functional modeling methods for statistical system activities to conceptualize real world situations.
C383.3	Analyze the modeled simulation results to resolve critical issues in areal-world environment
C383.4	Evaluate the simulation models using verification and validation methods

Course Name:C384 (Internship / Professional Practise-17CS84)

C384.1	Understand the key concerns, practices, Standard operating procedures protocols and new concepts of the company/ industry in which they have worked.
C384.2	Apply hands on experience, communication, interpersonal and other critical skills to integrate theory and practice in multidisciplinary area.
C384.3	Manage time, Analyze the skills which are transferable to new contexts and identify which appropriate engineering technology could be used to solve given problem.
C384.4	Understand the key concerns, practices, Standard operating procedures protocols and new concepts of the company/ industry in which they have worked.

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Department Of Electronics and Communication

EngineeringVision of the Institute

To be a respected and most sought after engineering educational institution engaged in equipping individuals capable of building learning organizations in the new millennium.

Mission of the Institute

To develop competent students with good value systems and face challenges of the continuously changing world.

Vision of the Department

To impart technical education par excellence and prepare leaders to serve the industries and society.

Mission of the Department

Mission 1. To Provide the world with a highly committed and quality conscious engineering workforce.

Mission 2. To Encourage the students to build self-help, Power of initiative, courage to change and create new things.

Mission 3. To inculcate the spirit of cooperation and capacity for organization with special emphasis on their self-reliance and sustainability tomeet ever changing requirements of local and global industries.

Program Educational Objectives

PEO 1.	Graduates apply their knowledge of mathematics and science to identify, analyze and solve problems in the field of Electronics & communication to develop sophisticated communication systems.
PEO	Graduates to design and build up interdisciplinary systems by solving core engineering problems in communication systems which are technically sound, economically feasible and socially acceptable.
PEO	Graduates exhibit desire for life-long learning which directs them to obtain thorough knowledge in their chosen fields and motivate them for higher studies/research.

Program Specific Objectives

PSO 1: An ability to understand the basic core courses of Electronics & Communication Engineering and to relate them to various areas of application like Communication Systems, control system, Signal processing, VLSI and Embedded systems.

PSO 2: Should have capability to apply modern tools to analyze and solve complex designs with optimal solutions for various real-world applications.

PSO 3: Excellent adaptability to changing work environment with good leadership qualities and zeal for social and environmental well-being.

Program Outcomes

1. Engineering knowledge: Apply the knowledge of mathematics, science, engineering fundamentals, and an engineering specialization to the solution of complex engineering problems.

2. Problem analysis: Identify, formulate, review research literature, and analyze complex engineering problems reaching substantiated conclusions using first principles of mathematics, natural sciences, and engineering sciences.

3. Design/development of solutions: Design solutions for complex engineering problems and design system components or processes that meet the specified needs with appropriate consideration for the public health and safety, and the cultural, societal, and environmental considerations.

4. Conduct investigations of complex problems: Use research-based knowledge and research methods including design of experiments, analysis and interpretation of data, and synthesis of the information to provide valid conclusions.

5. Modern tool usage: Create, select, and apply appropriate techniques, resources, and modern engineering and IT tools including prediction and modeling to complex engineering activities with an understanding of the limitations.

6. The engineer and society: Apply reasoning informed by the contextual knowledge to assess societal, health, safety, legal and cultural issues and the consequent responsibilities relevant to the professional engineering practice.

7. Environment and sustainability: Understand the impact of the professional engineering solutions in societal and environmental contexts, and demonstrate the knowledge of, and need for sustainable development.

8. Ethics: Apply ethical principles and commit to professional ethics and responsibilities and norms of the engineering practice.

9. Individual and team work: Function effectively as an individual, and as a member or leader in diverse teams, and in multidisciplinary settings.

10. Communication: Communicate effectively on complex engineering activities with the engineering community and with society at large, such as, being able to comprehend and write effective reports and design documentation, make effective presentations, and give and receive clear instructions.

11. Project management and finance: Demonstrate knowledge and understanding of the engineering and management principles and apply these to one's own work, as a member and leader in a team, to manage projects and in multidisciplinary environments.

12. Life-long learning: Recognize the need for, and have the preparation and ability to engage in independent and life-long learning in the broadest context of technological change.

Course Name: C102 (Basic Electronics-18ELN14/24)

C102.1	Describe the operation of diodes, BJT, FET and operational amplifiers
C102.2	Design and explain the construction of rectifiers, regulators, amplifiers, and oscillators
C102.3	Describe general operating principles of SCRs and its application
C102.4	Explain the working and design of fixed voltage IC regulator using 7805 and a stable oscillator using Timer IC555.
C102.5	Explain the different number systems and their conversions and construct simple combinational and sequential logic circuits using flip-flops.
C102.6	Describe the basic principle of operation of communication systems and mobile phone.

Course Name: C202 (Electronic Instrumentation-17EC32)

C202.1	Describe instrument measurement errors and calculate them
C202.2	Describe the operation of Ammeters, Voltmeters, Multimeters and develop circuits for multirange Ammeters and Voltmeters.
C202.3	Describe functional concepts and operation of Digital voltmeters and instruments to measure voltage, frequency, time, phase difference of signals, rotation speed, capacitance, and pH of solutions.
C202.4	Describe functional concepts and operation of various Analog measuring instruments to measure field Strength, impedance, stroboscopic speed, in/out of phase, Q of coils, insulation resistance.
C202.5	Describe and discuss functioning and types of Oscilloscopes, Signal generators and Transducers.
C202.6	Utilize AC and DC bridges for passive component and frequency measurements.

Course Name: C203 (Analog Electronics-17EC33)

C203.1	Describe the working principle and characteristics of BJT, FET, Single stage, cascaded and feedback amplifiers.
C203.2	Describe the Phase shift, Wien bridge, tuned and crystal oscillators using BJT/FET/UJT
C203.3	Calculate the AC gain and impedance for BJT using re and h parameters models for CE and CC configuration.
C203.4	Determine the performance characteristics and parameters of BJT and FET amplifier using small signal model.
C203.5	Evaluate the efficiency of Class A and Class B power amplifiers and voltage regulators.

C203.6	Describe the Feedback and Oscillator circuits using FET.

Course Name: C204 (Digital Electronics-17EC34)

C204.1	Develop simplified switching equation using Karnaugh Maps and Quine McClusky techniques.
C204.2	Explain the operation of decoders, encoders, multiplexers, demultiplexers, adders, subtractors and comparators.
C204.3	Explain the working of Latches and Flip Flops (SR, D, T and JK).
C204.4	Design Synchronous/Asynchronous Counters and Shift registers using Flip Flops.
C204.5	Develop Mealy/Moore Models and state diagrams for the given clocked sequential circ
C204.6	Apply the knowledge gained in the design of Counters and Registers.

Course Name:C205(Network Analysis -17EC34)

C205.1	Determine currents and voltages using source transformation/ source shifting/ mesh/ nodal analysis and reduce given network using star-delta transformation/ source transformation/ source shifting.
C205.2	Solve network problems by applying Superposition/ Reciprocity/ Thevenin 's/ Norton 's/ Maximum Power Transfer/ Millman 's Network Theorems and electrical laws to reduce circuit complexities and to arrive at feasible solutions.
C205.3	Calculate current and voltages for the given circuit under transient conditions.
C205.4	Apply Laplace transform to solve the given network.
C205.5	Evaluate for RLC elements/ frequency response related parameters like resonant frequency, quality factor, half power frequencies, voltage across inductor and capacitor, current through the RLC elements, in resonant circuits
C205.6	Solve the given network using specified two port network parameter like Z or Y or T or h.

Course Name:C206 (Engineering Electromagnetics-17EC36)

C206.1	Evaluate problems on electric field due to point, linear, volume charges by applying conventional methods or by Gauss law.
C206.2	Determine potential and energy with respect to point charge and capacitance using Laplace equation.
C206.3	Calculate magnetic field, force, and potential energy with respect to magnetic materials.
C206.4	Apply Maxwell 's equation for time varying fields, EM waves in free space and conductors.
C206.5	Evaluate power associated with EM waves using Poynting theorem.
C206.6	Develop the knowledge of Poynting theorem and its application of power flow.

Course Name: C212 (Signals and Systems -17EC42)

C212.1	Classify the signals as continuous/discrete, periodic/aperiodic, even/odd, energy/power, and deterministic/random signals
C212.2	Determine the linearity, causality, time-invariance, and stability properties of continuous and discrete time systems.
C212.3	Compute the response of a Continuous and Discrete LTI system using convolution integral and convolution sum.
C212.4	Determine the spectral characteristics of continuous and discrete time signal using Fourier analysis.
C212.5	Compute Z-transforms, inverse Z- transforms and transfer functions of complex LTI systems.
C212.6	Develop the knowledge of basics for understanding of courses such as signal processing, control system and communication.

Course Name: C213 (Control Systems -17EC43)

C213.1	Develop the mathematical model of mechanical and electrical systems
C213.2	Develop transfer function for a given control system using block diagram reduction techniques and signal flow graph method.
C213.3	Determine the time domain specification s for first and second order systems.
C213.4	Determine the stability of a system in the time domain using Routh-Hurwitz criterion and Root-locus technique.
C213.5	Determine the s stability of a system in the frequency domain u sing Nyquist and bode plots.
C213.6	Develop a control system model in continuous and discrete time using state variable techniques

Course Name:C214(Principles of communication systems-17EC44)

C214.1	Determine the performance of analog modulation schemes in time and frequency domains.
C214.2	Determine the performance of systems for generation and detection of modulated analog signals.
C214.3	Characterize analog signals in time domain as random processes and in frequency domain using Fourier transforms.
C214.4	Characterize the influence of channel on analog modulated signals
C214.5	Determine the performance of analog communication systems.
C214.6	Understand the characteristics of pulse amplitude modulation, pulse position modulation and pulse code modulation systems.

Course Name: C215 (Linear Integrated Circuits-17EC45)

C215.1	Explain Op-Amp circuit and parameters including CMRR, PSRR, Input & Output Impedances and Slew Rate.
C215.2	Design Op-Amp based Inverting, Non-inverting, Summing & Difference Amplifier, and AC Amplifiers including Voltage Follower.
C215.3	Test circuits of Op-Amp based Voltage/ Current Sources & Sinks, Current, Instrumentation and Precision Amplifiers.
C215.4	Test circuits of Op-Amp based linear and non-linear circuits comprising of limiting, clamping, Sample & Hold, Differentiator/ Integrator Circuits, Peak Detectors, Oscillators and Multiplier & Divider.
C215.5	Design first & second order Low Pass, High Pass, Band Pass, Band Stop Filters and Voltage Regulators using Op-Amps.
C215.6	Explain applications of linear ICs in phase detector, VCO, DAC, ADC and Timer.

Course Name: C216 (Microprocessors-17EC46)

C216.1	Explain the History of evaluation of Microprocessors, Architecture and instruction set of 8086, CISC & RISC, Von-Neumann & Harvard CPU Architecture, Configuration & Timing diagrams of 8086 and Instruction set of 8086.
C216.2	Write 8086 Assembly level programs using the 8086-instruction set
C216.3	Write modular programs using procedures.
C216.4	Write 8086 Stack and Interrupts programming.
C216.5	Interface 8086 to Static memory chips and 8255, 8254, 0808 ADC, 0800 DAC, Keyboard, Display and Stepper motors.
C216.6	Use INT 21 DOS interrupt function calls to handle Keyboard and Display.

Course Name:C301 (Management & Entrepreneurship-15ES51)

C301.1	Understand the fundamental concepts of Management and Entrepreneurship
C301.2	Select a best Entrepreneurship model for the required domain of establishment
C301.3	Describe the functions of Managers, Entrepreneurs and their social responsibilities
C301.4	Compare various types of Entrepreneurs
C301.5	Analyze the Institutional support by various state and central government agencies
C301.6	The small-scale industries and prepare the project report.

Course: C302(Digital Signal Processing -15EC52)

C302.1	Determine response of LTI systems using time domain and DFT techniques.
C302.2	Compute DFT of real and complex discrete time signals.
C302.3	Computation of DFT using FFT algorithms and linear filtering approach.
C302.4	Solve problems on digital filter design and realize using digital computations.

C302.5	Differentiate different Digital filter structures.
C302.6	Design the Digital filters for the given specifications.

Course Name:C303(Verilog HDL-15EC53)

C303.1	Write Verilog programs in gate, dataflow (RTL), behavioral and switch modeling levels of Abstraction.
C303.2	Write simple programs in VHDL in different styles.
C303.3	Design and verify the functionality of digital circuit/system using test benches.
C303.4	Identify the suitable Abstraction level for a particular digital design.
C303.5	Write the programs more effectively using Verilog tasks and directives.
C303.6	Perform timing and delay Simulation.

Course Name:C304(Information Theory & Coding -15EC54)

C304.1	Explain concept of Dependent & Independent Source, measure of information, Entropy, Rate of Information and Order of a source
C304.2	Represent the information using Shannon Encoding, Shannon Fano, Prefix and Huffman Encoding Algorithms
C304.3	Model the continuous and discrete communication channels using input, output and joint probabilities
C304.4	Determine a codeword comprising of the check bits computed using Linear Block codes, cyclic codes & convolutional codes
C304.5	Design the encoding and decoding circuits for Linear Block codes, cyclic codes, convolutional codes, BCH and Golay codes.
C304.6	Compare the performance of digital communication system by evaluating the probability of error for different error correcting codes

Course Name:C305 (Operating System-15EC553)

C305.1	Explain the goals, structure, operation, and types of operating systems.
C305.2	Apply scheduling techniques to find performance factors.
C305.3	Explain organization of file systems and IOCS.
C305.4	Apply suitable techniques for contiguous and non-contiguous memory allocation
C305.5	Describe message passing, deadlock detection and prevention methods.
C305.6	Implementing the concept of scheduling techniques.

Course Name: C306 (Object Oriented Programming Using C++-15EC562)

C306.1	Explain the basics of Object-Oriented Programming concepts.
C306.2	Apply the object initialization and destroy concept using constructors and destructors.
C306.3	Apply the concept of polymorphism to implement compile time polymorphism in programs by using overloading methods and operators.

C306.4	Use the concept of inheritance to reduce the length of code and evaluate the usefulness.
C306.5	Apply the concept of run time polymorphism by using virtual functions, overriding functions and abstract class in programs.
C306.6	Use I/O operations and file streams in programs

Course Name:C311 (Digital Communication-15EC61)

C311.1	Associate and apply the concepts of Bandpass sampling to well specified signals and channels.
C311.2	Analyze and compute performance parameters and transfer rates for low pass and bandpass symbol under ideal and corrupted non-band limited channels.
C311.3	Analyzing of different electrical means of signal
C311.4	Test and validate symbol processing and performance parameters at the receiver under ideal and corrupted bandlimited channels.
C311.5	Demonstrate by simulation and emulation that bandpass signals subjected to corrupted
C311.6	Distorted symbols in a bandlimited channel, can be demodulated and estimated at receiver to meet specified performance criteria

Course Name: C312 (ARM Microcontroller & Embedded Systems-15EC62)

C312.1	Describe the architectural features and instructions of 32-bit microcontroller ARM Cortex M3.
C312.2	Understand the instruction set of ARM Cortex M3 and perform assembly level programming.
C312.3	Apply the knowledge gained for Programming ARM Cortex M3 for different applications.
C312.4	Understand the basic hardware components and their selection method based on the characteristics and attributes of an embedded system.
C312.5	Develop the hardware /software co-design and firmware design approaches
C312.6	Explain the need of real time operating system for embedded system applications.

Course Name:C313(VLSI Design-15EC63)

C313.1	Demonstrate understanding of MOS transistor theory, CMOS fabrication flow and technology scaling.
C313.2	Draw the basic gates using the stick and layout diagrams with the knowledge of physical design aspects
C313.3	Interpret Memory elements along with timing considerations.
C313.4	Demonstrate knowledge of FPGA based system design

C313.5	Interpret testing and testability issues in VLSI Design
C313.6	Analyze CMOS subsystems and architectural issues with the design constraints

Course Name: C314 (Computer Communication Networks - 15EC64)

C314.1	Identify the protocols and services of Data link layer.
C314.2	Identify the protocols and functions associated with the transport layer services.
C314.3	Describe the layering architecture of computer networks and distinguish between the OSI reference model and TCP/IP protocol suite.
C314.4	Distinguish the basic network configurations and standards associated with each network.
C314.5	Construct a network model and determine the routing of packets using different routing algorithms.
C314.6	Analyze different concepts like DNS (Domain Name Systems) and TCP, UDP.

Course Name:C315(Digital Switching Systems-15EC654)

C315.1	Describe the electromechanical switching systems and its comparison with the digital switching.
C315.2	Determine the telecommunication traffic and its measurements.
C315.3	Define the technologies associated with the data switching operations.
C315.4	Describe the software aspects of switching systems and its maintenance.
C315.5	Describe the use of software for the switching and its maintenance
C315.6	Describe the maintenance of Digital Switching System

Course Name:C316(Digital System Design using Verilog-15EC663)

C316.1	Construct the combinational circuits, using discrete gates and programmable logic devices.
C316.2	Describe Verilog model for sequential circuits and test pattern generation.
C316.3	Design a semiconductor memory for specific chip design.
C316.4	Design embedded systems using small microcontrollers, larger CPUs/DSPs, or hard or soft processor cores. ·
C316.5	Synthesize different types of processors that are used in embedded system.
C316.6	Synthesize different types of I/O controllers that are used in embedded system

Course Name:C401(Microwaves and Antennas-15EC71)

C401.1	Describe the use and advantages of microwave transmission
C401.2	Analyze various parameters related to microwave transmission lines and waveguides
C401.3	Identify microwave devices for several applications

C401.4	Analyze various antenna parameters necessary for building an RF system
C401.5	Recommend various antenna configurations according to the applications
C401.6	Analyze horn antenna and various antenna types

Course Name: C402 (Digital Image Processing-15EC72)

C402.1	Understand image formation and the role human visual system plays in perception of gray and color image data.
C402.2	Apply image processing techniques in both the spatial and frequency (Fourier) domains.
C402.3	Design image analysis techniques in the form of image segmentation and to evaluate the Methodologies for segmentation.
C402.4	Conduct independent study and analysis of Image Enhancement techniques.
C402.5	Conduct independent study and analysis of Image Restoration techniques.
C402.6	Design image analysis techniques in the form of Morphological Operations used in digital image processing

Course Name: C403 (Power Electronics-15EC73)

C403.1	Describe the characteristics of different power devices and identify the various applications associated with it.
C403.2	Illustrate the working of power circuit as DC-DC converter
C403.3	Illustrate the operation of inverter circuit and static switches.
C403.4	Determine the output response of a thyristor circuit with various triggering options.
C403.5	Determine the response of controlled rectifier with resistive loads.
C403.6	Determine the response of controlled rectifier with inductive loads.

Course Name:C404 (Multimedia Communication-15EC741)

C404.1	Understand basics of different multimedia networks and applications.
C404.2	Understand different compression techniques to compress audio and video.
C404.3	Describe multimedia Communication across Networks.
C404.4	Analyze different media types to represent them in digital form.
C404.5	Compress different types of text using different compression techniques and analyze DMS.
C404.6	Compress different types of images using different compression techniques and analyze DMS.

Course Name:C405 (Satellite Communication-15EC755)

C405.1	Describe the satellite orbits and its trajectories with the definitions of parameters associated with it.
C405.2	Describe the electronic hardware systems associated with the satellite subsystem and earth station.
C405.3	Describe the various applications of satellite with the focus on national satellite system.
C405.4	Compute the satellite link parameters under various propagation conditions with the illustration of multiple access techniques.
C405.5	Describe the various technologies associated with the satellite communication.
C405.6	Describe the communication satellite and the national satellite system

Course Name:C411 (Wireless Cellular and LTE 4G Broadband-15EC81)

C411.1	Understand the system architecture and the functional standard specified in LTE 4G.
C411.2	Analyze the role of LTE radio interface protocols and EPS Data convergence protocols to set up, reconfigure and release data and voice from users.
C411.3	Demonstrate the UTRAN and EPS handling processes from set up to release including mobility management for a variety of data call scenarios.
C411.4	Test and Evaluate the Performance of resource management and packet data processing and transport algorithms.
C411.5	Describe the system architecture of LTE and E-UTRAN, the layer of LTE, based on the use of OFDMA and SC-FDMA principles.
C411.6	Analyze the main factors affecting LTE performance including mobile speed and transmission bandwidth.

Course Name:C412 (Fiber Optics and networks-15EC82)

C412.1	Classification and working of optical fiber with different modes of signal propagation.
C412.2	Describe the transmission characteristics and losses in optical fiber communication.
C412.3	Describe the construction and working principle of optical connectors, multiplexers and amplifiers.
C412.4	Describe the constructional features and the characteristics of optical sources and detectors.
C412.5	Illustrate the networking aspects of optical fiber and describe various standards associated with it.
C412.6	Describe the optical components and its applications in optical communication networks.

Course Name:C413 (RADAR Engineering-15EC833)

C413.1	Appreciate the technologies related to Micro Electromechanical Systems.
C413.2	Understand design and fabrication processes involved with MEMS devices.

C413.3	Analyze the MEMS devices and develop suitable mathematical models
C413.4	Know various application areas for MEMS device
C413.5	Describe the working of various radar transmitters and receivers.
C413.6	Analyze the range parameters of pulse radar system which affect the system performance.

CHILDREN'S EDUCATION SOCIETY (Regd.)
THE OXFORD COLLEGE OF ENGINEERING
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Department of Electrical and Electronics

EngineeringVision of the Institute

To be a respected and most sought after engineering educational institution engaged in equipping individuals capable of building learning organizations in the new millennium.

Mission of the Institute

To develop competent students with good value systems and face challenges of the continuously changing world.

Vision of the Department

To meet the educational and research needs of the student community and staff through collaboration with other academic and technical institutions, industry and government agencies and make the students to face problems of the country and society.

Mission of the Department

M1 - To develop and train competent Electrical and Electronics Engineers with adequate practical skills.

M2 - To provide state-of-the-art resources that contribute to achieve excellence in teaching-learning, research, and development activities.

M3 - To inculcate, ethics, leadership, moral values, and social activities.

Program Educational Objectives

PEO	Be able to apply the fundamental knowledge of mathematics, science, electrical and electronics engineering to analyze and solve the complex problem in electrical, electronics and allied interdisciplinary areas.
PEO	Possess good leadership skills, function ethically in multidisciplinary areas to develop sustainable solutions for global, environmental, and social issues.
PEO	Be able to inculcate lifelong learning to maintain and enhance professional skills.

Program Specific Objectives

PSO 1: Apply fundamental knowledge to identify, formulate, design, and investigate various problems of electrical and electronic circuits, power electronics, control systems and power systems.

PSO 2: Apply modern software tools for design, simulation, and analysis of electrical systems to engage in life- long learning and to successfully adapt in multi-disciplinary environments.

PSO 3: Solve ethically and professionally various Electrical Engineering problems in societal and environmental context and communicate effectively by applying project management techniques to complex engineering problems.

Program Outcomes

1. Engineering knowledge: Apply the knowledge of mathematics, science, engineering fundamentals, and an engineering specialization to the solution of complex engineering problems.

2. Problem analysis: Identify, formulate, review research literature, and analyze complex engineering problems reaching substantiated conclusions using first principles of mathematics, natural sciences, and engineering sciences.

3. Design/development of solutions: Design solutions for complex engineering problems and design system components or processes that meet the specified needs with appropriate consideration for the public health and safety, and the cultural, societal, and environmental considerations.

4. Conduct investigations of complex problems: Use research-based knowledge and research methods including design of experiments, analysis and interpretation of data, and synthesis of the information to provide valid conclusions.

5. Modern tool usage: Create, select, and apply appropriate techniques, resources, and modern engineering and IT tools including prediction and modeling to complex engineering activities with an understanding of the limitations.

6. The engineer and society: Apply reasoning informed by the contextual knowledge to assess societal, health, safety, legal and cultural issues and the consequent responsibilities relevant to the professional engineering practice.

7. Environment and sustainability: Understand the impact of the professional engineering solutions in societal and environmental contexts, and demonstrate the knowledge of, and need for sustainable development.

8. Ethics: Apply ethical principles and commit to professional ethics and responsibilities and norms of the engineering practice.

9. Individual and team work: Function effectively as an individual, and as a member or leader in diverse teams, and in multidisciplinary settings.

10. Communication: Communicate effectively on complex engineering activities with the engineering community and with society at large, such as, being able to comprehend and write effective reports and design documentation, make effective presentations, and give and receive clear instructions.

11. Project management and finance: Demonstrate knowledge and understanding of the engineering and management principles and apply these to one's own work, as a member and leader in a team, to manage projects and in multidisciplinary environments.

12. Life-long learning: Recognize the need for, and have the preparation and ability to engage in independent and life-long learning in the broadest context of technological change.

Course Name: 17EE32/ELECTRIC CIRCUIT ANALYSIS

C232.1	Understand the basic concepts, basic laws, reduce the complexity of the network using source transformation and source shifting, network reduction using star/delta transformations and understand the analysis of dc and ac networks
C232.2	Discuss the resonance in series and parallel circuits
C232.3	Solve complex electric circuits using superposition, Thevenin's and Norton's theorems
C232.4	Solve complex electric circuits using Reciprocity, Millman's and Maximum power transfer theorems
C232.5	Synthesize typical waveforms using Laplace transforms
C232.6	Evaluate the performance of two port networks and transient analysis

Course Name: 17EE33–Transformers and Generators

C233.1	Understand the construction and operation of 1-phase, 3-Phase transformers, and Autotransformer.
C233.2	Analyze the performance of transformers by polarity test, Sumner's Test, phase conversion, 3-phase connection, and parallel operation.
C233.3	Understand the construction and working of AC and DC Generators.
C233.4	Analyze the performance of the AC Generators on infinite bus and parallel operation.
C233.5	Determine the regulation of AC Generator by Slip test, EMF, MMF, and ZPF Methods.
C233.6	Performance of Synchronous Generators, Power angle characteristics.

Course Name: Analog Electronic Circuits / 17EE34

C234.1	Utilize the characteristics of transistor for different applications.
C234.2	Design and analyze biasing circuits for transistor.
C234.3	Observe the effect of negative feedback, different types of negative feedback topologies.
C234.4	Design and analyze and test transistor circuitry as amplifiers and oscillators.
C234.5	Design and working of different oscillators using BJT's.
C234.6	Develop the ability to understand the design and working of FET amplifiers.

SUBJECT CODE / SUBJECT NAME: 17EE35– Digital System Design

C235.1	Develop simplified switching equation using Karnaugh Maps
C235.2	Develop simplified switching equation using Quine McClusky techniques and Design of Adder circuits
C235.3	Design Multiplexer, Encoder, Decoder, Subtractors and Comparator as digital combinational control circuits.
C235.4	Design flip flops, counters, shift registers as sequential control circuits

C235.5	Design of Counters
C235.6	Develop Mealy/Moore Models and state diagrams for the given clocked sequential circuits and Explain the functioning of Read only and Read/Write Memories, Programmable ROM, EPROM and Flash memory

Course Name: 17EE36 - Electrical &Electronics Measurements

C236.1	Measure resistance, inductance and capacitance using bridges and determine earth resistance.
C236.2	Construction and operation of single-phase and three phase Electrodynamometer P.Fmeter, Weston frequency meter and Phase sequence indicator
C236.3	Explain the working of various meters used for measurement of Power, Energy & understand the adjustments, calibration & errors in energy meters.
C236.4	Understand methods of extending the range of instruments & instrument transformers
C236.5	Explain the working of different electronic instruments
C236.6	Explain the working of different display and recording devices

Course Name: 17EEL37–Electrical Machines Lab

C237.1	Evaluate the performance of transformers from the test data obtained.
C237.2	Connect and operate two single phase transformers of different KVA rating in parallel.
C237.3	Connect single phase transformers for three phase operation and phase conversion.
C237.4	Compute the voltage regulation of synchronous generator using the test data obtained in the laboratory.
C237.5	Evaluate the performance of synchronous generators from the test data and assess the performance of synchronous generator connected to infinite bus.
C237.6	Evaluate the performance of transformers from the test data obtained.

Course Name: 17EEL38–Electronics Lab

C238.1	Design and test rectifier circuits with and without capacitor filters
C238.2	Determine h-parameter models of transistor for all modes
C238.3	Design and test BJT and FET amplifier and oscillator circuits.
C238.4	Realize Boolean expressions using gates
C238.5	Realize adders and subtractors using gates
C238.6	Design a sequential Circuits using gates

SUBJECT CODE / SUBJECT NAME: 17EE42 – Power Generation and Economics

C242.1	Explain factors of site selection, arrangement of hydroelectric plant.
C242.2	Working of hydroelectric plant and major equipment of plant.
C242.3	Stem diesel and gas power plant operation.
C242.4	Nuclear power plants and site operation, components, factors of site selection.

C242.5	Substation components need, grounding methods.
C242.6	Economic aspects of power system operation and PF improvement

Course Name: Transmission and Distribution / 17EE43

C243.1	Understand the concepts of various methods of generation of power.
C243.2	Parameters associated with transmission line.
C243.3	Design and analyze the overhead transmission line for different configuration.
C243.4	Calculate the parameters of transmission line for different configuration.
C243.5	Understand the use of underground cable.
C243.6	Evaluate different types of distributors.

Course Name: Electric Motors / 17EE44

C244.1	Explain the constructional features of motors and drive for specific applications.
C244.2	Analysis the performance characteristic of DC motors.
C244.3	Explain the constructional features of 3-phase and single-phase induction motors.
C244.4	Control the speed of induction motor by suitable method
C244.5	Explain the operation of synchronous motor and special motors.
C244.6	Control the speed of motor by suitable method.

Course Name: Field theory / 17EE45

C245.1	To study different coordinate systems for understanding the concept of gradient, divergence, and curl of a vector.
C245.2	To study, apply coulomb's law and gauss laws for electric field produced by different charge configuration.
C245.3	To evaluate the energy and potential due to a system of charges.
C245.4	To study the behavior of electric field across a boundary between a conductor and dielectric and between two different dielectrics.
C245.5	To study the magnetic fields and magnetic materials.
C245.6	To study the time varying fields and propagation of wave of different media.

Course Name:Opamp / 17EE46

C246.1	Explain the representation, characteristics and equivalent circuit and application.
C246.2	Designing of first, second order filters, voltage regulators using OPAMP.
C246.3	Use of OPAMP in signal generation, comparator, and converter circuits.
C246.4	Use of OPAMP in signal processing, A/D and D /A converter circuits.
C246.5	Discussion of PLL, its components and performance factors.
C246.6	Discussion of 555 timers an its application in signal generation.

Course Name: Electrical Machines Lab – 2 / 17EEL47

C247.1	Test dc machines to determine their characteristics
C247.2	Control the speed of dc motor
C247.3	Pre-determine the performance characteristics of dc machines by conducting suitable tests.
C247.4	Perform load test on single phase and three phase induction motor to assess its performance
C247.5	Conduct test on induction motor to pre-determine the performance characteristics
C247.6	Conduct test on synchronous motor to draw the performance curves.

Course Name: Opamp & LIC Laboratory / 17EEL48

C247.1	To conduct experiment to determine the characteristic parameters of OP-Amp
C247.2	To design test the OP-Amp as Amplifier, adder, subtractor, differentiator and integrator
C247.3	To design test the OP-Amp as oscillators and filters.
C247.4	Design and study of Linear ICs as multivibrator power supplies.
C247.5	Use of OPAMP in signal generation, comparator, and converter circuits.
C247.6	Use of OPAMP in signal processing, A/D and D /A converter circuits.

Course Name: 15EE51 - Management & Entrepreneurship

C351.1	Able to discuss Management & Administration with Early, Modern approaches and demonstrate the planning process & decision making
C351.2	Able to explain organizational concept & recruitment process and illustrate leadership, motivational theories &teamwork
C351.3	Able to describe and choose concepts of Entrepreneurship, small scale industry in economic development of a nation.
C351.4	Able to identify the institutional (financial and technical) supports agencies and prepare project report

Course Name: 15EE52 – Microcontroller

C352.1	Internal architecture, its feature and memory organization of 8051 microcontroller.
C352.2	Addressing modes, I/O port programming, Arithmetic, and logical programs.
C352.3	C programs for time delay, I/O operations, data conversions.
C352.4	Hardware connections, timers, serial data communication and interfacing.
C352.5	8051 interrupts, interfacing with LCD's, ADC, DAC, and sensors.
C352.6	Interface 8051 with 8255 chip, ports, and relays, opto isolators and motors.

Course Name: 15EE53–POWER ELECTRONICS

C353.1	Explain application of power electronics, types, switching characteristics.
C353.2	Explain the types of power diodes, effects with RL circuits.

C353.3	Techniques for design, operation, and analysis of single-phase rectifier.
C353.4	Explain steady state, switching characteristics, gate circuit requirement.
C353.5	Discuss different types of Thyristors, characteristics.
C353.6	Design, analysis of Thyristor controlled rectifiers.

Course Name: 15EE54 – Signals and Systems

C354.1	Basic operations on signals and properties of system.
C354.2	Provide block diagram representation of linear time invariant systems.
C354.3	Evaluate response of given Linear time invariant system.
C354.4	Use convolution in C.T and D.T for the given impulse response.
C354.5	Represent C.T.F.T and D.T.F.T for linear time invariant system.
C354.6	Represent Z-transform for the analysis of D.T system.

Course Name: 15EE553 – Electrical Estimation & Costing

C355.1	Explain the purpose of estimation and costing.
C355.2	Discuss AE act and IE rules.
C355.3	Discuss energy distribution in a building, wiring, cable, fuses, lightning, points, circuits, sub circuits.
C355.4	Discuss types of service mains and estimation of service mains and power circuits.
C355.5	Discuss estimation of overhead transmission and distribution system and its components.
C355.6	Discuss main components of substation, preparation of single line diagram and ear thing of a substation.

Course Name: 15EE563 – Renewable Energy Sources

C356.1	Discuss energy scarcity, solution, availability of renewable energy.
C356.2	Explain about sun, earth relationship, types of solar collectors.
C356.3	Discuss solar cell components, characteristics, application, and configuration.
C356.4	Discuss hydrogen, wind energy production, site selection, storage.
C356.5	Discuss biomass, biogas composition types, production, advantages, and disadvantages.
C356.6	Discuss availability, generation, devices for tidal, sea wave and wave and ocean thermal energy.

Course Name: 15EEL57 – Microcontroller Lab

C357.1	Write assembly language programs for data transfer, arithmetic, Boolean and logical instructions.
C357.2	Write ALP for code conversions
C357.3	Write ALP using subroutines for generation of delays, counters, configuration of SFRs for serial communication and timers.

C357.4	Perform interfacing of stepper motor and dc motor for controlling the speed
C357.5	Generate different waveforms using DAC interface.
C357.6	Work with a small team to carryout experiments using microcontroller concepts and prepare reports that present lab work.

Course Name: 15EEL58 – Power Electronics Lab

C358.1	Obtain static characteristics of semiconductor devices to discuss their performance
C358.2	Trigger the SCR by different methods
C358.3	Verify the performance of single phase controlled full wave rectifier and AC voltage controller with R and RL loads.
C358.4	Control the speed of a dc motor, universal motor, and stepper motors
C358.5	Verify the performance of single-phase full bridge inverter connected to resistive load
C358.6	Perform commutation of SCR by different methods

Course Name: Control Systems / 15EE61

C361.1	Discuss the effect of feedback and types of control systems, evaluate the transfer
	function.
C361.2	Evaluate the stability of linear time invariant systems.
C361.3	Apply block diagram manipulation and signal flow graph.
C361.4	Demonstrate the model of control system using mathematical modeling.
C361.5	Determine the transient and steady state time response.
C361.6	Investigate the performance of the given system in time and frequency domain-based design of controller or compensator configuration.

Course Name: Power System Analysis / 15EE62

C362.1	Can Explain Per unit, one line diagram.
C362.2	Can Perform short circuit analysis of Machines and Power systems.
C362.3	Can evaluate symmetrical components of voltages and currents.
C362.4	Can analyze sequence impedance and networks.
C362.5	Can analyze the dynamics of synchronous machines and stability.
C362.6	Can show the analysis of equal area criterion.

Course Name: Digital Signal Processing / 15EE63

C363.1	Compute the DFT of various signals using its properties.
C363.2	Use the DFT to compute the linear and circular convolution and linear filters of long sequence.
C363.3	Apply fat and efficient algorithm for computing DFT and IDFT.
C363.4	Design of IIR Butterworth digital filters using impulse invariant/BT.
C363.5	Design of IIR digital filter using Impulse invariant/Bilinear transformation.

C363.6	Design of FIR filters using wind functions and frequency sampling method and realization of IIR and FIR filters

Course Name: Electrical Machine Design / 15EE64

C364.1	To know the properties of electrical and magnetic materials.
C364.2	To design the machines as in modern trend.
C364.3	Selection of loading for various machines
C364.4	To discuss the main dimensions of machines.
C364.5	To discuss design of AC and DC machines.
C364.6	To know the short circuit ration and performance.

Course Name: Computer Aided Electrical Drawing / 15EE651

C365.1	Discuss the terminology and types of DC and AC armature windings.
C365.2	Develop armature winding diagram for AC and DC machines.
C365.3	Develop layout of substation using standard symbols.
C365.4	Draw sectional views of transformer using design data.
C365.5	Draw sectional views of assembled DC machine or its parts.
C365.6	Draw sectional views of assembled alternator or its parts.

Course Name: Sensors and Transducers / 15EE662

C366.1	Discuss need of transducers, classification, advantages, disadvantages, working.
C366.2	Discuss recent trends in sensor technologies of their selection.
C366.3	Discuss basics of signal codes equipment.
C366.4	Discuss configuration of DAS and data conversion.
C366.5	Show knowledge of data transmission &telemetry.
C366.6	Express measurement of non-electrical quantities.

Course Name: Control Systems Lab / 15EEL67

C367.1	Use software package or discrete components in assessing the time and frequency domain reposes of a given second order system
C367.2	Design and analyze Lead, Lag and Lag – Lead compensators for given specifications.
C367.3	Determine the performance characteristics of ac and dc servomotors and synchro-transmitter receiver pair used in control systems
C367.4	Simulate the DC position and feedback control system to study the effect of P, PI, PD and PID controller and Lead compensator on the step response of the system
C367.5	Write a script files to plot root locus, bode plot, Nyquist plots to study the stability of the system using a software package
C367.6	Work with a small team to carryout experiments and prepare reports that present lab work.

Course Name: Digital Signal Processing Lab / 15EEL68

C368.1	Give physical interpretation of sampling theorem in time and frequency domains
C368.2	Evaluate the impulse response of a system
C368.3	Perform convolution of given sequences to evaluate the response of a system
C368.4	Compute DFT and IDFT of a given sequence using the basic definition and/or fast methods
C368.5	Provide a solution for a given difference equation.
C368.6	Conduct experiments using software and prepare reports that present lab work

Course Name: 15EE71 - Power System Analysis-2

C471.1	Formulate network matrices and models for solving load problems
C471.2	Perform steady state power flow analysis of power systems using numerical iterative methods
C471.3	Suggest a method to control voltage profile
C471.4	Show knowledge of optimal operation on busbar, optimal UC, optimal scheduling for hydrothermal
C471.5	Analyze short circuit faults in power system networks using z bus matrix.
C471.6	Perform numerical solution of swing equation for multi machine stability.

Course Name: 15EE72 - Power System Protection

C472.1	To discuss the performance of protective relays, components of protection scheme and relay terminology and to explain relay construction and operating principles
C472.2	To explain overcurrent protection using electromagnetic and static relays and overcurrent protective schemes
C472.3	To discuss types of electromagnetic and static distance relays, effect of arc resistance, power swings, line length and source impedance on performance of various differential relays for differential protection.
C472.4	To discuss pilot protection, wire pilot relaying and carrier pilot relaying, and also to discuss construction, operating principles and performance of various differential relays for differential protection.
C472.5	To discuss protection of generators, motors, transformer and bus zone protection
C472.6	To explain the principle of circuit interruption and different types of circuit breakers and to describe the construction and operating principle of different types of fuses and to give the definitions of different terminologies related to a fuse

Course Name: 15EE73 – HIGH VOLTAGE ENGG

C473.1	Explain conduction and breakdown phenomenon in gases, liquid dielectrics.
C473.2	Explain breakdown phenomenon in solid dielectrics.
C473.3	Explain generation of high voltages and currents

C473.4	Discuss measurement techniques for high voltages and currents.
C473.5	Discuss overvoltage phenomenon and insulation coordination in electric power systems.
C473.6	Discuss non-destructive testing of materials and electric apparatus and high-voltage testing of electric apparatus

Course Name: 15EE742 – Utilization of Electrical Energy

C4742.1	Discuss electric heating, air-conditioning and electric welding.
C4742.2	Explain laws of electrolysis, extraction and refining of metals and electro deposition.
C4742.3	Design interior and exterior lighting systems- illumination levels for factory lighting-flood lighting street lighting.
C4742.4	Discuss systems of electric traction, speed time curves and mechanics of train movement.
C4742.5	Explain the motors used for electric traction and their control and Discuss braking of electric motors, traction systems and power supply and other traction systems.
C4742.6	Explain the working of electric and hybrid electric vehicles.

Course Name: Testing and Commissioning of Power System Apparatus/ 15EE752

C4752.1	Describe the process to plan, control and implement commissioning of electrical equipment's.
C4752.2	Differentiate the performance specifications of transformer and induction motor.
C4752.3	Demonstrate the routine tests for synchronous machine, induction motor, transformer & switchgears
C4752.4	Describe corrective and preventive maintenance of electrical equipment's.
C4752.5	Explain the operation of an electrical equipment's such as isolators, circuit breakers
C4752.6	Explain the operation induction motor and synchronous machines

Course Name: 15EEL76-Power System Simulation Lab

C476.1	Develop a program in MATLAB to assess the performance of medium and long transmission lines.
C476.2	Develop a program in MATLAB to obtain the power angle characteristics of salient and non-salient pole alternator and assess the transient stability under three phase faults at different locations in a of radial power systems.
C476.3	Develop programs in MATLAB to formulate bus admittance and bus impedance matrices of interconnected power systems.
C476.4	Use Mi-Power package to solve power flow problem for simple power systems.
C476.5	Use Mi-Power package to study unsymmetrical faults at different locations in radial power systems

C476.6	Use of Mi-Power package to study optimal generation scheduling problems for thermal power plants

Course Name: 15EEL77-High Voltage &Relay Lab

C477.1	Experimentally verify the characteristics of over current, over voltage, under voltage and negative sequence relays both electromagnetic and static type
C477.2	Experimentally verify the characteristics of microprocessor based over current, over voltage, under voltage relays and distance relay. Show knowledge of protecting
C477.3	Analyze the spark over characteristics for both uniform and non-uniform configurations using High AC and DC voltages.
C477.4	Measure high AC and DC voltages and breakdown strength of transformer oil.
C477.5	Draw electric field and measure the capacitance of different electrode configuration models.
C477.6	Show knowledge of generating standard lightning impulse voltage to determine efficiency, energy of impulse generator and 50% probability flashover voltage for air insulation.

Course Name: 15EEP78-Project Work – Phase 1

C478.1	Demonstrate a sound technical knowledge of their selected project topic
C478.2	Undertake problem identification, formulation, and solution.
C478.3	Design engineering solutions to complex problems utilizing a systems approach.
C478.4	Communicate with engineers and the community at large in written an oral form.
C478.5	Demonstrate the knowledge &skills of a professional engineer.
C478.6	Demonstrate the attitudes of a professional engineer.

Course Name: Power System Operation and control / 15EE81

C481.1	Describe various levels of controls in power systems, the vulnerability of the system, components, architecture, and configuration of SCADA and Solve unit commitment problems
C481.2	Explain issues of hydrothermal scheduling and solutions to hydrothermal problems
C481.3	Explain basic generator control loops, functions of Automatic generation control, speed governors
C481.4	Develop and analyze mathematical models of Automatic Load Frequency Control
C481.5	Explain automatic generation control, voltage, and reactive power control in an interconnected power system.
C481.6	Explain reliability, security, contingency analysis, state estimation and related issues of power systems.

Course Name: Industrial Drives / 15EE82

C482.1	Explain the advantages and choice of electric drive.
C482.2	Explain dynamics and different modes of operation of electric drives.
C482.3	Analyze the performance of induction motor drives under different conditions.
C482.4	Control induction motor, synchronous motor, and stepper motor drives.
C482.5	Suggest a motor for a drive and control of dc motor using controlled rectifiers
C482.6	Suggest a suitable electrical drive for specific application in the industry

Course Name: Smart Grid / 15EE831

C4831.1	Discuss the progress made by different stakeholders in the design and development of smart grid and Explain measurement techniques using Phasor Measurement Units and smart meters
C4831.2	Discuss tools for the analysis of smart grid and design, operation, and performance
C4831.3	Discuss classical optimization techniques and computational methods for smart grid design, planning, and operation.
C4831.4	Explain predictive grid management and control technology for enhancing the smart grid performance
C4831.5	Discuss the computational techniques, communication, measurement, and monitoring technology tools essential to the design of the smart grid.
C4831.6	Explain methods to promote smart grid awareness and making the existing transmission system smarter by investing in new technology

Course Name: Internship / 15EE84

C484.1	Gain practical experience within industry in which the internship is done
C484.2	Apply knowledge and skills learned to classroom work
C484.3	Develop a greater understanding about career options while more clearly defining personal career goals
C484.4	Develop and refine oral and written communication skills.
C484.5	Expand intellectual capacity, credibility, judgment, intuition.
C484.6	Acquire the knowledge of administration, marketing, finance, and economics

Course Name: Project Work/ 15EEP85

C485.1	Present the project and be able to defend it
C485.2	Make links across different areas of knowledge and to generate, develop and evaluate ideas and information so as to apply these skills to the project task
C485.3	Habituated to critical thinking and use problem solving skills
C485.4	Communicate effectively and to present ideas clearly and coherently in both the written and oral forms
C485.5	Work in a team to achieve common goal.

C485.6	Learn on their own, reflect on their learning and take appropriate actions to improve it

Course Name: Seminar/ 15EES86

C486.1	Attain, use, and develop knowledge in the field of electrical and electronics engineering and other disciplines through independent learning and collaborative study
C486.2	Identify, understand, and discuss current, real-time issues
C486.3	Improve oral and written communication skills
C486.4	Explore an appreciation of the self in relation to its larger diverse social and academic contexts.
C486.5	Apply principles of ethics and respect in interaction with others
C486.6	Work in a team to achieve common goal.

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Department of Information

ScienceVision of the Institute

To be a respected and most sought after engineering educational institution engaged in equipping individuals capable of building learning organizations in the new millennium.

Mission of the Institute

To develop competent students with good value systems and face challenges of the continuously changing world.

Vision of the Department

To meet the educational, research & service needs of the region through collaboration with academic, technical institutions, businesses, government agencies & cultural organizations, thereby, providing a platform that encourages students & faculty to continue their intellectual & professional growth.

Mission of the Department

To develop the best Information Science Professionals, who work creatively, communicate effectively & become technologically competent and to mould them into good citizens by inculcating sense ethical values in them.

Program Educational Objectives

PEO 1.	Be capable of understanding, analyzing, and applying current & emerging technologies to design and develop solutions to IT/ITES/Software/Telecom related problems and acquire value and employment.
PEO 2.	To have sound foundation in mathematical, scientific and Information science engineering fundamentals necessary to formulate, solve and analyze practical problems and to prepare students for further studies and research.
PEO 3.	Function effectively as individuals and team members in the workplace, growing into highly technical or project management and leadership roles, in various organizations. Create an awareness of the life-long learning process, to communicate effectively, learn necessary tools to successfully identify and adapt to ever changing technologies, by ethical means and code of professional practice.

Program Specific Objectives

PSO 1.	Provide effective and efficient real time solutions with the application of knowledge in IT, ITES, Networking and Software domains.
PSO 2.	Demonstrate the ability to work in a team, with professional ethics, good communication and documentation skills in designing, implementation and management of software products and services, at optimal cost. Proven capability to exchange views/concepts, incubate ideas and to carry out lifelong learning with zeal, to be aware of the state of art technologies and their development.

Program Outcomes

1. Engineering knowledge: Apply the knowledge of mathematics, science, engineering fundamentals, and an engineering specialization to the solution of complex engineering problems.

2. Problem analysis: Identify, formulate, review research literature, and analyze complex engineering problems reaching substantiated conclusions using first principles of mathematics, natural sciences, and engineering sciences.

3. Design/development of solutions: Design solutions for complex engineering problems and design system components or processes that meet the specified needs with appropriate consideration for the public health and safety, and the cultural, societal, and environmental considerations.

4. Conduct investigations of complex problems: Use research-based knowledge and research methods including design of experiments, analysis and interpretation of data, and synthesis of the information to provide valid conclusions.

5. Modern tool usage: Create, select, and apply appropriate techniques, resources, and modern engineering and IT tools including prediction and modeling to complex engineering activities with an understanding of the limitations.

6. The engineer and society: Apply reasoning informed by the contextual knowledge to assess societal, health, safety, legal and cultural issues and the consequent responsibilities relevant to the professional engineering practice.

7. Environment and sustainability: Understand the impact of the professional engineering solutions in societal and environmental contexts, and demonstrate the knowledge of, and need for sustainable development.

8. Ethics: Apply ethical principles and commit to professional ethics and responsibilities and norms of the engineering practice.

9. Individual and team work: Function effectively as an individual, and as a member or leader in diverse teams, and in multidisciplinary settings.

10. Communication: Communicate effectively on complex engineering activities with the engineering community and with society at large, such as, being able to comprehend and write effective reports and design documentation, make effective presentations, and give and receive clear instructions.

11. Project management and finance: Demonstrate knowledge and understanding of the engineering and management principles and apply these to one's own work, as a member and leader in a team, to manage projects and in multidisciplinary environments.

12. Life-long learning: Recognize the need for, and have the preparation and ability to engage in independent and life-long learning in the broadest context of technological change.

Course Name: C202 Data Structures and Applications 18CS32

C202.1	Use different types of data structures, operations, and algorithms
C202.2	Apply searching and sorting operations on files
C202.3	Use stack, Queue, Lists, Trees and Graphs in problem-solving
C202.4	Implement all data structures in a high-level language for problem-solving.

Course Name: C203 Analog and Digital Electronics 18CS33

C203.1	Design and analyze application of analog circuits using photo devices, timer IC, power supply and regulator IC and op-amp.
C203.2	Explain the basic principles of A/D and D/A conversion circuits and develop the same.
C203.3	Simplify digital circuits using Karnaugh Map, and Quine-McCluskey Method
C203.4	Explain Gates and flip flops and make us in designing different data processing circuits, registers and counters and compare the types.
C203.5	Develop simple Deprograms

Course Name: C234 Computer Organization 18CS34

C234.1	Explain the basic organization of a computer system.
C234.2	Demonstrate functioning of different sub systems, such as processor, Input/output, and memory
C234.3	Illustrate hardwired control and micro programmed control, pipelining, embedded and other computing systems.
C234.4	Design and analyze simple arithmetic and logical units.

Course Name:C205Software Engineering 18CS35

C205.1	Design a software system, component, or process to meet desired needs within realistic constraints.
C205.2	Assess professional and ethical responsibility
C205.3	Function on multi-disciplinary teams
C205.4	Use the techniques, skills, and modern engineering tools necessary for engineering practice
C205.5	Analyze, design, implement, verify, validate, implement, apply, and maintain software systems or parts of software systems

Course Name:C206 Discrete Mathematical Structures 18CS36

C206.1	Use propositional and predicate logic in knowledge representation and truth verification.
C206.2	Demonstrate the application of discrete structures in different fields of computer science.
C206.3	Solve problems using recurrence relations and generating functions.
C206.4	Application of different mathematical proofs techniques in proving theorems in the courses.
C206.5	Compare graphs, trees, and their applications.

Course Name: C212 Design and Analysis of Algorithms 18CS42

C212.1	Describe computational solution to well-known problems like searching, sorting etc.
C212.2	Estimate the computational complexity of different algorithms
C212.3	Devise an algorithm using appropriate design strategies for problem solving

Course Name: C213 Operating Systems 18CS43

C213.1	Demonstrate need for OS and different types of OS
C213.2	Apply suitable techniques for management of different resources
C213.3	Use processor, memory, storage, and file system commands
C213.4	Realize the different concepts of OS in platform of usage through case studies

Course Name:C214 Microcontroller and Embedded Systems

C214.1	Describe the architectural features and instructions of ARM microcontroller
C214.2	Apply the knowledge gained for Programming ARM for different applications.
C214.3	Interface external devices and I/O with ARM microcontroller.
C214.4	Interpret the basic hardware components and their selection method based on the characteristics and attributes of an embedded system.
C214.5	Develop the hardware /software co-design and firmware design approaches.
C214.6	Demonstrate the need of real time operating system for embedded system applications

Course Name: C215 Object Oriented Concepts 18CS45

C215.1	Explain the object-oriented concepts and JAVA.
C215.2	Develop computer programs to solve real world problems in Java.
C215.3	Develop simple GUI interfaces for a computer program to interact with users, and to understand the event-based GUI handling principles using swings.

Course Name: C216 Data Communication 18CS46

C216.1	Explain the various components of data communication.
C216.2	Explain the fundamentals of digital communication and switching.
C216.3	Compare and contrast data link layer protocols.
C216.4	Summarize IEEE 802.xxstandards

Course Name:C301 (Management & Entrepreneurship-17CS51**)**

C301.1	Define management, organization, entrepreneur, planning, staffing, ERP and outline their importance in entrepreneurship
C301.2	Utilize the resources available effectively through ERP
C301.3	Make use of IPRs and institutional support in entrepreneurship

Course: C302 Computer Networks

C302.1	Explain principles of application layer protocols
C302.2	Outline transport layer services and infer UDP and Protocols
C302.3	Classify routers, IPand Routing Algorithms in network layer
C302.4	Explain the Wireless and Mobile Networks covering IEEE 802.11Standard

Course Name:C303 Database Management System 18CS51

C303.1	Define management, organization, entrepreneur, planning, staffing, ERP and outline their importance in entrepreneurship
C303.2	Utilize the resources available effectively through ERP
C303.3	Make use of IPRs and institutional support in entrepreneurship

Course Name:C304 Automata Theory and Computability17CS54

C304.1	Explain how to translate between different models of Computation (e.g., Deterministic and Non-deterministic and Software models).
C304.2	Interpret Grammars and Automata (recognizers) for different language classes and become knowledgeable about restricted models of Computation (Regular, Context Free) and their relative powers.
C304.3	Develop skills in formal reasoning and reduction of a problem to a formal model, with an emphasis on semantic precision and conciseness.
C304.4	Classify a problem with respect to different models of Computation

Course Name:C305 Object Oriented Modeling and Design17CS551

C305.1	Describe the concepts of object-oriented and basic classmodelling.
C305.2	Draw class diagrams, sequence diagrams and interaction diagrams to solve problems.
C305.3	Choose and apply a befitting design pattern for the given problem.

Course Name: C306 ADVANCED JAVA AND J2EE17CS553

C306.1	Interpret the need for advanced Java concepts like enumerations and collections in developing modular and efficient programs
C306.2	Build client-server applications and TCP/IP socket programs
C306.3	Illustrate database access and details for managing information using the JDBCAPI
C306.4	Describe how servlets fit into Java-based web application architecture
C306.5	Develop reusable software components using JavaBeans

Corse Name:C311 Programming in JAVA17CS561

C311.1	Explain the object-oriented concepts and JAVA.
C311.2	Develop computer programs to solve real world problems in Java.
C311.3	Develop simple GUI interfaces for a computer program to interact with users

Course Name:Dot Net Framework for Application Development17CS564

C312.1	Build applications on Visual Studio .NET platform by understanding the syntax and semantics ofC#
C312.2	Demonstrate Object Oriented Programming concepts in C# programming language
C312.3	Design custom interfaces for applications and leverage the available built-in interfaces in building complex applications.
C312.4	Illustrate the use of generics and collections inC#
C312.5	Compose queries to query in-memory data and define own operator behavior

Course Name:C313Cryptography, Network Security and Cyber Law17CS61

C313.1	Discuss cryptography and its need to various applications. Design and develop simple cryptography algorithms
C313.2	Understand cyber security and need cyber-Law

Course Name: C314 File Structures17IS62

C314.1	Discuss appropriate file structure for storage representation.
C314.2	Illustrate a suitable sorting technique to arrange the data.
C314.3	lain indexing and hashing techniques for better performance to a given problem.

Course Name:C315 Software Testing17IS63

C315.1	Discuss test cases for any given problem
C315.2	Compare the different testing techniques
C315.3	Illustrate the problem into suitable testing model

C315.4	Understand the appropriate technique for the design of flowgraph.
C315.5	gn and Develop appropriate document for the softwareartefact.

Course Name:C316 Operating Systems 17CS64

C316.1	Demonstrate need for OS and different types ofOS
C316.2	Discuss suitable techniques for management of different resources
C316.3	Illustrate processor, memory, storage, and file system commands
C316.4	Explain the different concepts of OS in platform of usage through case studies

Course Name:C401 Data Mining and Data Warehousing17CS651

C401.1	Understand data mining problems and implement the Datawarehouse
C401.2	Demonstrate association rules for a given data pattern.
C401.3	uss between classification and clustering solution.

Course Name: C402 System Software17IS652

C402.1	Explain system software such as assemblers, loaders, linkers, and microprocessor
C402.2	Design and develop lexical analyzers, parsers, and code generators
C402.3	Understand lex and yacc tools for implementing different concepts of system software

Course Name: C403 Python Application Programming17CS664

C403.1	Understand Python syntax and semantics and be fluent in the use of Python flow control and functions.
C403.2	Demonstrate proficiency in handling Strings and Filesystems.
C403.3	Implement Python Programs using core data structures like Lists, Dictionaries and use Regular Expressions.
C403.4	Interpret the concepts of Object-Oriented Programming as used in Python.

Course Name:C404Multi-Core Architecture and Programming17CS666

C404.1	Identify the issues involved in multicore architectures
C404.2	Explain fundamental concepts of parallel programming and its design issues
C404.3	Solve the issues related to multiprocessing and suggest solutions
C404.4	Discuss the salient features of different multicore architectures and how they exploit parallelism
C404.5	Illustrate Open MP and programming concept

Course Name: Web Technology and its Applications /15CS71

C371.1	Adapt HTML and CSS syntax and semantics to build web pages.
C371.2	Construct and visually format tables and forms using HTML and CSS
C371.3	Develop Client-Side Scripts using JavaScript and Server-Side Scripts using PHP to generate and display the contents dynamically
C371.4	Appraise the principles of object-oriented development using PHP
C371.5	Inspect JavaScript frameworks like jQuery and Backbone which facilitates developer to focus on core features

Course Name: Software Architecture and Design Patterns /15IS72

C372.1	Design and implement codes with higher performance and lower complexity
C372.2	Be aware of code qualities needed to keep code flexible
C372.3	Experience core design principles and be able to assess the quality of a design with respect to these principles.
C372.4	Capable of applying these principles in the design of object-oriented systems.
C372.5	Demonstrate an understanding of a range of design patterns. Be capable of comprehending a design presented using this vocabulary
C372.6	Be able to select and apply suitable patterns in specific contexts

Course Name: Machine Learning / 15CS73

C373.1	Identify the problems for machine learning. And select the either supervised, unsupervised or reinforcement learning
C373.2	Explain theory of probability and statistics related to machine learning
C373.3	Investigate concept learning, ANN, Bayes classifier, k nearest neighbor, Q,

Course Name: Cloud Computing and its Applications / 15CS742

C374.1	Explain cloud computing, virtualization and classify services of cloud computing
C374.2	Illustrate architecture and programming in cloud
C374.3	Describe the platforms for development of cloud applications and List the application of cloud.

Course Name: Storage Area Networks / 15CS754

C375.1	Identify key challenges in managing information and analyze different storage networking technologies and virtualization
C375.2	Explain components and the implementation of NAS
C375.3	Describe CAS architecture and types of archives and forms of virtualization
C375.4	Illustrate the storage infrastructure and management activities

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Department of Mathematics

Vision of the Institute

To be a respected and most sought after engineering educational institution engaged in equipping individuals capable of building learning organizations in the new millennium.

Mission of the Institute

To develop competent students with good value systems and face challenges of the continuously changing world.

Vision of the Department

We envision that our department will continue to grow as an intellectually stimulating environment that attracts engineers who have a knack for interdisciplinary research. We hope that the department will play a central role in bridging fundamental sciences and engineering.

Mission of the Department

Our mission is educating our students to excel in their work as well as mentor the next generation of engineers. We provide engineering Mathematics with theoretical and application- oriented technique and making them successful personally & professionally.

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Program Educational Objectives

PEO	Be able to apply the fundamental knowledge of mathematics to analyze and solve the complex problem in electrical, electronics and allied interdisciplinary areas.
PEO	Possess good leadership skills, function ethically in multidisciplinary areas to develop sustainable solutions for global, environmental, and social issues.
PEO	Be able to inculcate lifelong learning to maintain and enhance professional skills.

Course Name: 18MAT11 (Advanced calculus and linear algebra)

CO1	Apply the knowledge of calculus to solve problems related to polar curves and its applications in determining the bentness of the curve.
CO2	Learn the notion of partial differentiation to calculate rate of change f multivariate functions and solve problems related to composite functions and Jacobeans.
CO3	Apply the concept of change of order of integration and variables to evaluate multiple integrals and their usage in computing the area and volumes.
CO4	Solve first order linear/nonlinear differential equations analytically using standard methods.
CO5	Make use of matrix theory for solving system of linear equations and compute Eigen values and Eigen vector required for matrix diagonalization process.
CO6	Understanding and Applying the real-world problem through engineering techniques.

Course Name: 18MAT31 (Transform calculus, Fourier series and numerical techniques)

CO1	Use Laplace transform and inverse Laplace transform in solving differential/integral equation arising in network analysis, control systems and other fields of engineering.
CO2	Demonstrate Fourier series to study the behavior of periodic functions and their applications in system communications, digital signal processing and field theory.
CO3	Make use of Fourier and Z- transforms to illustrate discrete/continuous function arising in wave and heat propagation, signals, and systems.
CO4	Solve first and second order ordinary differential equations arising in engineering problems using single step and multistep numerical methods.
CO5	Determine the extremals of functional using calculus of variations and solve problems arising in dynamics of rigid bodies and vibrational analysis.
CO6	Understanding the Euler's equations, Geodesics under the variational problems.

Course Name: 18MAT21 (Advanced calculus and numerical methods

CO1	Illustrate the applications of multivariate calculus to understand the solenoidal and irrotational vectors and exhibit the inter dependence of line, surface, and volume integrals.
CO2	Demonstrate various physical models through higher order differential equations and solve such linear ordinary differential equations.
CO3	Construct a variety of partial differential equations and solution by exact methods/ methods of separation of variables.
CO4	Explain the applications of infinite series and obtain series solution of ordinary differential equations.
CO5	Apply the knowledge of numerical methods in the modeling of various physical and engineering phenomena.
CO6	To study the behavior of LCR circuits and oscillations of springs using ODE.

Course Name: 18MAT41 (Complex analysis, probability, and statistical methods)

CO1	Use the concept of analytic function and complex potentials to solve the problems arising in electromagnetic field theory.
CO2	Utilize conformal transformation and complex integral arising in aero foil theory, fluid flow visualization and image processing.
CO3	Apply discrete and continuous probability distributions in analyzing the probability models arising in engineering field.
CO4	Make use of the correlation and regression analysis to fit a suitable mathematical model for the statistical data.
CO5	Construct joint probability distributions and demonstrate the validity testing hypothesis.
CO6	Understanding and applying the real-world problem using through different mathematical models.

Course Name: 18CS36 (Discrete mathematical structures) -18CS36

CO1	Use of propositional and predicate logic in knowledge representation and truth verification.
CO2	Demonstrate the applications of discrete structures in different fields of computer science.
CO3	Solve problems using recurrence relations and generating functions.
CO4	Apply different mathematical proofs and techniques in proving theorems in the courses.
CO5	Compare graphs trees and their applications.
CO6	Understand and analyze prefix code and design the algorithm.

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Department of Mechanical Engineering

Vision of the Institute

To be a respected and most sought after engineering educational institution engaged in equipping individuals capable of building learning organizations in the new millennium.

Mission of the Institute

To develop competent students with good value systems and face challenges of the continuously changing world.

Vision of the Department

To become a center of excellence providing state of the art engineering education in mechanical engineering and making individual to be capable of building nation in the new millennium.

Mission of the Department

Mission 1: To provide an excellent teaching and learning process for the students to meet the needs and standards of the current industries and higher learning process.

Mission 2: To promote research and development activity in the recent emerging trends of the mechanical engineering department.

Mission 3: To provide the students with good communication skill, lifelong learning, team spirit and leadership qualities to face the current society.

Program Educational Objectives

PEO 1: Graduates in Mechanical Engineering will apply the basic technical knowledge for design, product development and analysis of mechanical engineering systems.
PEO 2: Graduates in Mechanical Engineering will demonstrate skill for research, innovation, higher studies, and entrepreneurship.
PEO 3: Graduates in Mechanical Engineering will demonstrate good communication skills, dynamic leadership qualities and awareness about environmental protection. blended with ethics and human values.

Program Specific Outcomes

PSO1	Apply Mechanical Engineering knowledge to address wide range of technical and societal problems with lifelong learning and professional development creativity, imagination, confidence, and responsibility.
PSO2	To understand the concept of manufacturing and design analysis of Mechanical components in various industrial sectors and development of the products in mechanical engineering
PSO3	Analyzing, evaluating thermal aspects for design and development of engineering products like I.C Engines, Refrigeration, Air-conditioning, Conventional and Non-Conventional Power Generating Systems.

Program Outcomes

1. Engineering knowledge: Apply the knowledge of mathematics, science, engineering fundamentals, and an engineering specialization to the solution of complex engineering problems.

2. Problem analysis: Identify, formulate, review research literature, and analyze complex engineering problems reaching substantiated conclusions using first principles of mathematics, natural sciences, and engineering sciences.

3. Design/development of solutions: Design solutions for complex engineering problems and design system components or processes that meet the specified needs with appropriate consideration for the public health and safety, and the cultural, societal, and environmental considerations.

4. Conduct investigations of complex problems: Use research-based knowledge and research methods including design of experiments, analysis and interpretation of data, and synthesis of the information to provide valid conclusions.

5. Modern tool usage: Create, select, and apply appropriate techniques, resources, and modern engineering and IT tools including prediction and modeling to complex engineering activities with an understanding of the limitations.

6. The engineer and society: Apply reasoning informed by the contextual knowledge to assess societal, health, safety, legal and cultural issues and the consequent responsibilities relevant to the professional engineering practice.

7. Environment and sustainability: Understand the impact of the professional engineering solutions in societal and environmental contexts, and demonstrate the knowledge of, and need for sustainable development.

8. Ethics: Apply ethical principles and commit to professional ethics and responsibilities and norms of the engineering practice.

9. Individual and team work: Function effectively as an individual, and as a member or leader in diverse teams, and in multidisciplinary settings.

10. Communication: Communicate effectively on complex engineering activities with the engineering community and with society at large, such as, being able to comprehend and write effective reports and design documentation, make effective presentations, and give and receive clear instructions.

11. Project management and finance: Demonstrate knowledge and understanding of the engineering and management principles and apply these to one's own work, as a member and leader in a team, to manage projects and in multidisciplinary environments.

12. Life-long learning: Recognize the need for, and have the preparation and ability to engage in independent and life-long learning in the broadest context of technological change.

Course Name: Elements of Mechanical Engineering-18EME14/24

C104.1	Understand the concept of nonrenewable and renewable energy and the working principles of different types of boilers and accessories.
C104.2	Learn the basic principles of operations of steam, water and gas turbines, IC Engines
C104.3	Understand the concept of refrigeration and air conditioning systems
C104.4	Gains knowledge on material joining processes, understands the concept of lubrication and different types of bearings.
C104.5	Get exposure to machining operations on lathe, milling, drilling, and grinding machines
C104.6	Understands the principle of power transmissions through belt drives and gear trains

Course Name: Workshop Practice-18WSL16/26

C108.1	Identify the fitting tools and instruments.
C108.2	Apply knowledge of fitting tools and measuring instruments for getting an object of required shape and size
C108.3	Acquire the skill required for carrying out the welding using electric arc welding process.
C108.4	Applying the skill acquired for preparing the different welding joints.
C108.5	Demonstrate the sheet metal working and joining by soldering processes.
C108.6	Understand the working of various power tools and its applications in mechanical engineering.

Course Name: Computer Aided Engineering Drawing-18CED14

C112.1	Understand the importance of engineering drawing as language of engineers.
C112.2	Able to draw the front, top and side views of points and straight lines.
C112.3	Able to draw the orthographic projections of regular plane surfaces in different orientations.
C112.4	Develops skill to imagine and draw the projections of regular solids.
C112.5	Understand the concept of the development of lateral surfaces of regular solids.
C112.6	Develop skill to generate 3D views like isometric projection of different types of solids and combination solids.

Course Name: Material Science & Metallurgy-17ME32A

C202.1	An understanding of the basic concepts of heat treatment process and its influences on properties of metal.

C202.2	An understanding of types of structures, imperfections in metals, diffusion mechanism, evaluation of mechanical properties by subjecting to various stresses and failure mechanism.
C202.3	An understanding of the basic concepts of phase transformation during solidification, phase diagrams, iron carbon equilibrium diagram, classifications of steel, iron, AL, CU, and it's alloys.
C202.4	An understanding of the basic concepts of classification, fabrication, and applications of composite materials.
C202.5	To understand the various processes for manufacturing of composites and obtain a knowledge of contemporary issues and an ability to use the skills and techniques in engineering practice
C202.6	An ability to use the techniques, skills, and modern engineering tools necessary for engineering practice and lifelong learning.

Course Name: Basic Thermodynamics-17ME33

C203.1	Understand the fundamentals of thermodynamics.
C203.2	Demonstrate the work and heat transfer in thermodynamic systems.
C203.3	Formulate the heat, work, and energy of the system for various thermodynamic processes.
C203.4	Evaluate the performance of heat engines, heat pumps and refrigerators.
C203.5	Analyze the entropy change for various thermodynamic processes and thermodynamic properties of pure substances.
C203.6	Impart the knowledge in thermodynamic relations and distinguish between ideal and real gases.

Course Name: Mechanics of Materials-17ME34

C204.1	Learn basic concepts of simple stress and strain.
C204.2	Understand importance of stresses in composite sections, principal stresses, and strains.
C204.3	Analyze the stresses in thick and thin cylinders.
C204.4	Draw shears force and bending moments.
C204.5	Gain knowledge on bending and shear stresses, deflection of beams.
C204.6	Impart knowledge of torsion of circular shafts and stability of columns.

Course Name: Manufacturing Process-I-17ME35

C205.1	Understand basic concept of foundry technology and identify various types of patterns, binders, additives, core, molding machines.
C205.2	Analyze working principle of gating and reserving systems, special molding processes

C205.3	Describe different furnaces used for melting of metals and special types of casting process.
C205.4	Demonstrate different methods of welding in the application of fabrication works and joining of two metals/alloys.
C205.5	Apply the concept of special types of welding, brazing, and soldering.
C205.6	Enhance the knowledge of metallurgical aspect in welding.

Course Name: Computer Aided Machine Drawing-17ME36A

C206.1	Student will be able to sketch sections of solids of various polyhedrons, and also visualize and draw orthographic views of simple machine parts.
C206.2	Student is able to understand and draw various thread forms, standard keys,
C206.3	Understanding of various types riveted joints and their drawings, couplings using memorable drawing
C206.4	The students can visualize and prepare detailed drawing of a given part and draw
C206.5	CO-5 Read and interpret a given drawing and Create 2-D and 3-D models using solid edge software with manufacturing purposes.
C206.6	Producing detailed sectional views drawing of a 3-D models using solid edge Software with parts list.

Course Name: Metallography & Material Testing Lab-17MEL37A

C207.1	e Students will be able to demonstrate the knowledge and the skills required for the conduction of Tensile, Shear and Compression test.
C207.2	The students will be able to determine the torsional and bending strength of different materials.
C207.3	e students will learn Identification of metals based on Microstructures.
C207.4	e students will be capable of detecting the defects like cracks, flaws in materials by using different NDT methods.
C207.5	e students will know the material behavior for impact and wear loads.
C207.6	e students will be capable of determining hardness of metals using different methods.

Course Name: Foundry & Forging Lab-17MEL38A

C208.1	Demonstrate various skills of sand preparation, molding.
C208.2	Conduct tests on foundry sands to determine properties for different ingredient compositions.
C208.3	Apply knowledge of design and practices of mold and pattern making.
C208.4	Analyze the design of gating system.
C208.5	Demonstrate various skills of forging operations.
C208.6	Work as a team keeping up ethical principles.

Course Name: Mechanical Measurements & Metrology-17ME42B

C210.1	Students shall demonstrate the knowledge associated with Comparators (Mech, Optical, and Electrical& Pneumatic), Use of Sine bar, Interferometer, and measurement of Screw threads & Gear tooth parameters.
C210.2	Students shall demonstrate the knowledge associated with Generalized Measurement system, Transducers, CRO, Oscillographs, and XY Plotters.
C210.3	Students shall demonstrate the knowledge associated with Measurement of Force, Torque, and Temperature& Strain measurement.
C210.4	Students shall demonstrate the knowledge associated with various Standards of length, use of slip gauges, and System of limits, fits and tolerance and Design of Gauges.
C210.5	Students will be able to work in Quality control and quality assurances divisions in
	industries.
C210.6	Students will be able to design a sensors and transducers used for stress analysis, design a measuring equipment's for the measurement of temperature and flow, to maintain quality in engineering products.

Course Name: Applied Thermodynamics-17ME43

C211.1	Describe the application; apply the concepts of combustion thermodynamics in engineering field.
C211.2	Analyze and implement various aspects of air standard cycles and basic concepts of gas power cycles.
C211.3	Evaluate the performance of various working aspects of internal combustion engines
C211.4	Understand the different concepts and implement various vapor power cycles, Analyze the concepts and functioning of reciprocating compressors.
C211.5	Apply knowledge of working procedure of gas turbine and Jet and Rocket Propulsion system.
C211.6	Describe the various psychometric processes; understand the working of air conditioning systems and refrigeration systems.

Course Name: Kinematics of Machines-17ME44

C212.1	To identify and select the proper mechanisms for the application in real life situations.
C212.2	Calculate mobility for various mechanisms and enumerate rigid links and types of joints within mechanisms.
C212.3	Explain different mechanisms and conduct a velocity and acceleration analysis of the different mechanisms.
C212.4	Construct CAM profile for the specific follower motion.

C212.5	To identify different gear trains for various practical applications and solve simple problems.
C212.6	To classify gears and calculate the various spur gear dimensions.

Course Name: Manufacturing Process-II-17ME45

C213.1	Understand metal cutting principles, cutting tool materials, properties,and fluid selection.
C213.2	Classify and understand the principle and constructional features, operations performed on Lathe & drilling machine.
C213.3	Understand and to operate the Milling machine and to know the concept of indexing mechanism and its methods.
C213.4	Understand the concept of Grinding machines and its constructional features. And, to know the selection of grinding wheel.
C213.5	Understand the principles, applications, and features of super finishing, polishing, and buffing operations, honing etc.
C213.6	Select the types of non-traditional machines and methods of operations along with applications.

Course Name: Fluid Mechanics-17ME46B

C214.1	To impart basic knowledge of fluid, its properties and recognize the various types of fluid flow, also variation of Pressure in a fluid is at rest.
C214.2	To made them understand the concept of Euler's equation and extracting Bernoulli's equation also to understand and analyze the Head losses in laminar and turbulent flow through pipes.
C214.3	To Contend the importance of flow measurement and use of dimensional analysis to design physical or numerical experiments and to apply dynamic similarity.
C214.4	Can understand the reasons for Major and minor loss of energy through pipe
C214.5	To understand and analyze the Head losses in laminar and turbulent flow through pipes.
C214.6	To learn the concept of Buoyancy and importance of continuity equation and can implement the compressible flow and flow around immersed bodies.

Course Name: Mech. Measurements & Metrology Lab-17MEL47B

C215.1	Understand the basic measurement units and calibrate various measuring devices.
C215.2	Use various measuring tools such as Sine Bar, Sine Center, Bevel Protractor to find taper and included angles.
C215.3	Gain knowledge on Optical Microscope, Tool Maker Microscope to measure screw thread parameters.
C215.4	Learn basic concepts of measuring temperature, pressure and strain using different methods.

C215.5	Gain knowledge on various measuring equipment's applied to engineering analysis in industries.
C215.6	Impart knowledge of error and correction factors of various measuring devices.

Course Name: Machine Shop-17MEL48B

C216.1	Describe the knowledge and the skills required with respect to the operation, procedure, conduction and analyzing the results of experiments.
C216.2	Perform the operations in lathe machine.
C216.3	Analyze the operations in milling machine and its mechanism.
C216.4	To know the concepts of grooving operations using Shaping machine.
C216.5	Demonstrate of operations on drilling machine.
C216.6	Impart the knowledge of Eccentric turning using four jaw chuck

Course Name: Management and Entrepreneurship-15AL51

C301.1	Understand the basic concepts of management and development of effective planning process.
C301.2	Understand the principles of organization and Illustrate different organizational structures.
C301.3	Understand the staff selection process, recruitment process and project selection process as well as directing, motivating, and controlling.
C301.4	To know how to motivate, directing and controlling the managers and management.
C301.5	Develop entrepreneurship and its concepts pertaining to small scale industries for sustainable development.
C301.6	Understand different schemes of government support to small scale industries and preparation of project report.

Course Name: Design of Machine Elements-I-15ME52

C302.1	Apply the concept of mechanics of materials to estimate the stresses in a machine element & predict failure of components.
C302.2	Analyze failure of components using different theories of failure for static loadings
C302.3	Determine the stress concentration factor for different irregularities and strength of components under different impact loadings.
C302.4	Design the machine components for fatigue failure & also for threaded fasteners.
C302.5	Design of keys, Shafts, cotter & knuckle joint & couplings used for power transmission
C302.6	Design & Analyze the power screws and welded joints for different applications.

Course Name: Energy Engineering-15ME53

C303.1	Describe the working principle of steam power plant and ability to solve problems involving height of chimney to produce a given draft.
C303.2	Apply knowledge of super heater, De-super heater, control of super heaters, economizer
C303.3	Evaluate the various methods of starting diesel engines and need for lubrication.
C303.4	Import the knowledge of Hydrograph, how to draw the hydrograph, flow duration and mass curve and its applications.
C303.5	Apply the knowledge of nuclear energy, solar energy, and wind energy.
C303.6	Demonstrate the various energy conversion methods such as Tidal power energy, Ocean thermal energy conversion, geothermal energy and photosynthesis.

Course Name: Dynamics of Machines-15ME54

C304.1	Students will be able to do static and dynamic analysis of different mechanisms subjected to forces using various principles.
C304.2	Students will be able to analyze the concept of friction in different bearings and belt drive.
C304.3	Students will be able to solve the problems on balancing of rotating masses in same and different planes.
C304.4	Analyze the concept of primary & secondary forces of reciprocating masses in different engines.
C304.5	Students will be able to determine thevarious parameters of governors and its usage.
C304.6	Course content helps the students to analyze gyroscopic effect on different vehicles andAnalysis of Cams.

Course Name: Manufacturing Process-III-15ME55

C305.1	Students will be able to understand necessity of forming process compared with other manufacturing techniques, and the knowledge of parameters effect on the processing of the wrought products.
C305.2	Students will be able to determine the process, load required and possible reasons for the formation of defects in forged components.
C305.3	Students will be able to identify the process, load calculations and reasons for defective rolled products.
C305.4	Students will be able to apply the knowledge of drawing and extrusion to find out defects and problems occurred in the processes.
C305.5	Students will be able to select the different process, related equipment's, and parameters for the fabrication of various sheet metal components.

C305.6	Students will be able to select the different high energy rate forming process and powder metallurgy for the fabrication of bulk components.

Course Name: Turbo Machines -15ME56

C306.1	Understanding the comparison of positive displacement machine and turbo machine.
C306.2	Gain the knowledge of working of centrifugal pumps.
C306.3	Study the performance of various hydraulic turbines.
C306.4	Impart the knowledge of performance of steam turbines.
C306.5	Sound knowledge of energy transfer in turbomachinery.
C306.6	Sound knowledge about stage efficiency, reheat factor and preheat factors in turbines and pumps, compression and expansion processes, the working of centrifugal and axial compressors.

Course Name: Fluid Mechanics & Machines Lab-15MEL57

C307.1	Students will be able to analyze fluid flow principles.
C307.2	Gain the knowledge in analyzing the performance of turbines and pumps.
C307.3	Able to determine coefficient of friction, minor losses in flow through the pipes.
C307.4	Students will be able to calibrate flow measuring devices such as orifice meter, venture meter and V- Notch and performance of centrifugal pumps.
C307.5	Students will have the ability to test the performance of turbines like Pelton wheel, Francis turbine and Kaplan turbine.
C307.6	Students will have the ability to test the performance of two stages reciprocating air compressor and air blower.

Course Name: Energy Conversion Lab-15MEL58

C308.1	At the end of the course, students will be able to determine the Flash point, Fire point, calorific value, and viscosity of various lubrication oils.
C308.2	Students will have the knowledge of engine operation through valve timing diagram.
C308.3	To conduct performance test on Two stroke Petrol Engine.
C308.4	To conduct performance test on 4 stroke Diesel Engine, Four Stroke Petrol Engines.
C308.5	Students able to draw valve timing and port timing diagram.
C308.6	Impart the knowledge of application of planimeter.

Course Name: Computer Integrated Manufacturing-15ME61

C309.1	Understand basic concepts of computer integrated Manufacturing, utilization parameters of machine and their capabilities
C309.2	Apply different work transfer methods and mechanism for high volume production
C309.3	Designautomated assembly systems for high volume production and analyzes single station, MultiTaction and automated guided vehicle system.

C309.4	Developmentof various types of computer aided manufacturing and planning systems
C309.5	Enhance various terminology, programming methods of robot and write part program in Robotics & CNC machine.
C309.6	Analyzeflow lines and solve problems through line balancing methods for manufacturing

Course Name: Design of Machine Elements-II -15ME62

C310.1	Demonstrate the fundamentals of stress analysis, different stress in curved beams and Design and select power transmission elements.
C310.2	Make proper assumptions with respect to material, size, static and dynamic loads for springs, clutches, and brakes.
C310.3	To change the existing design with minimum effort for better result/performance of IC-Engine parts
C310.4	Design of spur and helical gears for different power transmission ratio and to find BHN.
C310.5	Design bevel and worm gears based on strength, dynamic and wear loads.
C310.6	Performance of the rotating components can be increased with better knowledge of lubrication

Course Name: Heat & Mass Transfer-15ME63

C311.1	Provide sound understanding of the basic principles and laws, modes of heat transfer, different types of Fins and fin efficiency.
C311.2	Capability to analyze transient mode of heat transfer and use of Heiselers Charts.
C311.3	To know various heat transfer processes and heat exchangers.
C311.4	Able to analyze different regimes of boiling and condensation.
C311.5	To impart the knowledge of natural and forced convection and non-dimensional numbers associated with it.
C311.6	Understand the concept of radiation heat transfer.

Course Name: Finite Element Methods-15ME64

C312.1	Learn basic principles of finite element method for analysis of structures.
C312.2	Understand importance of principle of minimum potential energy, Raleigh's Ritz and Galperin's method to solve engineering problems.
C312.3	Analyze the finite element formulation of 2-D elements and higher order elements.
C312.4	Get exposure the finite element analysis of bars in engineering field.
C312.5	Gain knowledge on the finite element analysis of trusses.
C312.6	Impart knowledge of finite element analysis of beams and heat transfer problems.

Course Name: Mechatronics & Microprocessor-10ME65

C313.1	Learn basic concepts of Mechatronics systems.
C313.2	Understand importance of Transducers and Sensors.
C313.3	Gain knowledge on electrical actuation system and signal conditioning.
C313.4	Learn basic concepts of Microprocessor and number system, logic gates.
C313.5	Gain knowledge on logic function of INTEL 8085A Microprocessor.
C313.6	Impart knowledge of CPU, organization, and programming of Microprocessor.

Course Name: TOE-15ME66X

C314.1	Develop equations of equilibrium, Mohr's diagram & characteristic equation of principal stress for 2D & 3D stress systems
C314.2	Able to identify the possible strain field using compatibility equations. Reducing the complexity by assuming plane stress & plane strain condition.
C314.3	Derive the solutions for a two-dimensional problem in Cartesian coordinates using Airy's stress function method and to develop equations of equilibrium for 2D stress system in Polar co-ordinate system.
C314.4	Identify the stress distribution of different parts such as rotating disks & rotating cylinders. To derive equations for torsion of thin open sections & tubes.
C314.5	Derive equation for Radial & Circumferential stresses for disk, cylinders & sphere subjected to thermal loading.
C314.6	Understand the importance of basic theorems to solve practical problems.

Course Name: NTM-15ME665

C314.1	To appreciate the importance of NTM methods and their advantages over conventional methods.
C314.2	To demonstrate the working of USM processes.
C314.3	To operate with the elements of AJM & WJM processes.
C314.4	To gain the knowledge of elements related to ECM & Chemical machining processes.

C314.5	To select an appropriate NTM process for the machining of the components and suitable electrodes of EDM.
C314.6	To correlate specific applications of PAM, LBM and EBM process.

Course Name: Heat & Mass Transfer Lab-15MEL67

C315.1	Understand the concept and mechanism of forced, natural convection taking place in objects of different geometries, the various empirical correlations used in different fluid flow situations.
C315.2	Learn the thermal performance analysis of heat exchangers, their practical applications.
C315.3	At the end of the course, students will be able to understand conduction phenomenon thoroughly in objects of different geometries they can determine the thermal conductivity of composite wall, lagging material and critical heat flux.
C315.4	Understand the performance analysis of vapor compression refrigeration cycle and air conditioning system.
C315.5	Understand the concept of radiation heat transfer.
C315.6	To impart the knowledge non-dimensional numbers associated with natural and forced convection.

Course Name: CAMA Lab-15MEL68

C316.1	le to define the different element types, properties and material models to the different structures being analyzed.
C316.2	dents can be able to do the stress analysis of bar, truss, beam, and simple mechanical structures and validate the results with theoretical results.
C316.3	dents will carry out static and dynamic analysis of simple beams and bars.
C316.4	dents will be able to analyze the thermal problems like conduction and convection using ANSYS.
C316.5	dents will be able to do Air flow analysis of pipe and flat plate.
C316.6	Student will be able to solve thermal and mechanical stress problems**.**

Course Name: Engineering Economics-15ME71

C401.1	Students will be able to understand types of interest and its factors and use them in EMI and loan calculations.
C401.2	Students will be able to characterize different assets based on their Present, equivalent, and future worth and judge the best alternative.
C401.3	Students will be able to appreciate depreciation, costing, and estimation procedure. Perform tax analysis.
C401.4	Students will be able to Analyze the financial concepts and prepare financial statements for the company.

C401.5	Students will be able to use the knowledge of financial ratios for determining the firm's earning power.
C401.6	Students will be able to demonstrate the concepts of financial and profit planning through suitable budgeting.

Course Name: Mechanical Vibrations-15ME72

C402.1	Understand basic concepts of vibrations & learns to use the Fourier series method to idealize any motion in terms of sine & cosine curves which can be used in vibration
	analysis
C402.2	Able to write a mathematical model of undamped systems and can deploy the proper method to obtain the natural frequency of the system, which is required in failure analysis.
C402.3	Gains insight into the damped, forced vibrations and develops the skill to utilize the over, under and critically damped systems in different applications
C402.4	Realize the importance of vibration measuring, condition monitoring and methods to avoid vibrations.
C402.5	Learn to idealize any physical system into two DOF systems and determine their natural frequencies & mode shapes
C402.6	Able to solve multi DOF system and obtain their natural frequencies by numerical methods which helps the engineer to design stable system

Course Name: Hydraulics and Pneumatics-15ME73

C403.1	Describe the working principles of hydraulic and pneumatic system and its applications.
C403.2	Apply knowledge of pumps, motors, and its application.
C403.3	Evaluate the various types of valves and its applications.
C403.4	Import the knowledge of circuit design, control valves and its applications
C403.5	Learn and apply multi-purpose cylinder applications
C403.6	Describe the working principles of hydraulic and pneumatic system and its applications.

Course Name: Operation Research-15ME74

C404.1	Ability to understand and analyze solution for linear programming problems in industry so that they can use resources (capitals, men, machine, and materials) more effectively.

C404.2	Students will have the knowledge of optimizing the transportation models, assignment and travelling salesman problems. **Solve** the problem of transporting the products from origins to destinations with least transportation cost.
C404.3	Students will have the analysis of optimizing the Integer Programming models and Queuing theory.
C404.4	Students will have the Understand of Project management techniques: PERT-CPM & crashing techniques to reduce the man, machine, and material to increase the profits and reduce the losses.
C404.5	Students will have the knowledge of Game Theory analytical and graphical method problems solving for different types of Job's.
C404.6	Students will have the Describe the Sequencing of different types of Job's to reduce man, machine, and material cost to increase the profit.

Course Name: Non-Conventional Energy Sources-15ME754

C405.1	Understand the present energy scenario and the available non-conventional energy sources.
C405.2	Describe the basics of solar radiation geometry and various measurement techniques.
C405.3	Analyze the knowledge gained in tapping the solar energy through solar thermal devices, PV conversion and their performance analysis.
C405.4	Demonstrate the various energy conversion methods such as Wind, Tidal, OTEC and Geothermal.
C405.5	Apply knowledge of Biomass and Hydrogen energy and their impact on environment and sustainability.
C405.6	Understand the present energy scenario and the available Non-conventional energy sources.

Course Name: Theory of Plasticity-15ME752

C405.1	Get exposed to concepts of theory of elasticity, importance of stress and strains which are needed to understand the theory of plasticity.
C405.2	They knew about types of strain and plastic deformation of ductile materials.
C405.3	Use different yield criteria and its importance.
C405.4	Realize the importance of experimental verification of stress- strain relationship and bending of beams and use it in design of mechanical components.
C405.5	They can analyze stress; shear and residual stresses are distributed on the different types of beam.
C405.6	Gain knowledge on torsion of circular &non-circular shafts.

Course Name: Experimental Stress Analysis-15ME761

C406.1	ility to brief about types, mounting and performance of strain gages and wheat stone bridge circuits.
C406.2	dents can be aware of about different configurations of strain rosettes and its error minimization.
C406.3	dents can brief about concepts of Photoelasticity, polar scope and calibration of different models.
C406.4	get exposure on Two- and Three-Dimensional photoelasticity models and techniques
C406.5	ey will understand about Birefringent and Brittle coating methods used in ESA.
C406.6	They can use moiré techniques for finding stresses and displacements.

Course Name: Design Lab-15MEL77

C407.1	Understand the concept of natural frequency and damping coefficient in a single DOF vibrating system.
C407.2	To analyze the balancing of rotating masses by using static and dynamic balance.
C407.3	To demonstrate the concept of stress concentration for photo- elastic materials.
C407.4	To determine pressure distribution in journal bearings.
C407.5	To find the principal stresses using strain gauges.
C407.6	Knowing the concepts of whirling of shaft, governor, and gyroscope.

Course Name: CIM & Automation Lab-15MEL78

C408.1	To practically relate to concepts discussed in Computer Integrated Manufacturing
	Course.
C408.2	To write CNC part programs for simulation of machining operations such as Turning, Drilling & Milling.
C408.3	Ability to identify the type of machining center for the geometry given (cylindrical or prismatic), write the part program, explain the instructions, examine for the error in the program and choose right G and M codes to optimize the program and construct the final geometry by running the simulation using the software.
C408.4	To understand & write programs for Flexible Manufacturing Systems & Robotics.
C408.5	To understand the operating principles and practical applications of hydraulics, pneumatics, and electro–pneumatic systems.
C408.6	To apply these learning's to automate & improve efficiency of manufacturing process.

Course Name: Operations Management-15ME81

C409.1	Understand the history and development of Operation Management. Able to apply the Operation Management principles in manufacturing and service activities. Getting exposure to Environmental and contemporary issues. Understands the Importance of Productivity and able to apply mathematics to improve productivity.

C409.2	Gets exposure to Decision making process in an industry under different environments, importance of decision making. Able to apply Mathematical models like Break even analysis and tradeoffs.
C409.3	Understands about the importance of forecasting, different methods of Fore casting. Able to apply forecasting methods like qualitative or quantity. Getting exposed to Measure and controlling of forecasting. Understands the use of Aggregate and Master Scheduling Techniques.
C409.4	Learns about the importance of Purchasing and Supply Chain Management. Gets exposure to different Methods of Procurement, Tendering process, vendor development. Understands the importance of maintaining Transparency in Purchasing activity and able to apply Procurement methods in an Industry or Service Sector.
C409.5	Gets exposure to the various skills required finding out the Capacity requirement of Plant and Machinery, Plant location, and Plant lay out. Able to apply the acquired skill in an Industry or Service Sector.
C409.6	Gets exposure in the area of material requirement, inventory, importance of MRP and Able to apply the recent management techniques like MRP-1 and ERP in an industry or service sector. Able to apply different Inventory methods in a manufacturing or Service activity.

Course Name: Control Engineering-15ME82

C410.1	Describe the concept of control action, types of controllers and its applications relevant to the system.
C410.2	Apply the many inter-relationships in mechanical and electrical models.
C410.3	Evaluate the concept of block diagram reduction technique and SFG.
C410.4	Import the knowledge the step, ramp, and impulse input concepts by stability analysis
C410.5	apply the importance of root locus and bode plots
C410.6	Import the knowledge of lead-lag compensator and frequency response analysis.

Course Name: Power Plant Engineering-15ME831

C411.1	derstand Types of fuels and Equipment used for burning of coal in steam power plant.
C411.2	ppose ash handling, coal handling method in a thermal power plant.
C411.3	ferentiate Diesel engine power plants and Gas turbine power plants.
C411.4	lculate performance of a hydro-electric plant.
C411.5	plain working principle of different types of nuclear power plant.

C411.6	ect the suitability of site for a power plant and Indicate safety aspects of power plant.

Course Name: TRIBOLOGY-15ME831

C411.1	Describe the viscosity, Newton's law of viscosity.
C411.2	Apply knowledge of Hydrostatic and hydro dynamic lubrications.
C411.3	Evaluate the various types of bearing and its applications.
C411.4	Import the knowledge of oil flow and thermal equilibrium of journal bearing
C411.5	apply load carrying capacity and coefficient of friction
C411.6	Describe the wear, wear rate and its effects.

Course Name: Foundry Technology-15ME838

C411.1	Students can be able to demonstrate the Oxidation of liquid metals, gas dissolution in liquid metals, methods of degassing, fluidity, factors affecting fluidity, fluidity tests, hot tearing, shrinkage of liquid metals.
C411.2	Students can be able to understand the concept of Crystallization and development of cast structure and concept of progressive and directional solidification, need of gating system and rise ring system in casting methods.
C411.3	Students can be able to demonstrate the Special Molding Techniques for manufacturing different components by using different pattern, Developments in cupola melting–hot blast cupola, water cooled cupola, balanced blast cupola, coke less cupola, cupola charge calculations.
C411.4	Ferrous Foundry: Melting procedures, casting characteristics, production, specification, and properties of some ferrous metals.
C411.5	Students can be able to demonstrate the Non-Ferrous Foundry: Melting procedures, casting characteristics, production, specification, and properties of some typical aluminum, copper, and magnesium-based alloy castings.
C411.6	Modernization and Mechanization in foundry techniques in molding, core, material handling equipment's.

Course Name: Biomass Energy System-15ME843

C412.1	Knowledge about the various biomass resources and its energy content.
C412.2	Analyze the conversion of biomass to biofuels for combustion process.
C412.3	Evaluate the performance of biomass-based steam power plant for power generation.
C412.4	Demonstrate the concepts of bio-Methanization process.
C412.5	Apply knowledge of biofuels in IC Engine Combustion.
C412.6	Know the biogas production.

Course Name: Project Work-15ME85L

C413.1	Applying knowledge emerging areas of engineering and technology.
C413.2	Students able to apply engineering concepts with respect to different mechanical streams.
C413.3	Students focusing on more efficiency at most economically.
C413.4	Students improve communication skills, problem analyzing ability, design, and development skills.
C413.5	Developing new ideas, creative thinking, improvement in reverse engineering in mechanical engineering related technology.
C413.6	Improve their skills to work in a team as a member, to manage project in interdisciplinary environment and to draw appropriate conclusion.

Course Name: Seminar-15ME86L

C414.1	Enhancing knowledge in emerging area of technology.
C414.2	Students self-learning through seminar which may enable in lifelong learning.
C414.3	Improve their skills to work in a team.
C414.4	Improve their knowledge in project management and brought out their concern for ethical valve.
C414.5	Develop new ideas, creative thinking, improve in reverse engineering in related technology.
C414.6	Reduce the stage fear in leadership qualities.

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Department of Mechatronics

Vision of the Institute

To be a respected and most sought after engineering educational institution engaged in equipping individuals capable of building learning organizations in the new millennium.

Mission of the Institute

To develop competent students with good value systems and face challenges of the continuously changing world.

Vision of the Department

To develop the Mechatronics Engineering Department as a leading educational and research department with innovation in the design and development of electro-mechanical systems, intelligent machines, and products.

Mission of the Department

Mission 1. To provide an outstanding education in Mechatronics Engineering with a rich diversity of skills.

Mission 2. To contribute to the community prosperity through professional services and research.

Mission 3.To prepare graduates with ability to engage in life-long learning and capable ofcarrying out engineering practice with competence.

Program Educational Objectives

PEO 1.	Inculcate knowledge of basic engineering sciences and fundamentals of mechanical, electrical and computer systems.
PEO 2.	Create ability in graduates to design, develop product and applications in the field of Automation and Mechatronics and be able to use engineering tools that will enhance their productivity.
	Prepare graduates to be effective engineers with good analytical and problem-solving skill to innovate, research and develop in multidisciplinary Mechatronics environment.

Program Specific Objectives

PSO 1: An ability to understand the concepts of Mechatronics Engineering and to apply them to various areas like Mechanical, Electrical machines, Signal processing, Embedded systems, Communication Systems, Digital & Analog Devices, Computer fields etc.

PSO 2: An ability to solve complex Mechatronics Engineering problems, using latest hardware and software tools, along with analytical skills to arrive cost effective and appropriate solutions.

PSO 3: Excellent adaptability to changing work environment with good leadership qualities and zeal for social and environmental well-being.

Program Outcomes

1. Engineering knowledge: Apply the knowledge of mathematics, science, engineering fundamentals, and an engineering specialization to the solution of complex engineering problems.

2. Problem analysis: Identify, formulate, review research literature, and analyze complex engineering problems reaching substantiated conclusions using first principles of mathematics, natural sciences, and engineering sciences.

3. Design/development of solutions: Design solutions for complex engineering problems and design system components or processes that meet the specified needs with appropriate consideration for the public health and safety, and the cultural, societal, and environmental considerations.

4. Conduct investigations of complex problems: Use research-based knowledge and research methods including design of experiments, analysis and interpretation of data, and synthesis of the information to provide valid conclusions.

5. Modern tool usage: Create, select, and apply appropriate techniques, resources, and modern engineering and IT tools including prediction and modeling to complex engineering activities with an understanding of the limitations.

6. The engineer and society: Apply reasoning informed by the contextual knowledge to assess societal, health, safety, legal and cultural issues and the consequent responsibilities relevant to the professional engineering practice.

7. Environment and sustainability: Understand the impact of the professional engineering solutions in societal and environmental contexts, and demonstrate the knowledge of, and need for sustainable development.

8. Ethics: Apply ethical principles and commit to professional ethics and responsibilities and norms of the engineering practice.

9. Individual and team work: Function effectively as an individual, and as a member or leader in diverse teams, and in multidisciplinary settings.

10. Communication: Communicate effectively on complex engineering activities with the engineering community and with society at large, such as, being able to comprehend and write effective reports and design documentation, make effective presentations, and give and receive clear instructions.

11. Project management and finance: Demonstrate knowledge and understanding of the engineering and management principles and apply these to one's own work, as a member and leader in a team, to manage projects and in multidisciplinary environments.

12. Life-long learning: Recognize the need for, and have the preparation and ability to engage in independent and life-long learning in the broadest context of technological change.

Course Name: 17MT32 - Material Science & Technology

C232.1	Appreciate the necessity of engineering materials, Smart Sensors, and its applications in various fields.
C232.2	Identify possible cause of failure due to fatigue and Creep.
C232.3	Demonstrate the knowledge of nucleation, Crystal growth, Solid solution, and Phase diagrams.
C232.4	Appreciate the significance and applications of Various heat treatment processes.
C232.5	Explain the definition and classification and fabrication processes of composite materials.
C232.6	Identify the role of Carbon content in the material and accordingly the type of material and properties of material changes like steel and cast iron

Course Name: 17MT33-Machanics of Materials

C233.1	Analyze the normal stresses and strains for axially loaded members using Hooke's law
C233.2	Enumerate principal stresses and shear stresses for simple two-dimensional loadings
C233.3	Elucidate the stresses and strains in thick and thin cylindrical pressure vessels.
C233.4	Perform analysis of beams for static loading.
C233.5	Design torsional shafts and structural columns
C233.6	Calculate and represent the stress diagrams in bars and simple structures

Course Name: 17MT34- Control Systems

C234.1	Apply modeling knowledge in implementation physical systems.
C234.2	Understand the reduction of block diagram & analyze using Signal flow graph.
C234.3	Comment on performance of a system by evaluating various parameters.
C234.4	Model a system by applying the concept of State Space analysis
C234.5	Determine the time and frequency-domain responses of first and second-order systems to step and sinusoidal (and to some extent, ramp) inputs.
C234.6	Apply root-locus technique to analyze and design control systems

Course Name: 17MT35 - Analog & Digital Electronics

C235.1	Analyze the Importance & Applications of Diode as Rectifiers, Filters, Zener Diode Regulators & Switching Circuits.
C235.2	With the Knowledge of Active Filters & Oscillators students can better understand the Real-time Communication Systems
C235.3	Students are prepared to Understand, Analyze & Design Various Analog Electronics circuits if recruited to Analog Electronics Industry.

C235.4	Students are prepared to Understand, Analyze & Design Digital Circuits, if interested to work in VLSI Industry
C235.5	Formulate and employ a Karnaugh Map to reduce Boolean expressions and logic circuits to their simplest forms.
C235.6	Design and implement combinational logic circuits using reprogrammable logic devices. Content

Course Name: 17MT36 - Computer Organization

C236.1	Define Basic structure of computers, machine instructions and assembly language programs
C236.2	Ability to differentiate Addressing modes, output operations, Stacks and Queues has been described
C236.3	Understand the role and responsibilities of OS in the computer system.
C236.4	I/O Devices, Interrupts, Direct Memory Access, Busses, Interface Circuits, and Standard I/O Devices has been described
C236.5	Analyze the working of the memory system and basic processing unit.
C236.6	Understand the interfacing concepts in input and output module.

Course Name: 17MT42- Fluid Mechanics and Machines

C242.1	Appreciate the fluid mechanics fundamentals, including concepts of mass and energy conservation.
C242.2	Apply the fundamentals to flow measurement problems.
C242.3	Perform dimensional analysis for problems in fluid mechanics.
C242.4	Appreciate the understanding of turbo machines and principles of energy transfer in turbo machines.
C242.5	Apply the fundamentals for energy transfer problems in various turbo machines.
C242.6	Identify the role of Carbon content in the material and accordingly the type of material and properties of material changes like steel and cast iron

Course Name: 17MT43 – Microcontroller

C243.1	Understand the difference between microprocessor and microcontroller, operation of Peripherals of controller, and be able to program a microcontroller system in assembly code and C.
C243.2	Interface the system to switches, keypads, displays, A/D and D/A converters and build a microcontroller-based Robot.
C243.3	Design and Develop a microcontroller-based system.
C243.4	Understand of 8051 Microcontroller concepts, architecture, programming and application of Microcontrollers.
C243.5	Understand the basic idea about the data transfer schemes and its applications
C243.6	Impart the knowledge about the instruction set

Course Name: 17MT44 - Manufacturing Technology

C244.1	Understand the principles and techniques of casting, forging, rolling & drawing.
C244.2	Apply the knowledge of metal working process.
C244.3	To express the different techniques of joining process for metal & non-metals.
C244.4	Understanding and applying knowledge to execute CNC machining programs
C244.5	Calculate and understand appropriate single-point machining relationships taking tool material and machine constraints into consideration.
C244.6	Understand the principles and appropriateness of non-traditional machining processes

Course Name: 17MT45 - Theory of Machines

C245.1	Explain the concepts of mechanism, machines, and types of motion, and calculate the mobility of a mechanism.
C245.2	Explain basic cam terminology, analyze various types of CAMS, and draw CAM profile diagrams.
C245.3	Determine the positions, velocities, and accelerations of links of simple mechanisms by using graphical approach.
C245.4	Demonstrate the knowledge of various transmission mechanisms like gears and belts and apply them for simple problems.
C245.5	Appreciate the principles of Balancing, Governors, and Gyroscope, and their applications
C245.6	Understand the fundamentals of machine design for desired kinematic or dynamic performance.

Course Name: 17MT46Instrumentation And Measurements

C246.1	Measure various electrical parameters with accuracy, precision, resolution.
C246.2	Use AC and DC bridges for relevant parameter measurement.
C246.3	Select appropriate passive or active transducers for measurement of physical phenomenon.
C246.4	Understand the errors in measurements and their rectification
C246.5	Understand the various measurement techniques available
C246.6	Understand the basic working of instruments used for measurement

Course Name: 15MT51Design Of Machine Elements

C351.1	Have knowledge of theories of failures, stress concentration, power screws, shafts, keys, couplings, gears, bearings, and springs.
C351.2	Understand the technique of theories of failure, stress concentration, fatigue strength etc.

C351.3	Calculate the stresses; parameters of machine elements subjected to various loads also make proper assumptions with respect to material, FOS for various machine components.
C351.4	Design machine elements like couplings, gears, bearings ad springs
C351.5	Design machine elements like power screws.
C351.6	Design machine elements like shafts, keys.

Course Name: 15MT52Virtual Instrumentation

C352.1	Gain knowledge of Virtual Instrumentation and Lab View domain on various I/O Module, Sensor, DAQ Devices, Communication and Measurement System
C352.2	Understanding the basic programming concepts and various logical Instructions.
C352.3	Determine the extent and nature of electronic circuitry in Virtual Instrumentation
C352.4	Recognize the components of virtual instrumentation and use them for PC based Measurement.
C352.5	Publish Vis front panels on the web, view and control them remotely from LabVIEW or from a web
C352.6	Develop real time application using LabVIEW

Course Name: 15MT53 - Hydraulics& Pneumatics

C353.1	Engineering applications of hydraulic system
C353.2	Engineering applications of pneumatic system
C353.3	Gain knowledge of basis of hydraulic system
C353.4	Gain knowledge of basis of pneumatic system
C353.5	Understanding the working principle of hydraulic system
C353.6	Understanding the working principle of pneumatic system

Course Name: 15MT54Micro And Smart System Technology

C354.1	Know the basic concept of micro and smart system technology.
C354.2	Understand the need of micro size machines and devices.
C354.3	Know how this micro system technology is evolved in all fields of science amd technology
C354.4	Know the smart materials and their characteristics for the smart system applications.
C354.5	Understand the working of different sensors for smart system applications.
C354.6	Know how the different components of smart systems ate integrated with each other.

Course Name: 15MT551Wireless Network & Communication

C355.1	Have Knowledge of the fundamental concepts of wireless communication and networks.

C355.2	To understand the basics of wireless voice and data communication
C355.3	Differentiation between Wireless LAN, Wireless MAN, Wireless WAN
C355.4	Understand the working of modern network architectures from a design and performance perspective.
C355.5	Design requirements of network architectures
C355.6	Brief description regarding different wireless networks.

Course Name: 15MT562 - Automation In Manufacturing

C356.1	Know the fundamentals of automation in manufacturing
C356.2	Need of automation in manufacturing
C356.3	Types of automation process and its requirement
C356.4	Knowledge about quality control and its requirement
C356.5	Understand the techniques of automation in manufacturing
C356.6	Operations performed in manufacturing industry

Course Name: 15MT61 - PLC &SCADA

C361.1	Describe typical components of a Programmable Logic Controller.
C361.2	Explain the basic concepts of a Programmable Logic Controller.
C361.3	Use timer, counter, and other intermediate programming functions.
C361.4	Design and program basic PLC circuits for entry-level PLC applications.
C361.5	Design and program a small, automated industrial production line.
C361.6	Explain SCADA basic concept and application process,

Course Name: 15MT62 - Embedded System (ARM)

C362.1	Gain the knowledge of various RISC and CISC architectures of processors
C362.2	Know the different register usage in processor core
C362.3	Know the function of Embedded system hardware and software components,
C362.4	Have knowledge of embedded system based on the ARM processor, various cache methods and instruction set.
C362.5	Understand the various instruction set for writing and optimizing ARM assembly and C code
C362.6	Able to optimize error in programming and debug error code in efficient way.

Course Name: 15MT63- Power Electronics

C363.1	Have knowledge of power semiconductor devices, thyristors, AC voltage controllers.
C363.2	Have knowledge of choppers and inverters.
C363.3	Understand the characteristics and working principle of thyristors, AC voltage controllers.
C363.4	Understand the characteristics and working principle of choppers and inverters.

C363.5	Apply control techniques to meet desired switching objectives.
C363.6	Analyze the importance and applications of diode as rectifiers, filters, Zener diode, regulators and switching circuits.

Course Name: 15MT64Computer Aided Machine Drawing

C364.1	Have knowledge about Engineering Drawing
C364.2	Understand the concepts of sections of solids, orthographic views.
C364.3	Understand the concepts of threads, fasteners, couplings.
C364.4	Understand the concepts of joints and assembly drawing.
C364.5	Understand the concepts of Detailing.
C364.6	Students will be able to demonstrate the usage of CAD software

Course Name: 15MT652- Rapid Prototyping

C365.1	Have fundamental knowledge of modeling and simulation.
C365.2	Understand the techniques of discrete event simulation, random number generation.
C365.3	Understand the techniques to test for random number,
C365.4	Understand the techniques of random variants used in simulation study & simulation packages.
C365.5	Apply simulation packages for queuing system.
C365.6	Apply simulation packages for production system and maintenance system.

Course Name: 15MT662- Process Instrumentation

C366.1	Have the knowledge of Joints, Links.
C366.2	Have the knowledge of Sensors.
C366.3	Have the knowledge of Control units
C366.4	Have the knowledge of Actuators.
C366.5	Have the knowledge of Elements of Automation.
C366.6	**D**escribe motions and control system of Robots**.**

Course Name: 15MT71- : Industrial Robotics

C471.1	Gain knowledge of Robotics
C471.2	Gain knowledge of robotics in Automation
C471.3	Understand the working Methodology of Robotics and Automation
C471.4	Knowledge of robotics motion and sensors
C471.5	Write the program for Robot for various Application
C471.6	Knowledge of Robotic Control system and machine vision

Course Name: 15MT72: Thermal Engineering

C472.1	Understand the concepts of systems, energy interaction in systems and types
C472.2	Understand the energy interaction and thermodynamics equilibrium

C472.3	Know the thermodynamics concepts related terms
C472.4	Understand the difference between heat and work different process related to work
C472.5	Know the first law of thermodynamics to cyclic process and properties
C472.6	Understand steady flow energy equation for open system

Course Name: 15MT73 - Signal Processing

C473.1	Gain the Knowledge of signals and system transformation and filter
C473.2	Understand time domain, frequency domain signals analog and digital system
C473.3	Operate on signals and systems to bring out this characteristics and desired information
C473.4	Design Analog and Digital filters and implement discrete time systems
C473.5	Understand the basics of convolution sum and integral
C473.6	Properties of signals signal operation

Course Name: 15MT743REAL TIME SYSTEM

C474.1	Explain the types of real time systems and their properties
C474.2	Know concept of computer control
C474.3	Understand hardware and software requirements
C474.4	Know the languages for real time application
C474.5	Know the concept & working operation of operating systems
C474.6	Design RTSS and RTS developing Methodologies

Course Name: 15MT753 Safety & Security of System

C475.1	Have knowledge of IC Engines
C475.2	Have knowledge of Fuel, ignition, Lighting System
C475.3	Understand the working principle of Transmission System
C475.4	Understand the working principle of gear box
C475.5	Understand the working principle of Lubrication System
C475.6	Know about CMV safety rules

Course Name: 15MT81 Automotive Electronics & Hybrid vehicles

C481.1	Have knowledge of automotive electronics domain of various engine parts
C481.2	Have knowledge of automotive electronics sensors and types of sensors
C481.3	Know the electronics domain of various engine parts sensors, actuators, communication, and measurement system
C481.4	Understanding engine parameters and a critical awareness of current problems within the automotive electronics domain using various measurement technology
C481.5	Determine the extent and nature of electronic circuitry in automotive system including monitoring and control circuits for engines transmissions, brakes, steering, suspension, climate control system

C481.6	Understand the monitoring and control circuits for engines and instrumentations and radios and accessories involved in automotive industry

Course Name: 15MT-82- Communication System

C482.1	Know about communication systems, transmitter, receiver, and modulation in communication system.
C482.2	Know concepts of amplitude modulation and its types, coherent detection of different signals.
C482.3	Gain knowledge on angle modulation and demodulation, FM, and its types.
C482.4	Gain knowledge on phase locked loop, linear and nonlinear effects in FM systems.
C482.5	Know different waveform coding techniques.
C482.6	Gain knowledge on spread spectrum modulation, digital multiplexers, and its types.

Course Name: 15MT83 –Artificial Intelligence

C483.1	Understand the importance of Artificial systems, their domain details.
C483.2	Analyze the different Techniques used and algorithm applied to the system along with the system characteristics.
C483.3	Gain Knowledge of Artificial Intelligence, Production Rules, Search Algorithms, Expert System & its architectures, Machine Learning.
C483.4	Understand the working methodology of Search Algorithms, Expert System & Machine Learning.
C483.5	Ability to apply Artificial Intelligence techniques for problem solving.
C483.6	Explain the limitations of current Artificial Intelligence techniques.

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Department of Physics

Vision of the Institute

To be a respected and most sought after engineering educational institution engaged in equipping individuals capable of building learning organizations in the new millennium.

Mission of the Institute

To develop competent students with good value systems and face challenges of the continuously changing world.

Vision of the Department

To inculcate interest in Physics and promote the understanding of it, and to develop observational and computational skills, which will take the development in technology to new heights.

Mission of the Department

The department has been working towards fulfilling its vision through a synergic combination of teaching and research. The department also strives to promote excellence in technical education and scientific research through the effective use of Physics in real time engineering problems.

Program Educational Objectives

PEO	Inculcate knowledge of basic engineering sciences and fundamentals of mechanical, electrical and computer systems.
PEO	Create ability in graduates to design, develop product and applications in the field of Automation and Mechatronics and be able to use engineering tools that will enhance their productivity.
PEO	Prepare graduates to be effective engineers with good analytical and problem-solving skill to innovate, research and develop in a multidisciplinary Mechatronics environment.

Program Specific Objectives

PSO 1:Learn & understand more about basic principles & to develop problem solving skills and implementation in technology.

PSO 2: Study of material properties and their applications is the prime role to understand and usein engineering applications and studies.

PSO 3: Develop skills to impart practical knowledge in real time solution.

PSO 4: Understand measurement technology, usage of new instruments and real time applications in engineering studies.

Course Name:18PHY12/22

CO1	Apprehend theoretical background of laser, construction and working of different types of laser and its applications in different fields and Compute Eigen values, Eigen functions, momentum of Atomic and subatomic particles using Time independent 1-D Schrodinger's wave equation.
CO2	Understand various electrical and thermal properties of materials like conductors, semiconductors, dielectrics using different theoretical models.
CO3	Understanding different types of optical fibers and their applications
CO4	Realize the interrelation between time varying electric field and magnetic field, the transverse nature of the EM waves and their role in optical fiber communication.
CO5	Understand various types of oscillations and their implications, the role of Shock waves in various fields.
CO6	Recognize the elastic properties of materials for engineering applications

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PG COURSE OUTCOMES

Department of MBA

Vision of the

To be a respected and sought-after group of educational institutions, we are very much engaged in equipping individuals to be capable of building learning organization in the new millennium.

Institute

Mission of the Institute

Our mission is to develop competent students with good value systems to face challenges of the continuously changing world.

Vision of the Department

To impart value-based management education to the students, to nurture and enhance their competencies and to prepare them to face the challenges of industry, society, and country.

Mission of the Department

To provide integrated knowledge and demonstrated ability to the students and to groom them towards building their careers as well equipped professional. To foster a passion for learning, creative thinking, leadership skills that helps in developing entrepreneurial abilities among the students.

Program Educational Objectives

PEO1: To equip the students with necessary knowledge and managerial skills to occupy positions of management and administration in business, industry, public system and the government.

PEO2: To inculcate appropriate ethical values and attitudes among students to function effectively in the work environment.

PEO3: To provide a right mix of managerial and business exposure to function effectively in various domains of management.

Program Specific Outcomes

PSO1.To attain sufficient theoretical knowledge in areas of General Management, Marketing, Finance, Human Resources, Economics, Statistics, and its application to solve practical problems in business.

PSO2. An ability to demonstrate interpersonal skills, problem solving skills, and leadership qualities to facilitate management graduates to adapt to changes in the environment for self-sustenance and to enable lifelong learning.

PSO3. To instill a practice of professional standards and ethics and a sense of social responsibility in every management graduate.

Course Name:18MBA11(Management & Organizational Behavior)

C111.1	Comprehend & correlate all the management functions which are happening around with fundamental concepts and principles of management.
C111.2	Understand the overview of management, theory of management and practical applications of the same.
C111.3	Effectively use their skills for self-grooming, working in groups and to achieve organizational goals

C111.4	Demonstrate their acumen in applying managerial and behavioral concept in real world/situation.
C111.5	Understand and demonstrate their exposure on recent trends in management.

Course Name:18MBA12 (Managerial Economics)

C112.1	Understand the application of Economic Principles in Management decision making
C112.2	Acquire knowledge of micro economic concepts and apply them for effective functioning of a Firm and Industry
C112.3	Ability to understand, assess and forecast Demand.
C112.4	Apply the concepts of production and cost for optimization of production.
C112.5	Design Competitive strategies like pricing, product differentiation etc. And marketing according to the market structure.
C112.6	Design Competitive strategies like pricing, product differentiation etc. And marketing according to the market structure.
C112.7	Able to identify, assess profits and apply BEP for decision making.

Course Name:18MBA13(Accounting for Managers)

C113.1	Demonstrate theoretical knowledge and its application in real time accounting.
C113.2	Demonstrate knowledge regarding accounting principles and its application.
C113.3	Capable of preparing financial statement of sole trading concerns and companies.
C113.4	Independently undertake financial statement analysis and take decisions
C113.5	Comprehend emerging trends in accounting and computerization of Accounting systems.

Course Name:18MBA14 (Business Statistics& Analytics)

C114.1	Facilitate objective solutions in business decision making under subjective conditions.
C114.2	Demonstrate different statistical techniques in business/real-life situations.
C114.3	Understand the importance of probability in decision making.
C114.4	Understand the need and application of analytics
C114.5	Understand and apply various data analysis functions for business problems.

Course Name:18MBA15(Marketing Management)

C115.1	Develop an ability to assess the impact of the environment on marketing function.
C115.2	To formulate marketing strategies that incorporate psychological and sociological factors which influence buying.
C115.3	Explain how companies identify attractive market segments, differentiate, and position their products for maximum competitive advantage in the marketplace.
C115.4	Build marketing strategies based on product, price, place, and promotion objectives
C115.5	Synthesize ideas into a viable marketing plan.

Course Name:18MBA16(Managerial Communication)

C116.1	Awareness of the communication skills and know their potential to become successful managers.
C116.2	To get enabled with the mechanics of writing and can compose the business letters in English precisely and effectively.
C116.3	Introduced to the managerial communication practices in business those are in vogue.
C116.4	Trained in the art of business communication with emphasis on analyzing business situations
C116.5	Exposure in drafting business proposals to meet the challenges of competitive environment.

Course Name:18MBA21(Human Resource Management)

C121.1	Understanding of HRM functions, principles, Job analysis that facilitates students to design a job description and job specification for various levels of employees.
C121.2	Synthesize knowledge on effectiveness of recruitment process, sources & understanding of systematic selection procedure
C121.3	Identify the various training methods and design a training program.
C121.4	Understand the concept of performance appraisal process in an organization.
C121.5	List out the regulations governing employee benefit practices

Course Name:18MBA22(Financial Management)

C122.1	Understand the basic financial concepts.
C122.2	Apply time value of money.
C122.3	Evaluate the investment decisions.
C112.4	Analyze the capital structure and dividend decisions.
C112.5	Estimate working capital requirements.

Course Name:18MBA23(Research Methodology)

C123.1	Understand various research approaches, techniques, and strategies in the appropriate in business.
C123.2	Apply a range of quantitative / qualitative research techniques to business and day to day management problems.
C123.3	Demonstrate knowledge and understanding of data analysis, interpretation and report writing.
C123.4	Develop necessary critical thinking skills to evaluate different research approaches in Business.

Course Name:18MBA24(Legal and Business Environment)

C124.1	Develop an understanding of the macro environment of Business and various macroeconomic concepts.

C124.2	Understand the industrial policies of the past and the present and the evolution over time, and how Indian Industrial structure evolved over time.
C124.3	Exposure to various economic policies of the country and the state of economy

Course Name:18MBA25(Strategic Management)

C125.1	Understanding the concept of Strategic Management, its relevance, Characteristics, process nature and purpose.
C125.2	Understanding of how firms successfully institutionalize a strategy and create an organizational structure for domestic and overseas operations and gain competitive advantage
C125.3	An insight on strategy at different levels of an organization to gain competitive
	advantage.
C125.4	Understanding the strategic drive-in multinational firms and their decisions in different markets.
C125.5	Gain knowledge of strategy implementation and the control measures for effective decision-making.

Course Name:18MBA26(Entrepreneurship Development)

C126.1	Display keen interest and orientation towards entrepreneurship, entrepreneurial opportunities to setup a business.
C126.2	As an entrepreneur learn to think creatively and understand the components in developing a Business plan
C126.3	Become aware about various sources of funding and institutions supporting entrepreneurs.
C126.4	Gain consciousness towards social entrepreneurship and rural entrepreneurship opportunities.

Course Name:16/17 MBAMM301(Consumer Behavior)

C231.1	Explain the background and concepts vital for understanding Consumer Behavior.
C231.2	Identify the role of variables that determines Consumer Behavior in Social & cultural domain
C231.3	Identifying the psychological and behavioral practices adopted by organizations to enhance the Consumer Behavior.

Course Name:16/17MBAMM302 (Retail Management)

C232.1	Find out the contemporary retail management, issues, and strategies
C232.1	Evaluate the recent trends in retailing and its impact in the success of modern business.

C232.3	Relate store management and visual merchandising practices for effective retailing.

Course Name:16/17MBAMM303(Services Marketing)

C233.1	Develop an understanding about the various concepts and importance of Services Marketing.
C233.2	Enhance knowledge about emerging issues and trends in the service sector.
C233.3	Learn to implement service strategies to meet new challenges.

Course Name:16/17MBAFM301(Principles & Practices of Banking)

C234.1	Understand the banking system in India
C234.2	Know the nature of banker – customer relationship
C234.3	Make use of Negotiable instruments practically
C234.4	Have familiarity in using banking technologies like internet banking, Mobile banking, NEFT, ECS etc.
C234.5	Understand the concept of international banking and management of asset and
	liability in banks

Course Name:16/17MBAFM302(Investment Management & Financial Services)

C235.1	Understand the functioning of Investment banking
C235.2	Be aware of operation connected with depositories and custodians
C235.3	Know how financial services like factoring, venture capital, leasing and hire purchase are provided in the financial system.
C235.4	Understand the working of Housing finance and non-banking finance companies.
C235.5	Identify the developments happening in micro finance, credit rating and securitization system.

Course Name:16/17MBAFM303(Investment Management)

C236.1	Understand the process of investments.
C236.2	Get an insight into functioning of stock markets in India and abroad.
C236.3	Have insight into the relationship of the risk and return.
C236.4	Have familiarity of the fundamental and technical analysis
C236.5	Learn the Theories of Portfolio management and also the tools and techniques for efficient portfolio management.

Course Name:16/17MBAHR301(Industrial Relations & Legislations)

C237.1	Gain the insights of IR practices in the industry.
C237.2	Develop the knowledge related to employee-management relations
C237.3	Implementation of various industrial acts

Course Name:16/17MBAHR302(Recruitment & Selection)

C238.1	Learn the various recruitment policies and procedures.
C238.2	To provide a conceptual framework of Selection Procedure in the Industry.
C238.3	To understand the new concepts and techniques of recruitment and Selection in the Corporate

Course Name:16/17MBAHR303(Compensation & Benefits)

C239.1	Gain insights of various conceptual aspects of Compensation and Benefits.
C239.2	Determine the performance-based compensation system for business excellence.
C239.3	Understand the Legal & Administrative Issues in Compensation Global Compensation.

Course Name:16/17MBAIN307(Internship Study)

C2310.1	Exposure to the working culture of the organization
C2310.2	Application of theoretical culture to real life situation at the workplace
C2310.3	Understanding of the various functions of the organization
C2310.4	Use of McKinsey's 7S framework and Porter's five force model
C2310.5	Analysis of the financial statements

Course Name:16/17MBAMM401(Sales Management)

C241.1	Know the distinction between the skills required for selling and sales management
C241.2	Develop a plan for organizing staffing & training sales force.
C241.3	Organize sales territories to maximize selling effectiveness.
C241.4	Evaluate sales management strategies.

Course Name: 16/17MBAMM402(Integrated Marketing Communication)

C242.1	Define and apply knowledge of various aspects of managerial decision making related to marketing communications strategy and tactics.
C242.2	Ability to create an integrated marketing communications plan which includes promotional strategies.
C242.3	Explain the role of IMC in the overall marketing &Use effectiveness measures to evaluate IMC strategies.

Course Name:16/17MBAMM403(E-Marketing)

C243.1	Recognize appropriate e-marketing objectives.
C243.2	Appreciate the e-commerce framework and technology.
C243.3	Illustrate the use of search engine marketing, online advertising, and marketing strategies.

Course Name:17MBAFM401(Mergers, Acquisitions & Corporate Restructuring)

C244.1	Understand corporate merger and acquisition activity
C244.2	Analyze the mergers & acquisition deals that have taken place in the recent past
C244.3	Understand synergies of mergers & acquisition deals.
C244.4	Compute the valuation associated with M&A.
C244.5	Understand the human and cultural aspects of M&A's

Course Name:16/17MBAFM402(Risk Management and Insurance)

C245.1	Understand the process of identifying the risk
C245.2	Recognize the complexities involved in risk identification and measurement
C245.3	Be acquainted with the function of Insurance in risk management.
C245.4	Be aware of various types of insurance contracts.
C245.5	Understand working of insurance companies.

Course Name:16/17MBAFM403(Tax Management)

C246.1	Understand the process of computing residential status.
C246.2	Realize the complexities involved in tax liability of Individuals
C246.3	Know the corporate tax system.
C246.4	Be aware of deductions and exemptions of taxes
C246.4	Understand working of GST system in the country

Course Name:16/17MBAHR401(Public Relations)

C247.1	Gain the insights of Public relations principles and practices.
C247.2	Learn the various theories of mass communication
C247.3	Understand the various issues in crisis management

Course Name:16/17MBAHR402(Workplace Ethics & Value Systems)

C248.1	Learn the principles and practices of workplace ethics.
C248.2	Understand the concepts of corporate governance and ethics.
C248.3	Gain insights of Discrimination and Harassment at Workplace

Course Name:16/17MBAHR403(International Human Resource Management)

C249.1	Apply the concepts and knowledge about the range of Human Resource functions.
C249.2	Deploy the expatriate employees and expatriate failures on international assignments.
C249.3	Evaluate the effects of different Human Resource and International Industrial Relations strategies adopted by multinational organizations

Course Name:16/17MBAPR407(Project Work)

C2410.1	Exposure and to understand the working of therapization/Company/industry

C2410.2	To take up an in-depth study of an issue/problem in Marketing/Finance/Human Resources
C2410.3	Ability to analyze using statistical tools and statical packages
C2410.4	Knowledge of comprehending the data collected and editing, tabulating, and presenting for analysis.

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Department of MCA

Vision of the Institute

To be a respected and sought-after group of educational institutions, we are very much engaged in equipping individuals to be capable of building learning organization in the new millennium.

Mission of the Institute

Our mission is to develop competent students with good value systems to face challenges of the continuously changing world.

Vision of the Department

With a vision to be a respected and sought-after group of educational institutions, we are very much engaged in equipping individuals to be capable of building learning organization in the new millennium.

Mission of the Department

Our mission is to develop competent students with good value systems to face challenges of the continuously changing world.

Program Educational Objectives

PEO1: Exhibit their expertise in problem Solving skills through design, analysis, Implementation and evaluation of hardware and software systems.

PEO2: Engage in the Computer Science and Applications related Profession locally and globally by contributing ethically to the competent and professional practices.

PEO3: Effectively adapt as individuals and as team members in multidisciplinary projects involving technical, managerial, economic, and social constraints.

PEO4: Demonstrate Leadership and Entrepreneurship Skills by incorporating organizational goals and providing facilities for peer members with defined objective.

Program Specific Outcomes

PSO1. The graduates of the Program will have firm foundation in understanding and applying the principles of mathematics, computing techniques and its applications.

PSO2. The graduates of the Program will have skills to develop, deploy andmaintain applications for desktop, web, mobile, cloud and cross platforms using modern tools and technologies.

PSO3. The graduates of the Program will be prepared to achieve their career goals in the software industry or pursue higher studies and enhance their professional knowledge.

Course Name: Object Oriented Programming Using C++(18MCA11)

CO1	Acquiring the knowledge of C++
CO2	Analyze the different concepts of C++
CO3	Design and develop the solution to a problem using object-oriented programming concepts
CO4	Apply the leaning into real world problems independently

Course Name: UNIX Programming & Shell Programming(18MCA12)

CO1	Understand and experience the UNIX environment, File system and hierarchy.
CO2	Demonstrate commands to extract, interpret data for further processing
CO3	Apply commands to perform different tasks on various applications
CO4	Analyze the usage of different shell commands, variables and AWK filtering.
CO5	Evaluate different commands with sample shell scripts

Course Name: Web Technologies(18MCA13)

CO1	Understand the fundamentals of web and thereby develop web applications using various development languages and tools.
CO2	Build the ability to select the essential technology needed to develop and implement web applications
CO3	Use java script and jQuery to develop dynamic and interactive web pages
CO4	Write well-formed/valid XML document
CO5	Design XML document with presentation using CSS and XSLT

Course Name: Software Engineering(18MCA14)

CO1	Categorize problems based on their characteristics and practical importance.
CO2	Apply the correct process models for software development.
CO3	Apply the techniques, skills, and modern engineering tools necessary for engineering practice
CO4	Define, formulate, and analyze a problem as per the testing techniques.
CO5	Apply new Generation of Software Engineering Technology to Meet Current and FutureIndustrial Challenges of Emerging Software Trends

Course Name: Computer Organization(18MCA15)

CO1	Categorize problems based on their characteristics and practical importance. Understand the Basics of Digital System
CO2	Realize the concept of Computer System Organization

CO3	Apply the concept of input output organization and memory system
CO4	Analyze the performance of Memory System and Memory Management
CO5	Analyze the implementation of STACK organization

Course Name: C++ Programming Lab(18MCA16)

CO1	Apply and implement major programming and object-oriented concepts likefunction overloading, operator overloading, Encapsulations, and inheritance, message passing to solve real-world problems.
CO2	Use major C++ features such as Virtual functions, Templates for data typeindependent designs and File I/O to deal with large data sets.
CO3	Analyze, design, and develop solutions to real-world problems applying OOPConcepts of C++.

Course Name: UNIX & Shell Programming Laboratory(18MCA17)

CO1	Understand the Unix programming environment.
CO2	Be fluent in the use of Vi editor
CO3	Be able to design and implement shell scripts to manage users with different types of permission and file-based applications
CO4	Be fluent to write Awk scripts

Course Name: Web Technologies Laboratory(18MCA18)

CO1	Understand the concept and usages web-based programming techniques.
CO2	Learning and developing XHTML documents using JavaScript and CSS
CO3	To be familiar in the use of CGI and Perl programs for different types of serverapplications.
CO4	Design and implement user interactive dynamic web-based applications

Course Name: Programming using JAVA (18MCA21)

CO1	Understand the basic programming constructs of Java. Apply suitable OOP concepts to develop Java programs for a given scenario.
CO2	Illustrate the concepts of Generalization and run time polymorphism applications
CO3	Exemplify the usage of Packages, Interfaces, Exceptions and Multithreading Demonstrate Enumerations, Wrappers, Auto boxing, Generics, collection framework andI/O operations
CO4	Demonstrate Enumerations, Wrappers, Auto boxing, Generics, collection framework andI/O operations
CO5	Implement the concepts of Networking using Java network classes

Course Name: Data Structures using C++(18MCA22)

CO1	Acquire knowledge of - Various types of data structures, operations, and algorithms - Sorting and searching operations
CO2	Analyze the performance of - Stack, Queue, Lists, Trees, Hashing, Searching and Sorting techniques
CO3	Implement all the applications of Data structures in a high-level language
CO4	Design and apply appropriate data structures for solving computing problems.

Course Name: Discrete Mathematical Structures & Statics(18MCA23)

CO1	Use the logical notation to define and reason about fundamental mathematical concepts such as sets, relations, functions, and integers.
CO2	Calculate numbers of possible outcomes of elementary combinatorial processes such aspermutations and combinations.
CO3	Calculate probability and distribution for simple comitial process calculate expectations
CO4	Apply statical methods for correlation and regression fitting curve to a discrete data

Course Name: Computer Networks (18MCA24)

CO1	Understand computer network concepts
CO2	Know various types of network and communication media
CO3	Identify the components required to build different types of networks
CO4	Understand Layering concepts of TCP/IP and OSI Models
CO5	Understand the working principles of various application protocols

Course Name: Operating Systems (18MCA25)

CO1	Understand the Basics of Computer and Operating Systems Structure
CO2	Realize the concept of Process Management
CO3	Analysis and Evaluation of Synchronization and Deadlock
CO4	Understand Layering concepts of TCP/IP and OSI Models
CO5	Understand the concept of File and Secondary storage

Course Name: Java Programming Laboratory (18MCA26)

CO1	Understand Java programming language fundamentals and run time environment.
CO2	Acquire knowledge and skill necessary to write java programs.
CO3	Learn the object-oriented concepts and its implementation in Java

CO4	Implement the multithreading and client-side programming.

Course Name: Data Structures Laboratory (18MCA27)

CO1	Apply data structure concepts to develop interactive applications in C..
CO2	Linear data structures and their applications such as Stacks, Queues and Lists
CO3	Non-Linear Data Structures and their Applications
CO4	Be fluent in the use of different types of sorting and searching techniques.

Course Name: Computer Networks Laboratory (18MCA28)

CO1	Understand the basic terminologies used for computer networking.
CO2	Understand the functions of layers in the Internet Model.
CO3	Demonstrate application layer protocols used for process-to-process communication
CO4	Demonstrate subnetting and routing mechanisms for a given network topology. Exemplify link layer functionalities
CO5	Describe the components and working of wireless networks.

Course Name: Database Management System (18MCA31)

CO1	Demonstrate the fundamentals of data models and conceptualize and depict a database system and Make use of ER diagram in developing ER Model
CO2	To Summarize the SQL and relational database design.
CO3	Illustrate transaction processing, concurrency control techniques and recovery
CO4	Inference the database design in the real-world entities.

Course Name: Programming using Python (18MCA32)

CO1	Understand and comprehend the basics of python programming.
CO2	Apply knowledge in real time applications
CO3	Understands about files and its applications.
CO4	Use standard programming constructs

Course Name: Design and Analysis of Algorithms (18MCA33)

CO1	Categorize problems based on their characteristics and practical importance.
CO2	Develop Algorithms using iterative/recursive approach
CO3	Compute the efficiency of algorithms in terms of asymptotic notations
CO4	Design algorithm using an appropriate design paradigm for solving a given problem
CO5	Classify problems as P, NP or NP Complete

CO6	Implement algorithms using various design strategies and determine their order of growth.

Course Name: System Software (18MCA34)

CO1	Understand the introductory concepts of system software, SIC and SIC/XE machine architecture.
CO2	Understand the design and implementation of Assemblers with implementation examples.
CO3	Design and implement the linkers and loaders, macro processors and respectiveimplementation examples.
CO4	Learn the basic design and working of compilers.

Course Name: System Software (18MCA34)

CO1	Understand the introductory concepts of system software, SIC and SIC/XE machine
	architecture.
CO2	Understand the design and implementation of Assemblers with implementation examples.
CO3	Design and implement the linkers and loaders, macro processors and respectiveimplementation examples.
CO4	Learn the basic design and working of compilers.

Course Name: Software Testing (18MCA351)

CO1	Acquire knowledge of basic principles and knowledge of software testing and debugging and test cases.
CO2	Understand the perceptions on testing like levels of testing, generalizedpseudo code and with related examples
CO3	Study the various types of testing.
CO4	Analyze the difference between functional testing and structural testing.
CO5	Analyze the performance of fault-based testing.

Course Name: SDBMS Lab (18MCA36)

CO1	Understand, appreciate the underlying concepts of database technologies
CO2	Able to create database with different types of integrity constraints and use the SQLcommands such as DDL, DML, DCL, TCL to access data from database objects.
CO3	Design and implement a database schema for a given problem domain.
CO4	Perform embedded and nested queries
CO5	Take up real world problems independently

Course Name: Python Programming Laboratory (18MCA37)

CO1	Apply object-oriented programming concepts to develop dynamic interactive Pythonapplications
CO2	Use the procedural statements: assignments, conditional statements, loops, methodcalls and arrays
CO3	Design and implement a database schema for a given problem domain. Design, code, and test small Python programs with a basic understanding of top-down design.
CO4	Learn how to create GUI and solve real-world problem using language idioms, datastructures and standard library.

Course Name: Algorithms Laboratory (18MCA38)

CO1	Implement the concepts of time and space complexity, divide-and-conquer strategy, dynamic programming, greedy and approximate algorithms.
CO2	Describe the methodologies of how to analyze an algorithm
CO3	Choose a better algorithm to solve the problems

Course Name: Advanced Java Programming (18MCA41)

CO1	Learn the concept of Servlet and its life cycle
CO2	Understand JSP tags and its services
CO3	Create packages and interfaces
CO4	Build Database connection
CO5	Develop Java Server Pages applications using JSP Tags.
CO6	Develop Enterprise Java Bean Applications

Course Name: Advanced Web Programming (18MCA42)

CO1	Acquire the knowledge of building web applications PHP, Ruby, Bootstrap, AJAX, XML
CO2	Design the asynchronous web application in AJAX
CO3	Understand the terminology of building web applications using MVC architecture
CO4	Design responsive web applications using bootstrap

Course Name: Object Oriented Modeling and Design (18MCA43)

CO1	Acquire knowledge of - Basic UML Concepts and terminologies - Life Cycle of Object-oriented Development - Modeling Concepts
CO2	Identify the basic principles of Software modeling and apply them in real worldapplications

CO3	Produce conceptual models for solving operational problems in software and ITenvironment using UML
CO4	Analyze the development of Object-Oriented Software models in terms of - Static behavior - Dynamic behavior
CO5	Evaluate and implement various Design patterns

Course Name: Cyber Security (18MCA442)

CO1	Define and illustrate cyber security concepts and applications
CO2	Analyze the working of cyber security principles to system design
CO3	Illustrate appropriate techniques to solve cyber security threats
CO4	Evaluate and implement cyber security through network security protocols

Course Name: Cloud Computing (18MCA442)

CO1	Understand the cloud computing delivery model and the enabling technologies.
CO2	Understand the cloud computing platforms, key technology drivers and cloudprogramming/software environments
CO3	Identify the need for cloud computing model and compare various key enabling
	technologies.
CO4	Analyze and choose an appropriate programming environment for building cloud applications.

Course Name: Enterprise Resource Planning (18MCA451)

CO1	Acquire knowledge of - Benefits of ERP, Process Re-engineering - Project management and Monitoring
CO2	Analyze the performance of - Project implementations - Quality management
CO3	Know how ERP evolves in marketplace
CO4	Develop the ERP system, ERP with E-Commerce & Internet

Course Name: Data Warehousing and Data Mining (18MCA452)

CO1	Learn the concept of Data warehousing and OLAP.
CO2	Understand storage and retrieval technique of data from DATA CUBE
CO3	Analyze different types of data and different preprocessing techniques.

CO4	Evaluate various Association algorithms and its applications
CO5	Apply different Classification technique.
CO6	Evaluate different types of classifiers.
CO7	Analyze different clustering techniques and their applications

Course Name: Big Data Analytics (18MCA454)

CO1	Understand the Map Reduce technique for solving Big Data problems
CO2	Understand algorithms for Big Data by deciding on the apt Features set
CO3	Apply algorithms for handling peta bytes of datasets
CO4	Analyze main memory consumption for Big Data analytics
CO5	Understand and analyze the usage of map reduce techniques for solving big data problems

Course Name: Professional Communication Ethics and Report Writing (18MCA46)

CO1	Understand the professional communication at workplace
CO2	Acquire the knowledge of Technical writing and Business reporting
CO3	Develop leadership qualities
CO4	Understand and Implement ethical behavior at workplace
CO5	Evaluate and implement various Design patterns

Course Name: Advanced JAVA Programming Lab (18MCA47)

CO1	Designing HTML pages to demonstrate Java Servlets, JSP, Bean and EJB programs.
CO2	Implementing Dynamic HTML using Servlet and demonstration of service methods, auto web page refresh, Session tracking using cookie and Http Session in Servlet
CO3	Learn the fundamental of connecting to the database.
CO4	Demonstrate JSP (page attributes, action tags and all basic tags) and types of EJB application

Course Name: Advanced Web Programming Lab (18MCA48)

CO1	Understand, analyze, and apply the role of server-side scripting languages.
CO2	Build web application using PHP, Ruby, jQuery, XML and store values in MYSQL
CO3	Build web applications consisting of graphs using D3.JS.
CO4	Analyze a web project and identify its elements and attributes in comparison to traditional projects

Course Name: A Object Oriented Modeling And Design Lab (18MCA49)

CO1	Understand the fundamental principles of Object-Oriented analysis, design, development, and programming
CO2	Demonstrate and represent the UML model elements, to enable visual representation of the system being developed
CO3	Implement object-oriented design model with the help of modern tool, Rational software Architect
CO4	Analyze and differentiate the static and dynamic behavior of the system for achieving the intended functionalities of the system
CO5	Evaluate Various design patterns for applicability, reasonableness, and relation to other design criteria

Course Name: Programming Using C#&.NET (18MCA51)

CO1	Understand C# and client-server concepts using .Net Framework Components.
CO2	Apply delegates, event and exception handling to incorporate with ASP, Win Form, ADO.NET.
CO3	Analyze the use of .Net Components depending on the problem statement
CO4	Implement & develop a web based and Console based application with Database connectivity

Course Name: Mobile Applications (18MCA52)

CO1	Illustrate effective user interfaces that leverage evolving mobile device capabilities
CO2	Develop applications using software development kits (SDKs), frameworks and toolkits
CO3	Establish various methods to integrate database and server-side technologies
CO4	Design and develop open-source software based mobile applications
CO5	Build and deploy competent mobile development solutions

Course Name: Machine Learning (18MCA53)

CO1	Develop an appreciation for what involved in learning models from data
CO2	Differentiate supervised, unsupervised and reinforcement learning
CO3	Apply neural networks Bayes classifier and K nearest neighbor for real-world problems
CO4	Perform statistical analysis of machine learning techniques
CO5	Understand the theory of probability and statics related to machine learning
CO6	Understand a wide variety of learning applications

Course Name: Internet of Things (IoT) (18MCA542)

CO1	Understand constraints and opportunities of wireless and mobile networks for Internet of Things.
CO2	Analyze the societal impact of IoT security events.
CO3	Develop critical thinking skills.
CO4	Analyze, design, or develop parts of an Internet of Things solution and map it toward selected business model(s)
CO5	Evaluate ethical and potential security issues related to the Internet of Things.

Course Name: Principles of User Interface Design (18MCA552)

CO1	Use the new technologies that provide interactive devices and interfaces.
CO2	Apply the process and evaluate UID
CO3	Understand Direct Manipulation and Virtual Environment
CO4	Discuss the command, natural languages, and issues in design for maintaining QoS.
CO5	Persuade user documentations and information search

Course Name: C#&.NET Lab (18MCA56)

CO1	Understand C# and client-server concepts using .Net Framework Components
CO2	Apply delegates, event, and exception handling to incorporate with ASP, Win Form, ADO.NET.
CO3	Analyze the use of .Net Components depending on the problem statement
CO4	Implement & develop a web based and Console based application with Database connectivity

Course Name: Mobile Applications Lab(18MCA57)

CO1	Illustrate effective user interfaces that leverage evolving mobile device capabilities
CO2	Develop applications using software development kits (SDKs), frameworks and toolkits
CO3	Establish various methods to integrate database and server-side technologies
CO4	Design and develop open-source software based mobile applications
CO5	Build and deploy competent mobile development solutions

Course Name: Mini Project 18MCA58)

CO1	Illustrate effective user interfaces that leverage evolving mobile device capabilities
CO2	Develop applications using software development kits (SDKs), frameworks and toolkits
CO3	Establish various methods to integrate database and server-side technologies
CO4	Design and develop open-source software based mobile applications
CO5	Build and deploy competent mobile development solutions

Course Name: Internship (18MCA61) & Seminar(10MCA62)

CO1	Identify the suitable problem making use of technical and engineering knowledge gained from previous courses with the awareness of impact of technology on the society and their ethical responsibilities
CO2	Ability to segregate work and execute/implement projects using appropriate tools
CO3	Develop skills to determine technical and general information by means of oral as well as written presentation and professional skills

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Department Of Electronics and Communication

EngineeringVision of the Institute

To be a respected and most sought after engineering educational institution engaged in equipping individuals capable of building learning organizations in the new millennium.

Mission of the Institute

To develop competent students with good value systems and face challenges of the continuously changing world.

Vision of the Department

To impart technical education par excellence and prepare leaders to serve the industries and society.

Mission of the Department

Mission 1. To Provide the world with a highly committed and quality conscious engineering workforce.

Mission 2. To Encourage the students to build self-help, Power of initiative, courage to change and create new things.

Mission 3. To inculcate the spirit of cooperation and capacity for organization with special emphasis on their self-reliance and sustainability tomeet ever changing requirements of local and global industries.

Program Educational Objectives

PEO 4.	Graduates apply their knowledge of mathematics and science to identify, analyze and solve problems in the field of Electronics & communication to develop sophisticated communication systems.
PEO	Graduates to design and build up interdisciplinary systems by solving core engineering problems in communication systems which are technically sound, economically feasible and socially acceptable.
PEO	Graduates exhibit desire for life-long learning which directs them to obtain thorough knowledge in their chosen fields and motivate them for higher studies/research.

Program Specific Objectives

PSO 1: An ability to understand the basic core courses of Electronics & Communication Engineering and to relate them to various areas of application like Communication Systems, control system, Signal processing, VLSI and Embedded systems.

PSO 2: Should have capability to apply modern tools to analyze and solve complex designs with optimal solutions for various real-world applications.

PSO 3: Excellent adaptability to changing work environment with good leadership qualities and zeal for social and environmental well-being.

MTech in Digital Electronics and Communication

Course Name: C101 (Advanced Engineering Mathematics-18ELD11)

C101.1	Understand vector spaces, basis, linear transformations and the process of obtaining matrix of linear transformations arising in magnification and rotation of images.
C101.2	Apply the technique of singular value decomposition for data compression, least square approximation in solving inconsistent linear systems.
C101.3	Utilize the concepts of functional and their variations in the applications of communication systems, decision theory, synthesis and optimization of digital circuits.
C101.4	Learn the idea of random variables (discrete/continuous) and probability distributions in analyzing the probability models arising in control systems and system communications.
C101.5	Analyze random process through parameter-dependent variables in various random processes.

Course Name: C102 (Advanced Digital Signal Processing-18ECS12)

C102.1	Design adaptive filters for a given application
C102.2	Design multirate DSP Systems
C102.3	Implement adaptive signal processing algorithm
C102.4	Design active networks
C102.5	Understand advanced signal processing techniques, including multi-rate processing and time-frequency analysis techniques

Course Name: C103 (Advanced Embedded systems-18EVE13)

C103.1	Understand the basic hardware components and their selection method based on the characteristics and attributes of an embedded system.
C103.2	Explain the hardware software co-design and firmware design approaches.
C103.3	Acquire the knowledge of the architectural features of ARM CORTEX M3, a 32 bit Microcontroller including memory map, interrupts and exceptions.
C103.4	Apply the knowledge gained for Programming ARM CORTEX M3 for different Applications.

Course Name: C104 (Advanced Communication Systems-1-18ECS14)

C104.1	Explain the concept of low pass and Bandpass signals representations at the Transmitter, the process of Detection and Estimation at the receiver in the presence of AWGN only.

C104.2	Evaluate Receiver performance for various types of single carrier symbol modulations through ideal and AWGN Non-bandlimited and bandlimited channels.
C104.3	Design single carrier equalizers for various symbol modulation schemes and detection methods for defined channel models, and compute parameters to meet desired rate and performance requirements.
C104.4	Design and Evaluate Non band limited and Non power limited spread spectrum systems for communications in a Jamming environment, multiuser situation and low power intercept environment.

Course Name:C105(Advanced Communication Networks-18ECS15)

C105.1	Choose appropriate Network Infrastructure and Networking Architectures which suits current practice in networking
C105.2	Identify the suitable random access methods which suits wireless networks
C105.3	Identify IP configuration for the network with suitable routing mechanisms
C105.4	Analyze and develop various network traffic management and control techniques
C105.5	Analyze and develop various congestion and flow control

Course Name:C106 (Advanced Digital Signal Processing Lab-18ECSL16)

C106.1	Develop a Filter design
C106.2	Develop a Filter Realization
C106.3	Signal Manipulations using MatLab
C106.4	Design using Wavelet Transforms
C106.5	Estimating PSD using various techniques

Course Name:C106 (Research Methodology and IPR-18RMI17)

C107.1	Discuss research methodology and the technique of defining a research problem
C107.2	Explain the functions of the literature review in research, carrying out a literature search, developing theoretical and conceptual frameworks and writing a review.
C107.3	Explain various research designs and their characteristics.
C107.4	Explain the art of interpretation and the art of writing research reports
C107.5	Discuss various forms of the intellectual property, its relevance

Course Name: C111 (Advanced Communication Systems-2 -18ECS21)

C111.1	Explain the concepts of multi-channel signaling (including OFDM) scheme and synchronization for carrier and symbol timing recovery at receiver.
C111.2	Evaluate the capacity and degradation in performance of various symbol signaling schemes in a multipath fading environment.
C111.3	Develop &analyze schemes to improve performance in a multipath fading environment including maximal ratio combining, RAKE receivers, OFDM and MIMO.

C111.4	Develop and evaluate the performance of a OFDM MIMO scheme to meet specified rate in a given multipath environment.

Course Name: C112 (Antenna Theory and Design -18ECS22)

C112.1	Classify different types of antennas
C112.2	Define and illustrate various types of array antennas
C112.3	Design antennas like Yagi-Uda, Helical antennas and other broad band antennas
C112.4	Describe different antenna synthesis methods
C112.5	Apply methods like MOM

Course Name: C113 (Error Control Coding-18ECS23)

C113.1	Analyse a discrete memoryless channel, given the source and transition probabilities.
C113.2	Apply the concept of modern linear algebra for the error control coding technique.
C113.3	Construct and Implement efficient LBC, Cyclic codes etc encoder and decoders.
C113.4	Apply decoding algorithms for efficient decoding of Block codes and Convolutional codes.

Course Name: C114 (Cryptography and Network Security-18ECS243)

C114.1	Use basic cryptographic algorithms to encrypt the data.
C114.2	Generate some pseudorandom numbers required for cryptographic applications.
C114.3	Provide authentication and protection for encrypted data.
C114.4	Provide Web security

Course Name: C115 (Multimedia Over Communication links-18ECS251)

C115.1	Understand basics of different multimedia networks and applications.
C115.2	Analyze media types like audio and video to represent in digital form.
C115.3	Understand different compression techniques to compress audio.
C115.4	Understand different compression techniques to compress audio video.
C115.5	Describe the basics of Multimedia Communication Across Networks

Course Name: C116 (Advanced Communication Lab-18ECSL26)

C116.1	Plot the radiation pattern of some antennas using Matlab and wave guide setup
C116.2	Obtain the S-parameters of Magic tee and directional couplers.
C116.3	Test the IC CD4051 for modulation techniques.
C116.4	Study multiplexing techniques using OFC kit.

Course Name: C201 (LTE 4G Broadband-18ECS31)

C211.1	Understand the system architecture and the function standard specified components of the system of LTE 4G.
C211.2	Analyze the role of LTE radio interface protocols and EPS Data convergence protocols to set up, reconfigure and release data and voice from a number of users.
C211.3	Demonstrate the UTRAN and EPS handling processes from set up to release including mobility management for a variety of data call scenarios.
C211.4	Test and Evaluate the Performance of resource management and packet data processing and transport algorithms.

Course Name: C202 (Advances in Image Processing-18ECS321)

C212.1	Understand the representation of the digital image and its properties
C212.2	Apply pre-processing techniques required to enhance the image for its further analysis.
C212.3	Use segmentation techniques to select the region of interest in the image for analysis
C212.4	Represent the image based on its shape and edge information.
C212.5	Describe the objects present in the image based on its properties and structure.
C212.6	Use morphological operations to simplify images, and quantify and preserve the main shape characteristics of the objects.

Course Name: C203 (Pattern Recognition & Machine Learning - 18ESP332)

C213.1	Identify areas where Pattern Recognition and Machine Learning can offer a solution.
C213.2	Describe the strength and limitations of some techniques used in computational Machine Learning for classification, regression and density estimation problems.
C213.3	Describe and model data.
C213.4	Solve problems in Regression and Classification.

M.Tech in VLSI Design and Embedded systems

Course Name: C101 (Advanced Engineering Mathematics-18ELD11)

C101.1	Understand vector spaces, basis, linear transformations and the process of obtaining matrix of linear transformations arising in magnification and rotation of images.
C101.2	Apply the techniques of QR and singular value decomposition for data compression, least square approximation in solving inconsistent linear systems.
C101.3	Learn the idea of random variables (discrete/continuous) and probability distributions in analyzing the probability models arising in control systems and system communications.
C101.4	Utilize the concepts of functional and their variations in the applications of communication systems, decision theory, synthesis and optimization of digital circuits.
C101.5	Apply the idea of joint probability distributions and the role of parameter-dependent random variables in random process.

Course Name: C102 (ASIC Design -18EVE12)

C102.1	Describe the concepts of ASIC design methodology, data path elements, logical effort and FPGA architectures
C102.2	Analyze the design of FPGAs and ASICs suitable for specific tasks, perform design entry and explain the physical design flow.
C102.3	Design data path elements for ASIC cell libraries and compute optimum path delay.
C102.4	Create floor plan including partition and routing with the use of CAD algorithms.

Course Name: C103 (Advanced Embedded systems-18EVE13)

C103.1	Understand the basic hardware components and their selection method based on the characteristics and attributes of an embedded system.
C103.2	Explain the hardware software co-design and firmware design approaches.
C103.3	Acquire the knowledge of the architectural features of ARM CORTEX M3, a 32 bit Microcontroller including memory map, interrupts and exceptions.

C103.4	Apply the knowledge gained for Programming ARM CORTEX M3 for different Applications.

Course Name: C104 (VLSI Testing-18EVE14)

C104.1	Analyze the need for fault modeling and testing of digital circuits
C104.2	Generate fault lists for digital circuits and compress the tests for efficiency
C104.3	Create tests for digital memories and analyze failures in them
C104.4	Apply boundary scan technique to validate the performance of digital circuits
C104.5	Design built-in self tests for complex digital circuits

Course Name: C105 (DVD-18EVE15)

C105.1	Analyze issues of On-chip interconnect Modeling and Interconnect delay calculation.
C105.2	Analyze the Switching Characteristics in Digital Integrated Circuits.
C105.3	Use the Dynamic Logic circuits in state-of-the-art VLSI chips.
C105.4	Study critical issues such as ESD protection, Clock distribution, Clock buffering, and Latch phenomenon
C105.5	Use Bipolar and Bi-CMOS circuits in very high speed design.

Course Name:C106 (VLSI and ES Lab1-18EVEL16)

C106.1	Develop Verilog Code for the design of digital circuits
C106.2	Use FPGA/CPLD board and Logic Analyzer or Chipscope to verify the results
C106.3	Develop Assembly language programs for different applications using ARMCortex M3 Kit and Keil uVision-4 tool.
C106.4	Develop C language programs for different applications using ARM-Cortex M3 Kit and Keil uVision-4 tool

Course Name:C107 (Research Methodology-18RMI17)

C107.1	Discuss research methodology and the technique of defining a research problem
C107.2	Explain the functions of the literature review in research, carrying out a literature search, developing theoretical and conceptual frameworks and writing a review.
C107.3	Explain various research designs and their characteristics.
C107.4	Explain the art of interpretation and the art of writing research reports
C107.5	Discuss various forms of the intellectual property, its relevance and business impact in the changing global business environment and leading International Instruments concerning IPR

Course Name: C111 (Design of Analog and Mixed Mode VLSI Circuits-18EVE21)

C111.1	Use efficient analytical tools for quantifying the behaviour of basic
	circuits by inspection.
C111.2	Design high-performance, stable operational amplifiers with the tradeoffs between speed, precision and power dissipation.
C111.3	Design and study the behaviour of phase-locked-loops for the applications.
C111.4	Identify the critical parameters that affect the analog and mixed-signal VLSI circuits' performance
C111.5	Perform calculations in the digital or discrete time domain, more sophisticated data converters to translate the digital data to and from inherently analog world.

Course Name: C112 (Real Time Operating System-16EVE22)

C112.1	Develop programs for real time services, firmware and RTOS, using the fundamentals of Real Time Embedded System, real time service utilities, debugging methodologies and optimization techniques.
C112.2	Select the appropriate system resources (CPU, I/O, Memory, Cache, ECC Memory, and Microcontroller/FPGA/ASIC to improve the system performance.
C112.3	Apply priority based static and dynamic real time scheduling techniques for the given specifications.
C112.4	Analyze deadlock conditions, shared memory problem, critical section problem, missed deadlines, availability, reliability and QoS.
C112.5	Develop programs for multithreaded applications using suitable techniques and data structure

Course Name: C113(System Verilog-18EVE23)

C113.1	Write test benches for moderately complex digital circuits
C113.2	Use System Verilog language
C113.3	Appreciate functional coverage
C113.4	Apply constrained random tests benches using System Verilog
C113.5	Analyze a verification case and apply System Verilog to verify the design

Course Name: C114 (Advances in VLSI Design-18EVE241)

C114.1	Apply design automation for complex circuits using the different Implementation methodology like custom versus semi-custom, hardwired versus fixed, regular array versus ad-hoc.

C114.2	Use the approaches to minimize the impact of interconnect parasitic on performance, power dissipation and circuit reliability
C114.3	Impose the ordering of the switching events to meet the desired timing Constraints using synchronous, clocked approach.
C114.4	Infer the reliability of the memory

Course Name: C115 (LPVD-18EVE251)

C115.1	Identify the sources of power dissipation in CMOS circuits.
C115.2	Perform power analysis using simulation based approaches and probabilistic analysis.
C115.3	Use optimization and trade-off techniques that involve power dissipation of digital circuits.
C115.4	Make the power design a reality by making power dimension an integral part of the design process
C115.5	Use practical low power design techniques and their analysis at various levels of design abstraction and analyse how these are being captured in the latest design automation environments.

Course Name: C116 (VLSI and ES Lab-2-18EVEL26)

C116.1	Learn the various issues in Mixed signal designs basically data converters.
C116.2	Acquire hands-on skills of using CAD tools in VLSI design.
C116.3	Appreciate the design process in VLSI through a mini-project on the design of a CMOS sub-system.
C116.4	Select a suitable task switching technique in a multithreaded application.
C116.5	Implement different techniques of message passing and Inter task Communication.
C116.6	Implement different data structures such as pipes, queues and buffers in multithreaded programming.

Course Name: C201 (CAD of Digital Systems-18EVE31)

C201.1	Solve graph theoretic problems.
C201.2	Evaluate the computational complexity of an algorithm
C201.3	Write algorithms for VLSI Automation
C201.4	Simulate and synthesize digital circuits using VLSI automation tools.

Course Name: C202 (Advances in Image Processing-18ECS321)

C202.1	Understand the representation of the digital image and its properties
C202.2	Apply pre-processing techniques required to enhance the image for its further analysis.
C202.3	Use segmentation techniques to select the region of interest in the image for analysis

C202.4	Represent the image based on its shape and edge information.
C202.5	Describe the objects present in the image based on its properties and Structure.
C202.6	Use morphological operations to simplify images, and quantify and Preserve the main shape characteristics of the objects.

Course Name: C203 (IOT-18ECS333)

C203.1	Understand the basic concepts IOT Architecture and devices employed.
C203.2	Analyze the sensor data generated and map it to IOT protocol stack for transport
C203.3	Apply communications knowledge to facilitate transport of IOT data over various available communications media.
C203.4	Design a use case for a typical application in real life ranging from sensing devices to analyzing the data available on a server to perform tasks on the device.

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Department of Electrical and Electronics

EngineeringVision of the Institute

To be a respected and most sought after engineering educational institution engaged in equipping individuals capable of building learning organizations in the new millennium.

Mission of the Institute

To develop competent students with good value systems and face challenges of the continuously changing world.

Vision of the Department

To meet the educational and research needs of the student community and staff through collaboration with other academic and technical institutions, industry and government agencies and make the students to face problems of the country and society.

Mission of the Department

M1 - To develop and train competent Electrical and Electronics Engineers with adequate practical skills.

M2 - To provide state-of-the-art resources that contribute to achieve excellence in teaching-learning, research, and development activities.

M3 - To inculcate, ethics, leadership, moral values, and social activities.

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Program Educational Objectives

PEO	Be able to apply the fundamental knowledge of mathematics, science, electrical and electronics engineering to analyze and solve the complex problem in electrical, electronics and allied interdisciplinary areas.
PEO	Possess good leadership skills, function ethically in multidisciplinary areas to develop sustainable solutions for global, environmental, and social issues.
PEO	Be able to inculcate lifelong learning to maintain and enhance professional skills.

Program Specific Objectives

PSO 1: Apply fundamental knowledge to identify, formulate, design, and investigate various problems of electrical and electronic circuits, power electronics, control systems and power systems.

PSO 2: Apply modern software tools for design, simulation, and analysis of electrical systems to engage in life- long learning and to successfully adapt in multi-disciplinary environments.

PSO 3: Solve ethically and professionally various Electrical Engineering problems in societal and environmental context and communicate effectively by applying project management techniques to complex engineering problems.

M.Tech in Power Electronics

Course Name: 18EEE11/ Mathematical Methods in Control

C111.1	Understand the fundamentals of vector space and bases in reference to transformations
C111.2	Solve system of linear equations using direct and iterative methods.
C111.3	Use the idea of Eigen values and Eigen vectors for the application of SVD
C111.4	Describe the basic notions of discrete and continuous probability distributions
C111.5	Find out responses of linear systems using statistical and probability tools
C111.1	Understand the fundamentals of vector space and bases in reference to transformations

Course Name: 18EPE12/ POWER SEMICONDUCTOR DEVICES AND COMPONENTS

C112.1	Discuss power electronic concepts, electronic switches and semiconductor physics
C112.2	Explain representation of switches in P-spice and power computations.
C112.3	Explain the internal structure, the principle of operation, characteristics and base drive circuits of power semiconductor devices; power diodes, power BJT, power MOSFET
C112.4	Explain the internal structure, the principle of operation, characteristics and base drive circuits of power semiconductor devices; thyristors, power IGBT, power FET
C112.5	Design a heat sink to control the temperature rise of semiconductor devices
C112.6	Design magnetic components inductors and transformers used in the power electronic circuits

Course Name: 18EPE13 / POWER ELECTRONIC CONVERTERS

C113.1	Use the knowledge of PWM techniques in controlling different power electronic converters
C113.2	Apply the knowledge of power electronics in design and analysis of DC –DC PWM converters
C113.3	Design and analyze DC –AC and AC – DC converters and control their operation using PWM techniques
C113.4	Design and analyze different resonant converters and their control circuits
C113.5	Design & Analyze of AC – AC converters
C113.6	Design & Analyze of multilevel converters.

Course Name: 18EPE14 / MODELLING AND DESIGN OF CONTROLLERS

C114.1	Describe the role of computer simulations in the analysis and design of power electronics systems
C114.2	Understand the functional modelling of static systems.
C114.3	Use sampling technique to determine a digital equivalent to a continuous time system
C114.4	Design digital controllers in discrete time and frequency domain

C114.5	Design optimal and robust controllers by different methods
C114.6	Explain essentials of discrete computation

Course Name: 18EPE15 / MODELLING AND ANALYSIS OF ELECTRICAL MACHINES

C115.1	Develop mathematical models for DC motors for transient state analysis
C115.2	Use reference frame theory to transform three phase to two phase
C115.3	Develop dynamic model for three phase induction motor in stator ad rotor reference frames
C115.4	Model synchronous machine using Park's transformation for the analysis of steady state operation
C115.5	Model synchronous machine to perform dynamic analysis under different conditions
C115.6	Develop mathematical model of single phase transformers

Course Name: 18EPEL16 / POWER ELECTRONICS LABORATORY-1

C116.1	Analyze the static and dynamic characteristics of various semiconductor devices.
C116.2	Apply the knowledge of converters in assessing the performance of single phase and three phase fully controlled and semi controlled converters for RL load for continuous current modes.
C116.3	Apply the knowledge of converters in assessing the performance of single phase and three phase fully controlled and semi controlled converters for RL load for discontinuous current modes.
C116.4	Assess the performance of single phase bridge inverter for RL load and control the voltage by pulse width modulation
C116.5	Apply the knowledge of power electronics in performance analysis of chopper converter
C116.6	Apply the knowledge of power electronics in performance analysis of synchronous buck converter

Course Name: 18RMI17 / RESEARCH METHODOLOGY AND IPR

C117.1	Discuss research methodology and the technique of defining a research problem
C117.2	Explain the functions of the literature review in research, carrying out a literature search, developing theoretical and conceptual frameworks and writing a review.
C117.3	Explain various research designs, sampling designs, measurement and scaling techniques and also different methods of data collections
C117.4	Explain several parametric tests of hypotheses, Chi-square test, art of interpretation and writing research reports
C117.5	Discuss various forms of the intellectual property, its relevance and business impact in the changing global business environment

C117.6	Discuss various forms of the intellectual property and leading International Instruments concerning IPR.

Course Name: 18EPE21 / ELECTRIC DRIVES

C121.1	Explain characteristics of DC motors, induction motors and synchronous motors
C121.2	Explain braking of electric motors.
C121.3	Classify electric drives
C121.4	Discuss dynamics conditions and stability considerations of Electric drive
C121.5	Suggest a drive for a specific application
C121.6	Explain using microprocessor in the control of an electric drive.

Course Name: 18EPE22 / SWITCHED - MODE POWER SUPPLIES

C122.1	Explain a SMPS, its characteristics, new technologies, basic principles and control modes
C122.2	Suggest a suitable DC/DC converter for an SMPS.
C122.3	Explain the method of selecting key peripheral components of SMPS
C122.4	Design the power factor correction circuit of SMPS
C122.5	Explain selection of magnetic core and designing of high-frequency transformer
C122.6	Design protection and monitoring circuit for SMPS

Course Name: : 18EPE23 / POWER SYSTEM HARMONICS

C123.1	Explain the fundamentals that facilitate the understanding of the issues of harmonics
C123.2	Explain the causes for generation of harmonics
C123.3	Explain the effects of harmonics distortion on power system equipment and loads and suppression of harmonics in power systems
C123.4	Discuss standard limits of harmonic distortion and modeling of power system components for harmonic analysis study
C123.5	Model transmission lines and cables for harmonic analysis.
C123.6	Discuss implementation of harmonic studies

Course Name: 18EPE243 / HYBRID ELECTRIC VEHICLES

C124.1	Explain the basics of electric and hybrid electric vehicles, their architecture, technologies and fundamentals
C124.2	Explain plug – in hybrid electric vehicle architecture, design and component sizing
C124.3	Explain the use of different power electronics devices in hybrid electric vehicles
C124.4	Suggest a suitable electric drive for a specific type of hybrid electric vehicle.
C124.5	Explain the use of different energy storage devices used for hybrid electric vehicles, their technologies and control
C124.6	Simulate electric hybrid vehicles by different techniques for the performance analysis

Course Name: 18EPE252 / DIGITAL POWER ELECTRONICS

C125.1	Explain traditional parameters computation, multiple quadrant operation and choppers
C125.2	Explain the disadvantages of analog power electronics and conversion technology, energy factor and sub-sequential parameters
C125.3	Explain basic mathematics of digital control systems and mathematical modelling of digitally controlled power electronic devices such as rectifiers, inverters and converters
C125.4	Describe mathematical modelling of AC/DC rectifiers, DC/AC inverters, DC/DC converters and AC/AC (AC/DC/AC) converters are working in the discrete-time state
C125.5	Discuss DC/AC pulse-width-modulation (PWM) inverters and AC /AC converters modelled as a first order-hold (FOH) element in digital control systems.
C125.6	To explain open loop and closed loop control of power electronic devices and energy factor application of AC and DC motor drives

Course Name: 18EPEL26/ POWER ELECTRONIS LABORATORY-2

C126.1	Conduct experiments on single phase fully controlled converter fed separately excited DC motor to assess the performance in continuous and discontinuous current modes
C126.2	Conduct experiments to assess the performance of Chopper fed DC drives for class A and class C commutation in continuous current mode
C126.3	Conduct experiments on three phase fully controlled converter fed separately excited DC motor to assess the performance in continuous and discontinuous current modes
C126.4	Simulate different converters for analyzing the waveform in continuous current modes
C126.5	Simulate different converters for analyzing the waveform in discontinuous current modes
C126.6	Simulate forward converter, fly back converter and resonant converter to study their performance

Course Name: 18EPE27/ TECHHNICAL SEMINAR

C127.1	Attain, use and develop knowledge in the field of electrical and electronics engineering
C127.2	Identify, understand and discuss current, real-time issues
C127.3	Improve oral and written communication skills
C127.4	Explore an appreciation of the self in relation to its larger diverse social and academic contexts
C127.5	Apply principles of ethics and respect in interaction with others.

C127.6	Attain, use and develop knowledge in the field of other disciplines through independent learning and collaborative study

Course Name: 16EPE31/ Seminar

C231.1	Attain, use and develop knowledge in the field of electrical and electronics engineering and other disciplines through independent learning and collaborative study
C231.2	Identify, understand and discuss current, real-time issues
C231.3	Improve oral and written communication skills
C231.4	Explore an appreciation of the self in relation to its larger diverse social and academic contexts.
C231.5	Apply principles of ethics and respect in interaction with others
C231.6	Work in a team to achieve common goal.

Course Name: 16EPE32 & 33/ Internship

C232.1	Gain practical experience within industry in which the internship is done
C232.2	Acquire knowledge of the industry in which the internship is done
C232.3	Develop a greater understanding about career options while more clearly defining personal career goals
C232.4	Develop and refine oral and written communication skills
C232.5	Identify areas for future knowledge and skill development
C232.6	Acquire the knowledge of administration, marketing, finance and economics

Course Name: 16EPE34/ Project Phase – I

C234.1	Present the project and be able to defend it
C234.2	Make links across different areas of knowledge and to generate, develop and evaluate ideas and information so as to apply these skills to the project task
C234.3	Habituated to critical thinking and use problem solving skills
C234.4	Communicate effectively and to present ideas clearly and coherently in both the written and oral forms
C234.5	Work in a team to achieve common goal.
C234.6	Learn on their own, reflect on their learning and take appropriate actions to improve it

Course Name: 16EPE41/ HVDC POWER TRANSMISSION

C241.1	Explain importance of DC power transmission
C241.2	Describe the basic components of a converter, the methods for compensating the reactive power demanded by the converter.
C241.3	Explain the methods for simulation of HVDC systems and its control.

C241.4	Describe filters for eliminating harmonics and the characteristics of the system impedance resulting from AC filter designs
C241.5	Explain the protection of HVDC system and other converter configurations used for the HVDC transmission
C241.6	Explain the recent trends for HVDC applications.

Course Name: 16EPE421 / DIGITAL POWER ELECTRONICS

C242.1	Explain traditional parameters computation, multiple quadrant operation and choppers
C242.2	Explain the disadvantages of analog power electronics and conversion technology, energy factor and sub-sequential parameters
C242.3	Explain basic mathematics of digital control systems and mathematical modelling of digitally controlled power electronic devices such as rectifiers, inverters and converters
C242.4	Describe mathematical modelling of AC/DC rectifiers, DC/AC inverters, DC/DC converters and AC/AC (AC/DC/AC) converters are working in the discrete-time state
C242.5	Discuss DC/AC pulse-width-modulation (PWM) inverters and AC /AC converters modeled as a firstorder-hold (FOH) element in digital control systems
C242.6	To explain open loop and closed loop control of power electronic devices and energy factor application of AC and DC motor drives

Course Name: 16EPE43 & 16EPE44/ Evaluation of Project phase - 2

C243.1	Present the project and be able to defend it
C243.2	Make links across different areas of knowledge and to generate, develop and evaluate ideas and information so as to apply these skills to the project task
C243.3	Habituated to critical thinking and use problem solving skills
C243.4	Communicate effectively and to present ideas clearly and coherently in both the written and oral forms
C243.5	Work in a team to achieve common goal.
C243.6	Learn on their own, reflect on their learning and take appropriate actions to improve it

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Department of Civil Engineering

Vision of the Institute

To be a respected and most sought after engineering educational institution engaged in equipping individuals capable of building learning organizations in the new millennium.

Mission of the Institute

To develop competent students with good value systems and face challenges of the continuously changing world.

Vision of the Department

To impart very high-quality education to the students to make them do innovative sustainable engineering relevant to industry and people at large.

Mission of the Department

Mission 1. To emphasize on basics of engineering as well as their applications relevant tothe industry.

Mission 2. To serve the society with due consideration of economy, ecology and ethical issues of nation.

Mission 3. To sensitize the students and faculty to take up research and consultancy to beon par with international standards.

Program Educational Objectives

PEO 1. Apply fundamental concepts of civil engineering in developing economically viable and sustainable sound solutions.

PEO 2. To work collaboratively on multidisciplinary problems.

PEO 3. To achieve their professional aims keeping good ethics.

Program Specific Objectives

PSO 1: To apply technical skills and modern engineering tools for civil engineering day to day practice.

PSO 2: To participate in critical thinking and problem solving of civil engineering field that needs analytical and design requirements.

PSO 3: To pursue lifelong learning and professional development to face the challengingand emerging needs of our society.

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M.Tech in Structural Engineering

Course Name: C101 ADVANCED STRUCTURAL ANALYSIS-18CSE11

C101.1	Apply Winkler Bach and Strain Energy principles to obtain stresses and deformation in curved members
C101.2	Derive the expressions to Foundation pressure, Deflection, Slope, BM and SF of infinite and semi-infinite Beams resting on Elastic Foundation
C101.3	Obtain the equations for the shear centre for symmetrical and unsymmetrical from fundamental.
C101.4	Extrapolate the bending theory to calculate the stresses and deformations in unsymmetrical bending.
C101.5	Develop the characteristic equation for the buckling load of compound column and stresses and deformations in beam-column

Course Name: C102 Matrix methods of Structural Analysis -18CSE12

C102.1	Formulate force displacement relation by flexibility and stiffness method
C102.2	Analyze the plane trusses, continuous beams and portal frames by transformation approach
C102.3	Analyze the structures by direct stiffness method

Course Name: C102 ADVANCED DESIGN OF RC STRUCTURES-18CSE13

C102.1	Achieve Knowledge of design and development of problem solving skills
C102.2	Understand the principles of Structural Design.
C102.3	Design and develop analytical skills.
C102.4	Summarize the principles of Structural Design and detailing
C102.5	Understands the structural performance

Course Name: C103 MECHANICS OF DEFORMABLE BODIES-18CSE14

C103.1	Achieve Knowledge of design and development of problem solving skills.
C103.2	Understand the principles of stress-strain behavior of continuum
C103.3	Design and develop analytical skills.
C103.4	Describe the continuum 3 in 2 and dimensions
C103.5	Understand the concepts of elasticity and plasticity

Course Name: C105-STRUCTURAL DYNAMICS-18CSE15

C105.1	Achieve Knowledge of design and development of problem solving skills.

C105.2	Understand the principles of Structural Dynamics
C105.3	Design and develop analytical skills.
C105.4	Summarize the Solution techniques for dynamics of Multi-degree freedom systems
C105.5	Understand the concepts of damping in structures.

Course Name:C106-RESEARCH METHODOLOGY AND IPR-18RMI17

C106.1	Discuss research methodology and the technique of defining a research problem
C106.2	Explain the functions of the literature review in research, carrying out a literature search, developing theoretical and conceptual frameworks and writing a review.
C106.3	Explain various research designs, sampling designs, measurement and scaling techniques and also different methods of data collections
C106.4	Explain several parametric tests of hypotheses, Chi-square test, art of interpretation and writing research reports
C106.5	Discuss various forms of the intellectual property, its relevance and business impact in the changing global business environment and leading International Instruments concerning IPR.

Course Name: C111 ADVANCED DESIGN OF STEEL STRUCTURES-18CSE21

C111.1	Able to understand behavior of Light gauge steel members
C111.2	Able to understand design concepts of cold formed/unrestrained beams
C111.3	Able to understand Fire resistance concept required for present days
C111.4	Able to analyze beam column behavior

Course Name: C112FINITE ELEMENT METHOD OF ANALYSIS-18CSE22

C112.1	Explain the basic theory behind the finite element method.
C112.2	Formulate force-displacements relations for 2-D elements
C112.3	Use the finite element method to analyze real structures.
C112.4	Use a Finite Element based program for structural analysis

Course Name:C113-EARTHQUAKE RESISTANT STRUCTURES-18CSE23

C113.1	Achieve Knowledge of design and development of problem solving skills. Understand the principles of engineering seismology
C113.2	Design and develop analytical skills.
C113.3	Summarize the Seismic evaluation and retrofitting of structures

C113.4	Understand the concepts of earthquake resistance of reinforced concrete buildings.

Course Name: C114 Course Name: C114 ANALYSIS AND DESIGN OF PLATES AND SHELLS18CSE241

C114.1	Achieve Knowledge of design and development of problem solving skills.
C114.2	Understand the principles of Analysis and Design
C114.3	Design and develop analytical skills.
C114.4	Summarize the performance of shells
C114.5	Understand the concepts of energy principle

Course Name: C114 Course Name DESIGN OF TALL STRUCTURES-18CSE254

C115.1	Achieve Knowledge of design and development of problem solving skills.
C115.2	Understand the principles of Analysis and Design
C115.3	Design and develop analytical skills.
C115.4	Summarize the performance of shells
C115.5	Understand the concepts of energy principle

Course Name: C181 DESIGN OF BRIDGES-18CSE31

C181.1	Achieve Knowledge of design and development of problem solving skills.
C181.2	Understand the principles of Analysis and Design
C181.3	Design and develop analytical skills.
C181.4	Summarize the performance of shells
C181.5	Understand the concepts of energy principle

Course Name: C182 DESIGN OF MASONRY STRUCTURE-18CSE332

C182.1	Achieve Knowledge of design and development of problem solving skills.
C182.2	Understand the principles of design and construction of masonry structures
C182.3	Design and develop analytical skills.
C182.4	Summarize the masonry Characteristics.
C182.5	Evaluate the strength and stability of the masonry structures

Course Name: C183 RELIABILITY ANALYSIS OF STRUCTURES 18CSE324

C183.1	Understand the concepts of statistics for probabilistic analysis and importance of uncertainty (randomness) in structural analysis and design.
C183.2	Apply the theoretical principles of randomness of variables in structural
C183.3	Engineering through density functions.

C183.4	Analyze components of structure to assess safety using concepts related to structural reliability by various methods.

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Department of Computer Science Engineering

Vision of the Institute

To be a respected and most sought after engineering educational institution engaged in equipping individuals capable of building learning organizations in the new millennium.To produce technocrats with creative technical knowledge and intellectual skills to sustain and excel in the highly demanding world with confidence.

Mission of the Institute

To develop competent students with good value systems and face challenges of the continuously changing world.

Vision of the Department

To produce technocrats with creative technical knowledge and intellectual skills to sustain and excel in the highly demanding world with confidence.

Mission of the Department

Mission 1. The department's aim is to develop the best computer science professionals who work creatively, communicate effectively & become technologically competent, and to mould them into good citizens by inculcating sense of ethical values in them.

Mission 2. To Encourage the students to build self-help, Power of initiative, courage to change and create new things.

Mission 3. To inculcates the spirit of cooperation and capacity for organization with special emphasis on their self-reliance and sustainability to meet ever changing requirements of local and global industries.

PROGRAM EDUCATIONAL OBJECTIVES

PEO To create graduates equipped with life-long learning skills and have a successful professional career in IT industry.

PEO To prepare graduates to pursue higher education and get inclined towards research & development in computer science engineering.

PEO To provide adequate training and opportunities, with exposure to emerging cutting-edge technologies and to work in teams on multidisciplinary projects with effective communication skills and leadership qualities.

PROGRAM SPECIFIC OBJECTIVES

PSO 1: To design efficient algorithms and develop effective code for real-time computations.

PSO 2: To apply software engineering principles in developing optimal software solutions.

M.Tech in Computer Science and Engineering

Course Name: C101 (MATHEMATICAL FOUDATION OF COMPUTER SCIENCE-18SCS11)

C101.1	Understand the numerical methods to solve and find the roots of the equations.
C101.2	Utilize the statistical tools in multi variable distributions.
C101.3	Use probability formulations for new predictions with discrete and continuous RV's.
C101.4	To understand various graphs in different geometries related to edges.
C101.5	Understand vector spaces and related topics arising in magnification and rotation of images.

Course Name: C102 (ADVANCES IN OPERATING SYSTEMS -18SCS12)

C102.1	Demonstrate the Mutual exclusion, Deadlock detection and agreement protocols of Distributed operating system
C102.2	Learn the various resource management techniques for distributed systems
C102.3	Identify the different features of real time and mobile operating system
C102.4	Modify existing open source kernels in terms of functionality or features used
C102.5	Demonstrate the Mutual exclusion, Deadlock detection and agreement protocols of Distributed operating system

Course Name: C103 (ADVANCES IN DATA BASE MANAGEMENT SYSTEMS-18SCS13)

C103.1	Select the appropriate high performance database like parallel and distributed database
C103.2	Infer and represent the real world data using object oriented database
C103.3	Interpret rule set in the database to implement data warehousing of mining
C103.4	Discover and design database for recent applications database for better interoperability

Course Name: C104 (INTERNET OF THINGS-18SCS14)

C104.1	Develop schemes for the applications of IOT in real time scenarios
C104.1	Manage the Internet resources
C104.3	Model the Internet of things to business
C104.4	Understand the practical knowledge through different case studies
C104.5	Understand data sets received through IoT devices and tools used for analysis

Course Name:C105(ADVANCES IN COMPUTER NETWORKS-18SCS151

C105.1	List and classify network services, protocols and architectures, explain why they are layered.
C105.2	Choose key Internet applications and their protocols, and apply to develop their own applications (e.g. Client Server applications, Web Services) using the sockets
	API.
C105.3	Explain develop effective communication mechanisms using techniques like connection establishment, queuing theory, recovery Etc.
C105.4	Explain various congestion control techniques.

Course Name: C201 (MANAGING BIG DATA -16SCS21)

C201.1	Describe big data and use cases from selected business domains
C201.2	Explain NoSQL big data management
C201.3	Install, configure, and run Hadoop and HDFS
C201.4	Perform map-reduce analytics using Hadoop
C201.5	Use Hadoop related tools such as HBase, Cassandra, Pig, and Hive for big data Analytics

Course Name: C202 (ADVANCED ALGORITHMS-16SCS22)

C202.1	Design and apply iterative and recursive algorithms.
C202.2	Design and implement optimization algorithms in specific applications.
C202.3	Design appropriate shared objects and concurrent objects for applications

Course Name: C203 (CLOUD COMPUTING-16SCS23)

C203.1	Compare the strengths and limitations of cloud computing
C203.2	Identify the architecture, infrastructure and delivery models of cloud computing
C203.3	Apply suitable virtualization concept.
C203.4	Choose the appropriate cloud player
C203.5	Address the core issues of cloud computing such as security, privacy .
C203.6	Design Cloud Services
C203.7	Set a private cloud

Course Name: C204 (ADVANCES IN STORAGE AREA NETWORKS-16SCS241)

C204.1	Identify the need for performance evaluation and the metrics used for it
C204.2	Apply the techniques used for data maintenance.
C204.3	Realize strong virtualization concepts

C204.4	Develop techniques for evaluating policies for LUN masking, file systems

Course Name: C301 (MACHINE LEARNING TECHNIQUES-18SCS31)

C301.1	Choose the learning techniques with this basic knowledge.
C301.2	Apply effectively neural networks and genetic algorithms for appropriate applications.
C301.3	Apply bayesian techniques and derive effectively learning rules.
C301.4	Choose and differentiate reinforcement and analytical learning techniques

Course Name: C302 (INFORMATION AND NETWORK SECURITY-18SCS322)

C302.1	Analyze the vulnerabilities in any computing system and hence be able to design a security solution.
C302.2	Identify the security issues in the network and resolve it.
C302.3	Evaluate security mechanisms using rigorous approaches, including theoretical.

Course Name: C303 (APPLICATION AND WEB SECURITY -18SCS331)

C303.1	Achieve Knowledge of web application's vulnerability and malicious attacks.
C303.2	Understand the basic web technologies used for web application development
C303.3	Understands the basic concepts of Mapping the application.
C303.4	Able to illustrate different attacking illustrations
C303.5	Basic concepts of Attacking Data Stores.

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Department of Information

TechnologyVision of the Institute

To be a respected and most sought after engineering educational institution engaged in equipping individuals capable of building learning organizations in the new millennium.

Mission of the Institute

To develop competent students with good value systems and face challenges of the continuously changing world.

Vision of the Department

To meet the educational, research & service needs of the region through collaboration with academic, technical institutions, businesses, government agencies & cultural organizations, thereby, providing a platform that encourages students & faculty to continue their intellectual & professional growth.

Mission of the Department

To develop the best Information Science Professionals, who work creatively, communicate effectively & become technologically competent and to mould them into good citizens by inculcating sense ethical values in them.

Program Educational Objectives

PEO 5.	Be capable of understanding, analyzing, and applying current & emerging technologies to design and develop solutions to IT/ITES/Software/Telecom related problems and acquire value and employment.
PEO 6.	To have sound foundation in mathematical, scientific and Information science engineering fundamentals necessary to formulate, solve and analyze practical problems and to prepare students for further studies and research.
PEO 7.	Function effectively as individuals and team members in the workplace, growing into highly technical or project management and leadership roles, in various organizations. Create an awareness of the life-long learning process, to communicate effectively, learn necessary tools to successfully identify and adapt to ever changing technologies, by ethical means and code of professional practice.

Program Specific Objectives

PSO 4.	Provide effective and efficient real time solutions with the application of knowledge in IT, ITES, Networking and Software domains.
PSO 5.	Demonstrate the ability to work in a team, with professional ethics, good communication and documentation skills in designing, implementation and management of software products and services, at optimal cost. Proven capability to exchange views/concepts, incubate ideas and to carry out lifelong learning with zeal, to be aware of the state of art technologies and their development.

M.Tech in SCN

Course Name: (ADVANCES IN COMPUTER NETWORKS/18SCN12)

C112.1	List and classify network services, protocols and architectures, explain why they are layered.
C112.2	Choose key Internet applications and their protocols, and apply to develop their own applications (e.g. Client Server applications, Web Services) using the sockets API.
C112.3	Explain develop effective communication mechanisms using techniques like connection establishment, queuing theory, recovery Etc.
C112.4	Explain various congestion control techniques.

Course Name: (INFORMATION AND NETWORK SECURITY/18SCN13)

C113.1	Analyze the vulnerabilities in any computing system and hence be able to design a security solution.
C113.2	Identify the security issues in the network and resolve it.
C113.3	Evaluate security mechanisms using rigorous approaches, including theoretical.

Course Name: C114. (INTERNET OF THINGS/18SCN14)

C114.1	Develop schemes for the applications of IOT in real time scenarios
C114.2	Manage the Internet resources
C114.3	Model the Internet of things to business
C114.4	Understand the practical knowledge through different case studies
C114.5	Understand data sets received through IoT devices and tools used for analysis

Course Name: (WIRELESS NETWORKS AND MOBILE COMPUTING/18SCN151)

C115.1	Explain state of art techniques in wireless communication.
C115.2	Discover CDMA, GSM. Mobile IP, WImax
C115.3	Demonstrate program for CLDC, MIDP let model and security concerns

Course Name:(MULTI-CORE ARCHITECTURE AND PROGRAMMING/18SCN152)

C115.1	Identify the limitations of ILP and the need for multicore architectures
C115.2	Define fundamental concepts of parallel programming and its design issues
C115.3	Solve the issues related to multiprocessing and suggest solutions
C115.4	Make out the salient features of different multicore architectures and how they exploit parallelism
C115.5	Demonstrate the role of OpenMP and programming concept

Course Name: (SOCIAL NETWORK ANALYSIS/18SCN153)

C115.1	Define notation and terminology used in network science.
C115.2	Demonstrate, summarize and compare networks.
C115.3	Explain basic principles behind network analysis algorithms.
C115.4	Analyzing real world network.

Course Name: (CLOUD SECURITY/18SCN154)

C115.1	Demonstrate the growth of Cloud computing, architecture and different modules of implementation.
C115.2	Evaluate the different types of cloud solutions among IaaS, PaaS, SaaS.
C115.3	Access the security implementation flow, actions and responsibilities of stakeholders.
C115.4	Generalize the Data Centre operations, encryption methods and deployment details.
C115.5	Provide recommendations for using and managing the customer's identity and choose the type of virtualization to be used.

Course Name: (COMPUTER NETWORKS AND IOT LABORATORY/18SCNL16)

C116.1	Apply key Internet applications and their protocols, and ability to develop their own applications (e.g. Client Server applications, Web Services) using the sockets API.
C116.2	Design and evaluate application layer protocol
C116.3	Analyze the vulnerabilities in any computing system and hence be able to design a security solution.
C116.4	Identify the security issues in the network and resolve it.
C116.5	Evaluate security mechanisms using rigorous approaches, including theoretical.

Course Name:(MULTIMEDIA COMMUNICATIONS/18SCN21)

C121.1	Deploy the right multimedia communication models.
C121.2	Apply QoS to multimedia network applications with efficient routing techniques.
C121.3	Solve the security threats in the multimedia networks.
C121.4	Develop the real-time multimedia network applications

Course Name: (NETWORK PROGRAMMING/18SCN22)

C122.1	Develop applications that communicate with each other using TCP and SCTP.
C122.2	Identify the IPv4 and IPv6 compatibility.
C122.3	Evaluate socket programming APIs

Course Name: (WIRELESS AD-HOC NETWORKS/18SCN23)

C123.1	Design their own wireless network
C123.2	Evaluate the existing network and improve its quality of service
C123.3	Choose appropriate protocol for various applications
C123.4	Examine security measures present at different level
C123.5	Analyze energy consumption and management

Course Name: (ADVANCES IN STORAGE AREA NETWORKS/18SCN241)

C124.1	Identify the need for performance evaluation and the metrics used for it
C124.2	Apply the techniques used for data maintenance.
C124.3	Realize strong virtualization concepts
C124.4	Develop techniques for evaluating policies for LUN masking, file systems

Course Name: (SWITCHING & STATISTICAL MULTIPLEXING IN TELECOMMUNICATIONS/18SCN242)

C124.1	Explain basics of telecommunications and digital form
C124.2	Elaborate switching and multiplexing, telecommunication.
C124.3	Illustrate transmission control in telecommunication
C124.4	Design and develop switching, multiplexing and traffic control.

Course Name: (ETHERNET TECHNOLOGY/18SCN243)

C124.1	Classify different types of Ethernet systems
C124.2	Contrast Ethernet Media systems
C124.3	Evaluate a complete Ethernet system

Course Name: (MOBILE APPLICATION DEVELOPMENT/18SCN244)

C124.1	Describe the requirements for mobile applications
C124.2	Explain the challenges in mobile application design and development
C124.3	Develop design for mobile applications for specific requirements
C124.4	Implement the design using Android SDK
C124.5	Implement the design using Objective C and iOS
C124.6	Deploy mobile applications in Android and iPone marketplace for distribution

Course Name: (WIRELESS SENSOR NETWORKS/18SCN251)

C125.1	Explain existing applications of wireless sensor actuator networks
C125.2	Apply in the context of wireless sensor networks and explain elements of distributed computing and network protocol design

C125.3	Contrast Various hardware, software platforms that exist for sensor networks
C125.4	Summarize various network level protocols for MAC, routing, time synchronization, aggregation, consensus and distributed tracking

Course Name: (MANAGING BIG DATA/18SCN252)

C125.1	Describe big data and use cases from selected business domains
C125.2	Explain NoSQL big data management
C125.3	Install, configure, and run Hadoop and HDFS
C125.4	Perform map-reduce analytics using Hadoop
C125.5	Use Hadoop related tools such as HBase, Cassandra, Pig, and Hive for big data Analytics

Course Name: (NETWORK MANAGEMENT/18SCN253)

C125.1	Analyze the issues and challenges pertaining to management of emerging network technologies such as wired/wireless networks and high-speed internets.
C125.2	Apply network management standards to manage practical networks
C125.3	Formulate possible approaches for managing OSI network model.
C125.4	Use on SNMP for managing the network
C125.5	Use RMON for monitoring the behavior of the network
C125.6	Identify the various components of network and formulate the scheme for the managing them

Course Name: (ADVANCES IN OPERATING SYSTEMS/18SCN254)

C125.1	Demonstrate the Mutual exclusion, Deadlock detection and agreement protocols of Distributed operating system.
C125.2	Learn the various resource management techniques for distributed systems
C125.3	Identify the different features of real time and mobile operating system
C125.4	Modify existing open source kernels in terms of functionality or features used

Course Name: (CLOUD COMPUTING/18SCN31)

C231.1	Compare the strengths and limitations of cloud computing
C231.2	Identify the architecture, infrastructure and delivery models of cloud computing
C231.3	Apply suitable virtualization concept.
C231.4	Choose the appropriate cloud player
C231.5	Address the core issues of cloud computing such as security, privacy and Interoperability
C231.6	Design Cloud Services

Course Name: (COMPUTER SYSTEMS PERFORMANCE ANALYSIS /18SCN321)

C232.1	Identify the need for performance evaluation and the metrics used for it
C232.2	Implement Little's law and other operational laws
C231.3	Apply the operational laws to open and closed systems
C232.4	Use discrete-time and continuous-time Markov chains to model real world systems
C232.5	Develop analytical techniques for evaluating scheduling policies

Course Name: (NETWORK ROUTING ALGORITHMS/18SCN322)

C232.1	Given the network and user requirements and the type of channel over which the network has to operate, the student would be in a position to apply his knowledge for identifying a suitable routing algorithm, implementing it and analyzing its performance.
C232.2	The student would also be able to design a new algorithm or modify an existing algorithm to satisfy the evolving demands in the network and by the user applications.

Course Name: (INFORMATION SECURITY POLICIES IN INDUSTRY/18SCN323)

C232.1	Explain the content, need, and responsibilities of information security policies.
C232.2	Explain the standards, guidelines, Procedures, and key roles of the organization.
C231.3	Able to write policy document for securing network connection and interfaces.
C232.4	Explain the threats to the stored data or data in transit and able to write policy document.
C232.5	Able to write, monitor, and review policy document.

Course Name: (MACHINE LEARNING TECHNIQUES/18SCN324)

C232.1	Choose the learning techniques with this basic knowledge.
C232.2	Apply effectively neural networks and genetic algorithms for appropriateapplications.
C231.3	Apply bayesian techniques and derive effectively learning rules.
C232.4	Choose and differentiate reinforcement and analytical learning techniques

Course Name: (ANALYSIS OF COMPUTER NETWORKS/18SCN331)

C233.1	List and classify network services, protocols and architectures
C233.2	Implement key Internet applications and their protocols, and will apply to develop their own applications.

Course Name: (PROTOCOL ENGINEERING/18SCN332)

C233.1	Describe the requirements for protocol engineering systems
C233.2	Explain the challenges in designing protocol engineering systems
C233.3	Implement the design using SDL

Course Name: (WEB ENGINEERING/18SCN333)

C233.1	Ability to Model the requirements of a web application.
C233.2	Contrast technology-aware Web Application.
C233.3	Ability to analyze the performances of web applications

Course Name: (WEB MINING/18SCN334)

C233.1	Identify the application areas for web content mining, web structure mining and web usage mining.
C233.2	Design to retrieval the web data
C233.3	Develop schemes to crawl the web data, organize and index
C233.4	Cluster the documents for fast access
C233.5	Develop algorithms used by web mining applications.
C233.6	Select between different approaches and techniques of web mining

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Department of Mechanical Engineering

Vision of the Institute

To be a respected and most sought after engineering educational institution engaged in equipping individuals capable of building learning organizations in the new millennium.

Mission of the Institute

To develop competent students with good value systems and face challenges of the continuously changing world.

Vision of the Department

To become a center of excellence providing state of the art engineering education in mechanical engineering and making individual to be capable of building nation in the new millennium.

Mission of the Department

Mission 1: To provide an excellent teaching and learning process for the students to meet the needs and standards of the current industries and higher learning process.

Mission 2: To promote research and development activity in the recent emerging trends of the mechanical engineering department.

Mission 3: To provide the students with good communication skill, lifelong learning, team spirit and leadership qualities to face the current society.

Program Educational Objectives

PEO 1: Graduates in Mechanical Engineering will apply the basic technical knowledge for design, product development and analysis of mechanical engineering systems.
PEO 2: Graduates in Mechanical Engineering will demonstrate skill for research, innovation, higher studies, and entrepreneurship.
PEO 3: Graduates in Mechanical Engineering will demonstrate good communication skills, dynamic leadership qualities and awareness about environmental protection. blended with ethics and human values.

Program Specific Outcomes

PSO1	Apply Mechanical Engineering knowledge to address wide range of technical and societal problems with lifelong learning and professional development creativity, imagination, confidence, and responsibility.
PSO2	To understand the concept of manufacturing and design analysis of Mechanical components in various industrial sectors and development of the products in mechanical engineering
PSO3	Analyzing, evaluating thermal aspects for design and development of engineering products like I.C Engines, Refrigeration, Air-conditioning, Conventional and Non-Conventional Power Generating Systems.

M.Tech in Machine Design

Course Name: C101 (MATHEMATICAL METHOD IN ENGG-18MDE11)

C101.1	To understand the course are to enhance the knowledge of various methods in finding the roots of an algebraic
C101.2	To understand Transcendental or simultaneous system of equations
C101.3	To solve Numerical Integration: Newton –Cotes and Guass Quadrature Integration formulae, Integration of Equations, Romberg integration
C101.4	To solve Direct methods, Cramer's Rule, Gauss Elimination Method, Gauss-Jordan Elimination Method
C101.5	To evaluate integrals numerically and differentiation of complex functions with a greater Accuracy. These concepts occur frequently in their subjects like finite element method
C101.6	To Analysis for direct methods, Iteration Methods.

Course Name: C102 (Advanced Theory of vibrations-18MDE12)

C102.1	To teach students how to use the theoretical principles of vibration, and vibration analysis techniques, for the practical solution of vibration problems
C102.2	To understand the concepts of Vibration Measurement and applications, Modal analysis & Condition Monitoring
C102.3	To understand the concepts of Transient Vibration of single Degree-of freedom systems and Random vibrations
C102.4	To understand the concepts of Non Linear Vibrations
C102.5	To understand the concepts of Continuous Systems
C102.6	To understand the importance of vibrations in mechanical design of machine parts subject to vibrations.

Course Name: C103 (Continuum Mechanics-18MDE13)

C103.1	To understand the analysis of stress
C103.2	To study the deformation and strain
C103.3	To understand the generalized Hooke's law
C103.4	Formulation of Two Dimensional Electrostatic problems
C103.5	To understand the Basic equations of Visco elasticity
C103.6	Continuum Mechanics background essential to mathematically model physical problems in Solid Mechanics

Course Name: C104 (Dynamics and Mechanism Design-18MDE14)

C104.1	To provide a theoretical and practical foundation for analysis and design of articulated mechanical systems for desired applications
C104.2	Develop skills to analyze the displacement, velocity, and acceleration of mechanisms
C104.3	Improve understanding of the synthesis of mechanisms for given tasks
C104.4	To include dynamics considerations in the design of mechanisms For engineering applications.

Course Name: C105(Fracture Mechanics -18MDE15)

C105.1	Develop basic fundamental understanding of the effects of crack like defects on the performance of aerospace, civil and mechanical Engineering structures
C105.2	Learn to select appropriate materials for engineering structures to insure damage tolerance.
C105.3	Learn to employ modern numerical methods to determine critical crack sizes and fatigue crack propagation rates in engineering structures.
C105.4	To understand the concepts of Dynamics and crack arrest
C105.5	Provides a methodology for prediction, prevention and control of fracture in materials, components and structures.
C105.6	Gain an appreciation of the status of academic research in field of fracture mechanics

Course Name:C106 (Research Methodology and IPR-18RMI17)

C106.1	understand some basic concepts of research and its methodologies
C106.2	identify appropriate research topics
C106.3	select and define appropriate research problem and parameters
C106.4	prepare a project proposal (to undertake a project)
C106.5	organize and conduct research (advanced project) in a more appropriate manner

Course Name: C212 (Finite Element Methods -18MDE21)

C212.1	Knowledgeable about the FEM as a numerical method for the solution of solid mechanics, structural mechanics and thermal problems
C212.2	To present Finite element formulation using variational and weighted residual approaches
C212.3	To present Finite elements for the analysis of bars & trusses, beams & frames.
C212.4	To present Finite elements for the analysis of plane stress & plane strain problems and 3-D solids.
C212.5	To present Finite elements for the analysis of thermal and dynamics problems
C212.6	Developing skills required to use a commercial FEA software

Course Name: C213 (Tribology and Bearing Design -18MDE23)

C213.1	Focuses regarding hydrodynamic, hydrostatic lubrication and various bearings, with their design and applications
C213.2	To understand the concepts of Reynolds's 2D equation
C213.3	To understand the concepts of EHL Contacts
C213.4	To understand the concepts of Antifriction bearings
C213.5	To understand the concepts of Magnetic Bearings
C213.6	To develop skills to design and selection of bearings on various tribological factors to be considered in moving and rotating parts.

Course Name: C213 (Rotor Dynamics-18MDE243**)**

C214.1	To understand the rotor dynamics phenomena with the help of simple rotor models and subsequently the modern analysis methods for real life rotor systems.
C214.2	To understandmodelingofbearings,shaftsandrotorstages(compressors,turbines including blades)to predict instability likewhirling including gyroscopic and Corialiseffect.
C214.3	Provides the student understanding of modeling rotating machine elements theoretically.
C214.4	Upon completion of this course, students will have gained an understanding of the design, application
C214.5	Upon completion of this course, students will have gained an understanding of thereliability evaluation of bearings in rotating machinery applications.

Course Name:C215(Automobile System Design-18MEA252)

C215.1	To understand of the stages involved in automobile system design.
C215.2	To expose thetoindustrialpractices in design of various systems of antomobile.
C215.3	To study importance and features of different systems like axle, differential, brakes, Steering, suspension, and balancing etc.
C215.4	To study working of various Automobile Systems.
C215.5	To know some modern trends in Automotive Vehicles.

Course Name:C215 (Design for manufacture and **Assembly**-18MDE31)

C311.1	To understand various general design rules for manufacturability and criteria for material selection
C312.2	To study various machining process and tolerance aspects in machining.
C313.3	To know the design considerations for casting, forging and welding process.
C314.4	To study the general design guidelines for manual assembly and development of DFA Methodology.

C315.5	Select proper materials and manufacturing processes for designing products/components by applying the relevant principles for ease and economic 36 production.

Course Name:C311 (Experimental Mechanics-18CAE321)

C311.1	To introduce the concepts of dynamic measurements and analysis of experimental data.
C312.2	To expose them to the techniques of Data Acquisition, Signal conditioning and processing.
C313.3	To introduce students to different aspects of measuring deformation, strains, and stresses for developing a mechanistic understanding of both the material and the structure behavior.
C314.4	Tofamiliarizethestudentwithstateoftheartexperimentaltechniquesemployingstraingauges, photoelasticity, Moiréinteroferometry, brittle coating, oiréfringesandholography.
C315.5	Apply the principles and techniques of holographic interferometry.

Course Name:C312 (Composite Materials Technology-18MDE332)

C311.1	To impart a basic understanding of micro-mechanics of layered composites, analysis and design of composite structures and failure analysis of laminated panels.
C312.2	To understand the principles, matrix and reinforcement material options, advantages and disadvantages of different manufacturing techniques of composites.
C313.3	To comprehend recent developments in composites, including metal, ceramic and polymer matrix composites.
C314.4	To know the use of composites in engineering applications.
C315.5	Analyze the performance of composites in engineering applications.

M.Tech in Thermal Power Engineering

Course Name: C101 (MATHEMATICAL METHOD IN ENGG-18MTP11)

C101.1	To understand the course are to enhance the knowledge of various methods in finding the roots of an algebraic
C101.2	To understand Transcendental or simultaneous system of equations
C101.3	To solve Numerical Integration: Newton –Cotes and Guass Quadrature Integration formulae, Integration of Equations, Romberg integration
C101.4	To solve Direct methods, Cramer's Rule, Gauss Elimination Method, Gauss-Jordan Elimination Method
C101.5	To evaluate integrals numerically and differentiation of complex functions with a greater Accuracy. These concepts occur frequently in their subjects like finite element method
C101.6	To Analysis for direct methods, Iteration Methods.

Course Name: C102 (Finite Element Methods -18MTP21)

C102.1	Knowledgeable about the FEM as a numerical method for the solution of solid mechanics, structural mechanics and thermal problems
C102.2	To present Finite element formulation using variational and weighted residual approaches
C102.3	To present Finite elements for the analysis of bars & trusses, beams & frames.
C102.4	To present Finite elements for the analysis of plane stress & plane strain problems and 3-D solids.
C102.5	To present Finite elements for the analysis of thermal and dynamics problems
C102.6	Developing skills required to use a commercial FEA software

Course Name: C103 (Advanced Fluid Mechanics-18MTP13)

C103.1	Explain the basic concepts fluid flow and their governing equations
C103.2	Understand the concepts in the analysis of fluid flow problems in laminar and Turbulent flows
C103.3	Formulate and solve one dimensional incompressible and compressible fluid flow problems
C103.4	Distinguish normal and oblique shocks and their governing equations.
C103.5	Identify relevant instruments and methods for flow measurements

Course Name: C104 (Thermodynamics &Combustion Engineering-18MTP14)

C104.1	Understand the concepts of combustion phenomena in energy conversion devices.

C104.2	Apply the knowledge of adiabatic flame temperature in the design of combustion devices.
C104.3	Identify the phenomenon of flame stabilization in laminar flames.
C104.4	Identify the phenomenon of flame stabilization in turbulent flames.
C104.5	Analyze the pollution formation mechanisms in combustion of solid, liquid and gaseous fuels.

Course Name: C105(Energy Conservation and Management-18MTP15)

C105.1	Understand the various conservation techniques
C105.2	Explain various Energy Efficiency Improvement technique
C105.3	Employ the principles of thermal engineering and energy management to improve the performance of thermal systems.
C105.4	Assess energy projects on the basis of economic and financial criteria.
C105.5	Describe methods of energy production for improved utilization

Course Name: C107 (Thermal Engineering measurement - Lab 1-18RMI17)

C106.1	Perform experiments to determine the coefficient of discharge of flow measuring devices.
C106.2	Conduct experiments on hydraulic turbines and pumps to draw characteristics.
C106.3	Test basic performance parameters of hydraulic turbines and pumps and execute the knowledge in real life situations.
C106.4	Identify exhaust emission, factors affecting them and report the remedies.
C106.5	Determine the energy flow pattern through the hydraulic machines and I C Engine
C106.6	Exhibit his competency towards preventive maintenance of IC engines.

Course Name:C107 (Research Methodology and IPR-18RMI17)

C107.1	understand some basic concepts of research and its methodologies
C107.2	identify appropriate research topics
C107.3	select and define appropriate research problem and parameters
C107.4	prepare a project proposal (to undertake a project)
C107.5	organize and conduct research (advanced project) in a more appropriate manner

Course Name: C212 (Advanced Heat Transfer-18MTP21)

C212.1	Summarize both the physics and the mathematical treatment of the advanced topics pertaining to the modes of heat transfer.
C212.2	Use principles of heat transfer to develop mathematical models for uniform and non-uniform fins.

C212.3	Employ mathematical functions and heat conduction charts in tackling two-dimensional and three dimensional heat conduction problems.
C212.4	Identify free and forced convection problems involving complex geometries with proper boundary conditions.
C212.5	Use the concepts of radiation heat transfer for enclosure analysis.

Course Name: C213 (Steam &Gas Turbines-18MTP22)

C213.1	Summarize the working principles of Gas and steam turbines nozzle and diffusers.
C213.2	Use the principles of thermodynamics to determine the performance of steam and gas turbines.
C213.3	Distinguish and demonstrate the working principle and performance of impulse and reaction turbines
C213.4	Explain the concepts of axial flow and centrifugal compressors
C213.5	Differentiate axial flow and radial flow gas turbines for their analysis.

Course Name: C213 (Alternate Fuels for 1C Engines-18MTP243)

C214.1	Explain about the availability and usage of conventional fuels for IC engines.
C214.2	Identify possible alternative fuels for IC engines.
C214.3	Demonstrate the use of alternative fuels for different types of engines
C214.4	Assess the environmental impact standards
C214.5	Performance using alternate fuels.

Course Name:C215 (Theory of 1C Engines-18MTP251)

C215.1	Distinguish different Fuel-air and actual cycles.
C215.2	Demonstrate the different types of injection and carburetor systems
C215.3	Formulate the flow and combustion phenomenon for modeling
C215.4	Identify the various types of emissions ,noise and their control systems
C215.5	Recommend the suitable alternative fuel for IC Engine.

Course Name:C215 (Simulation Laboratory Projects on Thermal Engineering - Lab 2-18MTPL26

C311.1	Explain the basic principles and concepts underlying in modeling techniques
C312.2	Explain the basic principles and concepts underlying in simulation techniques
C313.3	Optimize the design of thermal systems.
C314.4	Develop representational modes of real processes and systems.
C315.5	Generate suitable modeling techniques to compute the performance.

Course Name:C311 (Design of heat Transfer Equipment's for thermal powerPlant -18CAE321)

C311.1	Understand the physics and the mathematical treatment of typical heat exchangers.

C312.2	Employ LMTD and Effectiveness methods in the design of heat exchangers and analyze the importance of LMTD approach over AMTD approach.
C313.3	Examine the performance of double-pipe counter flow (hair-pin) heat exchangers.
C314.4	Design and analyze the shell and tube heat exchanger.
C315.5	Understand the fundamental, physical and mathematical aspects of boiling and condensation.
C316.6	Classify cooling towers and explain their technical features.

Course Name:C312 (Convective Heat and Mass Transfer-18MTP321

C311.1	Understand the fundamental and advanced principles of forced and natural convection heat transfer processes.
C312.2	Formulate and solve convective heat transfer problems
C313.3	Relate the principles of convective heat transfer to estimate the heat dissipation from devices.
C314.4	Estimate the energy requirements for operating a flow system with heat transfer.
C315.5	Relate to the current challenges in the field of convective heat transfer.

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Academic Year-2019-20

Department of Automobile Engineering

Vision of the Institute

To be a respected and most sought after engineering educational institutions engaged in equipping individuals capable of building learning organizations in the new millennium.

Mission of the Institute

To develop competent students with good value systems and face challenges of the continuously changing world.

Vision of the Department

To establish the department as a renowned center of excellence in the area of scientific education, research with industrial guidance and exploration of the latest advances in the rapidly changing field of Automobile Engineering.

Mission of the Department

Mission 1. The Department will serve its students, industry and society by fulfilling the mission of learning, and engagement through the creation, dissemination and application of engineering methods.

Mission 2. Encourage students to continuously challenge the existing methods in Automobile Engineering with an intention to align the students towards research.

Mission 3. Impart knowledge on practical aspects and professional standards relevant to the practice of Automobile Engineering in the many aspects of modern life where it plays a vital role.

Program Educational Objectives

PEO 1.	Graduates shall display technical knowledge in basic Mechanical and Automobile Engineering subject areas enabling them to find career opportunities in relevant government agencies, reputed private firms.
PEO 2.	Graduates shall gain practical knowledge in the working of Automobile Systems, capable of working on indigenous projects, ventures related to automotive discipline.
PEO 3.	Graduates shall be well versed with the academic learning material of the course syllabus and ready to take up further learning through higher education and scientific research. Graduates shall be well equipped with the requirements of the current industries to obtain job opportunities in Mechanical and Automotive sectors in the design, Manufacturing, Analysis domains.

Program Specific Objectives

PSO1. Graduate will demonstrate the knowledge to design, develop, implement, and use same into various domains to identify cause and hence provide solutions in the automotive field.

PSO2. Graduate to work in interdisciplinary environment to design systems with the futureemission norms and safety standards in automobile sector.

PSO3. Graduate will be able to pursue of lifelong learning and professional development to face the challenging and emerging needs of our society.

Course Name: (Engineering Mathematics III-8MAT31)

CO-1	Know the use of periodic signals and Fourier series to analyze circuits and system communications.
CO-2	Explain the general linear system theory for continuous-time signals and digital signal processing using the Fourier Transform and z-transform.
CO-3	Employ appropriate numerical methods to solve algebraic and transcendental equations
CO-4	Apply Green's Theorem, Divergence Theorem and Stokes' theorem in various applications in the field of electro-magnetic and gravitational fields and fluid flow problems.
CO-5	Determine the extremals of functionals and solve the simple problems of the calculus of variations.

Course Name: (Engineering Thermodynamics-18AU32)

CO-1	Explain different types of material crystal structures and arrangement of atoms.
CO-2	Describe various mechanical properties of materials.
CO-3	Describe about different types of fractures and their importance in engineering. applications.
CO-4	Draw and Interpret TTT curves and Iron carbon diagram
CO-5	Identify various ferrous metals and nonferrous metals and alloys based on composition and properties
CO-6	Describe about different types of composite materials and their production and application in engineering field

Course Name: (Material Science And Metrology-18AU33)

CO-1	Define and explain fundamental thermodynamic laws and concepts, work, various types of works and heat and its applications, entropy and its relations, Zeroth, First & Second law of thermodynamics and its applications.
CO-2	Explain various thermodynamic relations, constants of gas and basics of ideal gas & its mixtures.
CO-3	Calculate load and IP, BP and other performance characteristics of I.C. engines.
CO-4	Explain the selection of air conditioning system; evaluate thermal performance of refrigeration cycles.
CO-5	Calculate efficiency and MEP of various gas power & vapor power cycles.
CO-6	Explain the principles of gas turbine & jet propulsion system and their fuels

Course Name: (Mechanics of Materials-18AU34)

CO-1	Explain the concepts of stress, strain; material properties.
CO-2	Explain the behavior of materials under different loading conditions
CO-3	Calculate SF and BM and draw the SF and BM diagrams types of beams carrying different types of loads.
CO-4	Explain the concepts of torque and calculate the diameter of hollow and solid shafts subjected to twisting moment.
CO-5	Stresses & angle of twist induced into the shaft due to twisting.
CO-6	Calculate Critical load for different types of columns using Euler's, Rankine's equations & limitations of these equations and explain the applications.

Course Name: (MMM-18AU35)

CO-1	Explain the significance of mechanical measurements and components of a generalized measurement system.
CO-2	Classify and explain principles of various types of transducers, modifying devices and terminating devices.
CO-3	Explain the working principle of instruments used for measurement of Force, Torque, Pressure, Temperature, Strain and Vibration
CO-4	Classify the comparators and explain their working principles.
CO-5	Explain the objectives of metrology and explain various standards of length such as line and end standards
CO-6	Explain the usage of instruments used for the measurement of screw thread and gear parameters.

Course Name: (Manufacturing Process-I-18AU36)

CO-1	Define various terminologies used in casting process.
CO-2	Explain basic concepts used in construction of various moulds.
CO-3	Analyze the working of various moldings machines.
CO-4	Select the appropriate moulding machine and moulding process depending on the type of raw material required to produce the desired product
CO-5	Select the appropriate joining process depending on the type of joint required to produce the desired product.
CO-6	Select the Non-Destructive Testing method for application

Course: Dynamics of Machines-17AU52

CO-1	Calculate static forces at various points in different types of mechanism
CO-2	Calculate fluctuation of energy in flywheel and dimensions of flywheel

CO-3	Balance rotating masses and of reciprocating masses in internal combustion engine, V engine, radial engine and to solve analytically and graphically to balance the systems
CO-4	Describe gyroscopic couple and to understand effect of gyroscopic couple
CO-5	Calculate gyroscopic effect on stability of vehicles, ship, aircraft etc.
CO-6	Analyze effect of profile of cam on motion of followers

Course Name: Design of Machine Elements 1-17AU53

CO-1	To know the Standards in Design, Selection of materials as per CODES &STANDARDS
CO-2	Analyze the various modes of failure of machine components under different static load conditions and use appropriate theories of failures
CO-3	To understand the Impact stresses for machine components, Fatigue stress analysis stress concentration
CO-4	To evaluate dimensions of shafts and other simple machine components
CO-5	Able to understand design of joints like welded and riveted joints
CO-6	Terminologies and Design of threaded joints and power screws

Course Name: Automotive Fuels & Combustion-17AU54

CO-1	Introduce understanding about available energy sources for ICE
CO-2	Distinguish between properties of difference fuels
CO-3	Determine the A/F ratio for complete combustion
CO-4	Explain and differentiate between multi fuel and dual fuel engines
CO-5	Design SI& CI engine combustion chambers
CO-6	Explain stages of combustion in S.I. & C.I. engines

Course Name: (CAD/CAM)17AU551

CO-1	Use the Solid Edge software for drawing and solid modeling.
CO-2	Sketch the solutions of the sections of solids, determine the inclination of the cutting plane when true shape of section of an object is given.
CO-3	Sketch and draw the orthographic views of simple machine parts (top view, front view, side view) using first angle projection. • Sketch and draw the sectional views of simple machine parts.
CO-4	Sketch and draw ISO metric threads, Square, ACME & BSW forms of threads using conventional representation.
CO-5	Distinguish between temporary and permanent joints and sketch and draw the different types of keys. • Sketch and draw two views of different types of riveted joints

C0-6	Create solid models of different parts and assemble them and draw their sectional views using Solid Edge software. • Prepare assembly drawings along with their bill of material.

Course Name: (AE & ES)-15AU71

CO-1	Explain the construction of battery used in automotive vehicles.
CO-2	Describe the construction and working of cranking motor, D. C. generator, alternator, ignition systems along with trouble shooting.
CO-3	Discuss the faults arising in automotive wiring and lighting system.
CO-4	Explain various chassis electrical systems.
CO-5	Describe transducers and sensors.
CO-6	Explain various aspects of electrical and Hybrid vehicles.

Course Name: (Automotive Engine Component Design & AS-15AU72

CO-1	Calculate major dimensions of engine components like cylinder, piston, connecting rod, crankshaft, valve and valve operating mechanisms.
CO-2	Analyze working of two stroke engines.
CO-3	Select suitable scavenging process for two stroke engines.
CO-4	Select suitable lubricant and lubrication system for given engine
CO-5	Calculate amount coolant required and select suitable cooling system for given engine.
CO-6	Explain need for supercharger and modifications required in engine for supercharging.

Course Name: (Finite Element Modelling & Analysis) -15AU73

CO-1	The question paper will have ten questions
CO-2	Each full question consists of 16 marks
CO-3	There will be 2full questions (with a maximum of four sub questions) from each module.
CO-4	Each full question will have sub questions covering all the topics under a module.
CO-5	The students will have to answer 5 full questions, selecting one full question from each module.

Course Name: (Earth Moving Equipment& Tractors) -15AU741

CO-1	Gain the knowledge about various basic operations and applications of earth moving equipment.
CO-2	Acquire the knowledge of under carriage, hydraulics, steering of tractors.
CO-3	Get the complete information about the earth moving equipment
CO-4	Select suitable machine depending on type of land, haul distance, climate, etc.

Course Name: (Two & Three Wheeled Vehicle)-15AU754

CO-1	Describe construction and working of different type of internal combustion engines for two and three wheeled vehicles.
CO-2	Laydown wiring diagram for two-wheeler and three wheeled vehicles.
CO-3	Explain types of clutches, transmission and final drives used for two and three wheeled vehicles.
CO-4	Describe types of frames, brakes and tires used for two and three wheeled vehicles.
CO-5	Laydown maintenance schedule for two and three wheeled vehicles.

Course Name: (CP & SM)-18MAT41

CO-1	Solve first and second order ordinary differential equation arising in flow problems using single step and multistep numerical methods.
CO-2	Illustrate problems of potential theory, quantum mechanics and heat conduction by employing notions and properties of Bessel's functions and Legendre's polynomials.
CO-3	Explain the concepts of analytic functions, residues, poles of complex potentials and describe conformal and Bilinear transformation arising in field theory and signal processing.
CO-4	Develop probability distribution of discrete, continuous random variables and joint probability distribution occurring in digital signal processing, information theory and design engineering.
CO-5	. Demonstrate testing of hypothesis of sampling distributions and illustrate examples of Markov chains related to discrete parameter stochastic process.

Course Name: (Fluid Mechanics) 18AU42

CO-1	Define fluid properties and distinguish between types of fluids. • Describe Pascal's law, Hydrostatic law & their application to solve engineering static fluid problems.
CO-2	Explain the concepts of Buoyancy and stability of floating objects. • Explain the types of flows, application of continuity equations.
CO-3	Explain the forces acting when fluid is under motion & application of Bernoulli's equation for solving flow problems
CO-4	Estimate the various types of losses in pipes.
CO-5	Analyze various forces acting on submerged bodies in engineering flow problems.

Course Name: (Kinematics of Machine) 18AU43

CO-1	Define and explain the terms such as Link, Kinematic chain, Kinematic pair, types of pairs, degree freedom, Mechanism, Machine Mobility.
CO-2	Sketch and explain various types of mechanisms, and their inversions.
CO-3	Draw Velocity and Acceleration of simple mechanisms using Instantaneous center method, Analytical and Graphical methods.

CO-4	Explain the Gear terminology, Law of gearing, gear tooth systems
CO-5	Determine the velocity ratio of different types of gear trains using tabular and algebraic methods
CO-6	To draw cam profile and calculate the velocity and acceleration of cams at any given instant.

Course Name: (Automotive Engines) :18AU44

CO-1	Explain the constructional details of SI and CI engines and classify engines.
CO-2	Explain the construction and working of carburetors and fuel injection pumps.
CO-3	Explain the combustion process in SI and CI engines.
CO-4	Suggest an efficient cooling system for IC engines.
CO-5	Select a proper lubricant to be used in an automobile used in various environmental conditions.

Course Name: (Computer Aided Machine Drawing) 18AU46

CO-1	Use the Solid Edge software for drawing and solid modeling.
CO-2	Sketch the solutions of the sections of solids, determine the inclination of the cutting plane when true shape of section of an object is given.
CO-3	Sketch and draw the orthographic views of simple machine parts (top view, front view, side view) using first angle projection. • Sketch and draw the sectional views of simple machine parts.
CO-4	Sketch and draw ISO metric threads, Square, ACME & BSW forms of threads using conventional representation.
CO-5	Distinguish between temporary and permanent joints and sketch and draw the different types of keys. • Sketch and draw two views of different types of riveted joints
C0-6	Create solid models of different parts and assemble them and draw their sectional views using Solid Edge software. • Prepare assembly drawings along with their bill of material.

Course Name: (Manufacturing Process-II) 18AU45

CO-1	Define various terminologies used in production technology.
CO-2	Explain basic concepts used in construction of various machine tools.
CO-3	Analyze the various mechanisms underlying the working of various machine tools.
CO-4	Select the appropriate machining process depending on the properties of the raw material required to produce the desired product.
CO-5	Select non-traditional machining process for given application.

Course Name: Automotive Chasis & Suspension) :17AU61

CO-1	Explain different chassis layouts and frames and solve for stability and weight distribution and suitability cross sections for frames.
CO-2	Describe various Front Axles, factors of wheel alignment Steering Systems and Calculate dimensions of Front Axle.
CO-3	Describe various types of Propeller Shaft, Differential and Rear axles and can find dimensions of these components.
CO-4	Select type of brake required to given application and will be able to calculate basic dimension of brakes.
CO-5	Describe, About Various Types of Suspensions, Wheels, and Tires
Co-6	Calculate dimensions of different suspensions.

Course Name: (Heat and Mass Transfer) 17AU62

CO-1	Demonstrate fundamental principles and laws of conduction, convection, and radiation modes of heat transfer.
CO-2	Analyze one dimensional steady state heat transfer. Analyze one dimensional one-dimensional unsteady state heat transfer
CO-3	Analyze one dimensional forced convection heat transfer problems.
CO-4	Analyze one dimensional application like flow over flat plate etc.
CO-5	Introduce basic principle of heat exchanger analysis and thermal design.
Co-6	Apply laws of radiation heat transfer to solve engineering problems.

Course Name: (Design of Machine Elements-II) 17AU63

CO-1	Design the curved beams using the equations of stress.
CO-2	Design helical spring and leaf spring using the equations of stress and deflection.
CO-3	Design the spur gears and helical gears using different parameters and check the gears for dynamic and wear load.
CO-4	Design sliding contact and rolling contact bearings to find coefficient of friction, heat generated, heat dissipated and average life of bearings.
CO-5	Design the various types of bevel gears and worm gears for dynamic and wear load using various parameters.
Co-6	Analyze and design given machine components and present their designs in the form of a Report.

Course Name: (Automotive Transmission) :17AU64

CO-1	Explain the Constructional, design and working principles of different types of clutches.

CO-2	Explain the constructional and working principle of different types of fluid flywheel, torque converter and one-way clutches.
CO-3	Explain the constructional and working principle of different types of gear box.
CO-4	Determine the gear ratio, speed of vehicle and number of teeth on driving and driven gears.
CO-5	Explain the necessity and advantages of automatic transmission.
Co-6	Explain the constructional and principle of operation of different types of automatic transmissions and hydraulic control.

Course Name: (Composite Materials) 17AU653

CO-1	Describe basic concepts of composite materials and application of composite materials in various engineering fields.
CO-2	Describe various FRP processing.
CO-3	Describe selection, requirements for production and application of MMCs.
CO-4	Describe concepts of nano materials, nano technology and use of nano materials.
CO-5	Use various techniques used for MMCs production.
Co-6	Analyze micro mechanical properties of lamina using various approaches.

Course Name: (Vehicle Body Engineering & Safety15AU81

CO-1	Classify the vehicles and define basic terms.
CO-2	Select appropriate body material. 3. Calculate various aerodynamic forces and moments acting on vehicle.
CO-3	Calculate load distribution in vehicle body.
CO-4	Explain the ergonomics, stability the vehicle.
CO-5	Identify the various safety aspects in each vehicle.
Co-6	Identify various sources of noise and methods of noise separation

Course Name: (Mechanical Vibration:15AU82

CO-1	Classify different types of vibration / damping associated with systems and vibration measuring instruments.
CO-2	Calculate natural frequency, damping, logarithmic decrement, and other parameters of single degree of freedom un-damped / damped free vibrating systems
CO-3	Compute the response of single degree of freedom damped vibrating systems to different excitation forces.
CO-4	Determine the natural frequencies and the modes of two degree of freedom free vibrating systems

CO-5	Compare the natural frequencies / modes of multi-degree of freedom free vibrating systems using numerical methods

Semester: (Total Quality Management15AU831

CO-1	Explain basic concepts of TQM.
CO-2	Describe leadership qualities, different factors of customer satisfaction and benefits of involvement of employee in quality management
CO-3	Describe various techniques for continuous process improvement and to understands its benefits
CO-4	Apply various tools and techniques in industries to achieve the higher productivity
CO-5	Describe importance of HR dept. recruitment process, importance of training of employees
Co-6	Understand use of various graphical representation of process behavior in TQM

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DEPARTMENT OF BIOTECHNOLOGY

Vision of the Department

Aspiring to be recognized as a premier source of outstanding graduates, who in turn will help their enterprise attain and sustain industrial and societal competitiveness.

Mission of the Department

To create and disseminate knowledge by being accountable for developing and motivating our pupils to attain academic excellence and industrial competency. With our focus on teaching, learning & research, we engage in helping our students to face challenges in the field of Biotechnology

Detailed Mission

M1	To embrace and disseminate fundamental and applied knowledge of Biotechnology Engineering to attain academic excellence and industrial competency
M2	To empower the students for enhanced performance through continuous learning and research capabilities in multidisciplinary domains
M3	To create awareness about professional conduct and socio-ethical implications of potentials of biotechnology
M4	To equip the students to interrelate biotechnological solutions for present day challenges

Program Specific Objectives

1: Graduates will gain and apply knowledge of Science, Biotechnology and Engineering concepts in order to design and perform the experiments followed by validating the data to solve complex problems in the multidisciplinary research fields of Biotechnology.

2: Graduates will be able to analyze, appraise and develop technologies to address the Biotechnology Engineering problems while keeping in mind safety & ethical factors to safeguard the environment and society at large.

Program Educational Objectives

1. To endow students with basics of mathematics, life sciences and engineering necessary to analyze and solve scientific problems.
2. To provide students with the necessary instructions and relevant practical experience combined with exposure to and adequate training to face basic challenges in Biotechnology.
3. To inculcate scientific temperament in students to pursue and engage in research projects related to health, food, and environment.
4. To prepare students with efficient communication skills, team spirit and leadership qualities and awareness of professional conduct and mould them into responsible and competent engineers.
5. To empower students to work in scientific environment with ethical values and social responsibilities.

Course Name: C201(Biostatistics-18BT31)

C201.1	Study and design various statistical problems
C201.2	Foundation to tackle live problems in various spheres of bioscience and bioengineering.
C201.3	Demonstrate strong basics in statistics and numerical analysis

Course Name: C202(Microbiology-18BT32)

C202.1	Describe the structure and function of typical prokaryotic and eukaryotic cell structure like bacteria, algae, yeast & molds, protozoa, viruses, etc.
C202.2	Ability to isolate, grow, identify the microorganisms.
C202.3	Study of equipment's like LAF, hot air oven, autoclave microscope etc. and their role in sterilization and understanding the mechanism of chemical based sterilization
C202.4	Learning to disinfect the microbes and to work in sterile environment.
C202.5	Define the role of microorganisms towards environmental protection, industrial applications, and infectious diseases their diagnosis and control of the spread of the disease.
C202.6	Out-line industrial fermentation processes leading to the production of antibiotics, organic acids, enzymes, vitamins, and therapeutic products.

Course Name: C203 (UnitOperations-18BT33)

C203.1	State and describe the nature and properties of the fluids
C203.2	Classify fluid systems and understand its behavior and derive equations governing fluid flow
C203.3	Study the different flow measuring instruments and demonstrate applications of Bernoulli's theorem in venturi meter, orifice meter and pumps.
C203.4	Illustrate the working of size reduction, sedimentation, and mixing equipment's.
C203.5	Understand the working of mass transfer operations and distinguish them
C203.6	Design and operate the heat exchange equipment

Course Name: C204 (Introduction to Biomolecules-18BT34)

C204.1	present the foundational principles of macromolecular structure and function
C204.2	understand the principle of high energy molecules and Photosynthesis

C204.3	Understand about biological membrane and transport mechanism across the cell membrane and analyses its regulation

Course Name: C205 (Cell Biology and Genetics-18BT35)

C205.1	Able to summarize and recollect the concepts of cell biology and understand the cell
	organelles and functions
C205.2	To Exploit and analyze the knowledge of cell division and importance of cell cycle regulation and cell locomotion
C205.3	explain the concepts of hematology and Growth factors
C205.4	understand the structure of genetic material, classical experiments, and Mendelian laws of Inheritance
C205.5	Illustrate the gene interactions, linkage, mapping, and the structure of chromosome.
C205.6	To interpret the knowledge of population genetics in brief &apply the fundamental aspects of genetics in biotechnology

Course Name: C206 (PYTHON programming-18BT36)

C206.1	Develop algorithmic solutions to simple computational problems
C206.2	Read, write, execute by hand simple Python programs.
C206.3	Structure simple Python programs for solving problems.
C206.4	Decompose a Python program into functions.

Course Name: C207(Microbiology Laboratory-18BTL37)

C207.1	To use different laboratory equipment and instruments such as Microscope, Laminar Air Flow Station, Autoclave, oven, incubators
C207.2	Prepare the media and use for the cultivation of the microorganisms.
C207.3	Perform laboratory experiments for the isolation, identification, and characterization of microorganisms
C207.4	Carry-out experiments for the enumeration, staining and control.
C207.5	Understanding the biochemical characterization of microbes to establish taxonomic classification.
C207.6	Ability to interpret the growth pattern and mechanism and correlation w.r.t industrial microbiology

Course Name: C208 (Unit Operations Laboratory-18BTL38)

C208.1	Arrive at required results based on experimental observations recorded systematically.
C208.2	Study and illustrate the working of different flow measuring instruments
C208.3	Understand and estimate the shape and size of irregular particles by sieve analysis
C208.4	Demonstrate the experimental procedure for mass transfer operation though distillation and diffusion studies.
C208.5	Study heat transfer operation in double pipe heat exchanger and compare flow
	patterns of double pipe heat exchanger
C208.6	Understand operation of centrifugal and reciprocating pumps by varying flow rates

Course Name: C209 (Stoichiometry-18BT41)

C209.1	Discuss the significance of material and energy balance for bioprocess technology.
C209.2	Solve problems related to material and energy balance to give solutions for bioprocess development.
C209.3	Develop the flowsheet for general processes operating in bioprocess industry.
C209.4	Apply the stoichiometry of microbial growth and product formation involved in bioprocess technology

Course Name: C210 (Molecular Biology-18BT42)

C210.1	Explain replication, transcription and translation processes with underlying differences in prokaryotic and eukaryotic systems
C210.2	Recognize and explain the role of enzymes and factors involved in replication, transcription, and translation
C210.3	Describe the regulation of gene expression in prokaryotes and eukaryotes and interpret its importance
C210.4	Elaborate importance of genetic recombination with special reference to bacterial system
C210.5	Categorize DNA damage occurring in living system and outline repair mechanisms
C210.6	Apply the knowledge of molecular biology in biotechnological applications

Course Name: C211(Immunotechnology-18BT43)

C211.1	Classify the immune system and summarize their functions

C211.2	Outline the molecular and cellular mechanisms involved in the development of the immune response
C211.3	Explain the regulatory mechanism involved in development of immune response
C211.4	Describe the cause, challenges and treatment for Immune System Pathologies
C211.5	Describe the cause, challenges and treatment for Immune System Dysfunctions
C211.6	Apply the major immunological laboratory techniques and their application to both clinical analysis and experimental research

Course Name: C212(Cell Culture Techniques-18BT44)

C212.1	Ability to understand the importance of equipment's a, their sterilization and usage aspects
C212.2	Able to Differentiate between the various sources of cells to be used in cell culture techniques
C212.3	Ability to Correlate between different biological samples and understand the importance of different media in tissue culture
C212.4	Ability to Comprehend the applications of plant tissue culture and their utilization.
C212.5	Ability to Comprehend the applications of animal and microbial cell culture in industry, healthcare, and environment.
C212.6	Appraise the role of biotechnology in plant, animal, and microbial sciences for sustainable eco-system & human welfare

Course Name: C213(BiochemicalThermodynamics-18BT45)

C213.1	State & describe the concepts of system, surrounding, process, laws of thermodynamics & entropy
C213.2	Explain the PVT behavior of pure fluids and derive equations of state for real gases
C213.3	Distinguish between various equations of state & their applications and analyze the thermodynamic diagrams
C213.4	Determine the importance of partial molar properties, activity co-efficient of solution & the concepts of phase equilibrium.
C213.5	Summarize vapor liquid equilibrium data for ideal solutions
C213.6	Illustrate the phase rule for reacting systems and effect of temperature, pressure on equilibrium constants

Course Name: C214(Clinical Biochemistry-18BT46)

C214.1	Able to discuss the biochemistry and pathophysiology associated with various disorders of cellular metabolism and inborn errors of metabolism.
C214.2	Able to describe the structure and function of metabolic pathways for carbohydrates, amino acids and lipids and their corresponding clinical conditions.
C214.3	Able to analyze the medical problems associated with abnormal lipoprotein and enzyme levels and therapeutic agents used to treat such disorders.
C214.4	Able to assess the clinical manifestations of renal, hepatic, pancreatic, gastric, and intestinal functions.
C214.5	Able to understand and outline the significance of hormonal systems and their corresponding disturbances.
C214.6	Able to evaluate the biochemical and clinical aspects of hematology including measurement of coagulation and thrombosis.

Course Name: C215(BiochemistryLaboratory-18BTL47)

C215.1	Able to understand and use many of the techniques and tools of biochemistry
C215.2	Able to explain the basic concepts of pH, buffers, and colorimeter
C215.3	Able to comprehend fundamental principles of biochemical research and conduct qualitative and quantitative analysis of biological samples for constituents like glucose, urea, phosphate, iron & cholesterol
C215.4	Able to evaluate the properties of important biomolecules like carbohydrates, amino acids, proteins & lipids
C215.5	Able to implement experimental protocols, and adapt them to plan and carry out simple clinical investigations to identify biomolecules based on their color reactions
C215.6	Able to develop basic laboratory skills and use apparatus to obtain reproducible data from biochemical experiments and analyze, interpret, and report the results of clinical investigations.

Course Name: C216(ImmunoTechnologyLaboratory-18BTL48)

C216.1	Learn and demonstrate the various Immunodiagnostic techniques like agglutination, precipitation, immunoelectrophoretic, qualitative analysis, ELISA, separation of Lymphocytes and Immunoblot
C216.2	Independently carry out research experiments in immunology and cell biology.

Course Name: C301(Bio-Kinetics AND Bio-Reaction-17BT51)

C301.1	Understand the different importance of kinetic and thermodynamic considerations for the choice of feed temperature in reactor systems.
C301.2	Explain the different steps in reaction mechanisms on catalytic surfaces and identify the rate determining step
C301.3	Comprehend the fundamentals of Microbial growth kinetics and its stoichiometry
C301.4	Analyze the kinetic study of enzymes and its regulation
C301.5	Develop suitable environment for microbial growth by analyzing various parameters.

Course Name: C302(Genetic Engineering & Applications-17BT52)

C302.1	Able to explain the basic concepts of gene cloning and of applications recombinant DNA technology
C302.2	Able to categorize vectors, enzymes, and nucleic acid purification strategies important for transgenic technology, gene manipulation concepts and transgene methods.
C302.3	Able to outline and assess specific techniques like PCR, hybridization & construction of libraries used in genetic engineering
C302.4	Able to appraise the different gene/DNA transfer techniques to produce transgenic organisms
C302.5	Able to comprehend various methods of producing transgenic plants and animals and engineering microbes to produce useful products like enzymes and antibiotics
C302.6	Able to formulate specific applications of genetic engineering for the welfare of mankind & society.

Course Name: C303(Immunotechnology-17BT53)

C303.1	Classify the immune system and summarize their functions
C303.2	Outline the molecular and cellular mechanisms involved in the development of the immune response
C303.3	Explain the regulatory mechanism involved in development of immune response
C303.4	Describe the cause, challenges, and treatment for Immune System Pathologies
C303.5	Describe the cause, challenges, and treatment for Immune System Dysfunctions
C303.6	Apply the major immunological laboratory techniques and their application to both clinical analysis and experimental research

Course Name: C304(Bioinformatics -17BT54)

C304.1	Students will use basic biological concepts, grounded in foundational theories, to interpret relationships among living things and to analyze and solve biological problems.
C304.2	To know the relevant online resources, databases, and software tools
C304.3	To understand the underlying concepts of Bioinformatics in disease understanding
C304.4	To be able to design for engineering proteins and genetic engineering.
C304.5	Analyze biological data using modeling, predictive and drug design methods
C304.6	The students will be familiar with tools and techniques of bioinformatics and they can apply these techniques to Health care and pharmacy industry.

Course Name: C305(AnimalBiotechnology-17BT553)

C305.1	Understand, classify & distinguish the various parameters and concepts involved in animal cell culture and media formulation.
C305.2	Execute the experimental aspects by utilizing high end equipment's
C305.3	Interpret knowledge of the recent advances in animal breeding
C305.4	Explain basic principles & techniques in genetic engineering, gene transfer technologies for animal cell lines
C305.5	Explain the contribution 'functional genomics' is making & is likely to make in animal biotechnology now & in the future
C305.6	Appraise the role of biotechnology in animal sciences for sustainable eco-system & human welfare

Course Name: C306 (Biotechnology for Sustainable Environment-17BT563

C306.1	Apply reasoning to identify the components of environmental eco systems and effect of pollutant on environment
C306.2	Characterize the various parameters for treatment of water, wastewater, and solid waste from their sources to provide valid conclusions.
C306.3	Understand the impact of recovery, recycle of the useful resources from the wastes by adopting advanced techniques to demonstrate the need for sustainable development.
C306.4	Identify and demonstrate the knowledge to use suitable equipment for abatement and control of air & noise pollution

Course Name: C307 (Genetic Engineering &ImmunoTechnology Laboratory-17BTL57)

C307.1	Categorize the blood group and analyze the sample for diagnosis of typhoid.
C307.2	Measure the concentration of antigen or antibody present in the sample by selecting the appropriate immunochemical technique and infer the results
C307.3	Choose a suitable experimental method to isolate, quantify & measure the concentration of DNA& RNA
C307.4	Demonstrate the use of PCR and prepare amplified DNA using thermal cycler
C307.5	Perform gene transformation using the appropriate method
C307.6	Analyze and identify the DNA & protein by suitable technique

Course Name: C308(Bioinformatics Lab -17BTL57)

C308.1	The students will be gaining expertise on practical data analytics, Data mining, machine learning.
C308.2	Utilize the biological information from public databases for given problem in biotechnology, medicine, or biology.
C308.3	To gain foundational knowledge about molecular evolution, protein structure and gene expression using computational tools.
C308.4	Ability to write computer programs in various programming techniques to analyze bioinformatics data
C308.5	To apply the tools to address important problems of biotechnology and to verify the capability in handling a research project.
C308.6	The students will be able to visualize data and will apply this knowledge towards analysis of data related to graphical interfaces in the fields of systems biology, functional genomics, and biomedicine

Course Name: C309(Bio-Business and Entrepreneurship -17BT61

C309.1	To understand analyze and explore entrepreneurship opportunity in biotechnology
C309.2	To Analyze societal problems and derive biotech based scientific solutions.
C309.3	To accelerate innovation and conservation of IPR
C309.4	To Explore funding opportunity for innovations and startups.
C309.5	To Exploit business opportunity through expired patent, technology learning and licensing.

C309.6	To illustrate scientific problem into a project proposal.

Course Name: C310(Bioprocess Control and Automation -17BT62

C310.1	Able to describe the Instrumentation of flow, pressure, temperature.
C310.2	Able to determine the transient response and to derive the transfer functions of first order systems and first order systems in series and to solve problems of response of first order systems for different types of input.
C310.3	Able to determine the transient response and to derive the transfer functions of second order systems.
C310.4	To Understand the parameters to be measured and controlled in the bioreactor.
C310.5	Able to apply the design aspects for block diagrams and use the concept of stability for solving the problems.
C310.6	Able to analyze online data and understand the dynamics and control of bioreactors.

Course Name: C311 (Enzyme Technology & Biotransformation-17BT63)

C311.1	Classify and identify the enzymes based on the biochemical reaction catalyzed by them
C311.2	Compare enzymes and catalyst, and explain the mechanism of enzyme catalysis
C311.3	Recognize & Interpret the importance of enzymes in medicine
C311.4	Explain the methods involved in study of enzyme kinetics,standardization, and optimization of enzyme catalyzed reactions
C311.5	Compare immobilized enzymes over conventional enzymes, apply the knowledge of immobilized enzymes in bioprocess industry
C311.6	Summarize the applications of enzymes in medicine and industry

Course Name: C312 (Bioprocess Equipment Design & CAED-17BT64)

C312.1	To define the notations and terminology for welding and pipe joints.
C312.2	To draw various values and joints.
C312.3	To calculate the no of tubes, diameter, and different parameter of double pipe heat exchanger.
C312.4	To calculate the dimensions of shell and tube heat exchangers.
C312.5	To apply the design aspects by solving the problems.
C312.6	To evaluate the no of plates & height of packing in distillation column and to design the fermenter.

Course Name: C313 (Cell Culture Techniques-17BT653)

C313.1	Ability to understand the importance of equipment's a, their sterilization and usage aspects
C313.2	Able to Differentiate between the various sources of cells to be used in cell culture techniques
C313.3	Ability to Correlate between different biological samples and understand the importance of different media in tissue culture
C313.4	Ability to Comprehend the applications of plant tissue culture and their utilization.
C313.5	Ability to Comprehend the applications of animal and microbial cell culture in industry, healthcare, and environment.
C313.6	Appraise the role of biotechnology in plant, animal, and microbial sciences for sustainable eco-system & human welfare

Course Name: C314 (Nano Biotechnology-17BT662)

C314.1	Able to understand and describe nanobiotechnology and its applications
C314.2	Able to discuss nanoparticle types and synthesis method
C314.3	Able to describe the importance and various classification of nanolithography process
C314.4	Able to describe various characterization techniques for nanoparticles
C314.5	Understand the principle and application of nano diagnostics
C314.6	Able to understand and differentiate between bio nanotechnology and nanobiotechnology

Course Name: C315 (Bioprocess Control & Automation Laboratory-17BTL67)

C315.1	To understand the characteristics of transducers of temperature, pressure & flow
C315.2	To understand determine the oxygen demand required for biological degradation of pollutant
C315.3	To analyze the response of first order systems for step and impulse input
C315.4	To interpret the response of first order systems.
C315.5	Describe the principles of controllers
C315.6	To explain the concept of control of DO& agitation

Course Name: C316 **(Biokinetics and Enzyme Technology Laboratory -17BTL68)**

C316.1	Able to apply principles of protein chemistry and enzymology for analysis and study of enzymes as biocatalysts
C316.2	Able to investigate various methods available for isolation, purification, and characterization of enzymes
C316.3	Able to apply the principles and methods of immobilization of enzymes useful in a diverse range of industries
C316.4	Able to assess biokinetics parameters using different reactors
C316.5	Able to implement experimental protocols, and adapt them to plan and carry out investigations to relate experimental data with fundamental theories of enzyme kinetics
C316.6	Able to use basic laboratory skills and apparatus to obtain reproducible data from biochemical experiments and analyze, interpret, and report the results.

Course Name: C401(Fermentation Technology -15BT71)

C401.1	To Describe the factors affecting secondary metabolite production and its industrial importance.
C401.2	To Describe the basic requirements of downstream processing for biochemical product recovery.
C401.3	To Identify and summarize the effect of change in unit's operations and its impact on the process.
C401.4	To Illustrate how emerging technologies would benefit the biochemical product recovery and show the likely benefits it would have over the traditional operations.

C401.5	To Analyzing both analytical and process validation issues that are critical to successful manufacturing
C401.6	To Outline the processes involving large-scale, high-purity protein production.

Course Name: C402(Genomics & Proteomics -15BT72)

C402.1	The students will be able to apply DNA/genome sequencing techniques to various genome projects.
C402.2	The students will be able to analyze genomes of various organisms and genome
	annotation importance.
C402.3	The students will be able to correlate the relationship between genome, transcriptome, proteome, and metabolome.
C402.4	To engineer proteins for therapeutic and clinical applications.
C402.5	The students will be able to apply the knowledge of the major web-resources and the notion about how the methods are applied in real-life scientific research.
C402.6	The students will be able to understand how to perform simple analysis of this data and remember examples of how the research tools are applied in published investigations.

Course Name: C403(Plant Biotechnology -15BT73)

C403.1	To apply tissue culture techniques for the large-scale production of various plantlets with economically useful traits
C403.2	Analyze the developments of crop production by using plant breeding and hybridization techniques.
C403.3	Apply genetically engineered concepts to induce biotic and abiotic stresses in plants
C403.4	Develop & create genetically modified plants with genes from microbial and animal origin that have diagnostic application
C403.5	Utilize the technique for the development and production of pharmaceutically important molecules as edible drugs
C403.6	Utilize and implement knowledge of mass production of plants to meet the societal demand for food

Course Name: C404(Lab to Industrial Scaling -15BT743)

C404.1	Analyze the various parameters for bioreactor design.
C404.2	Identify appropriate qualitative and quantitative analysis methods depending upon the chemical nature of analyze.
C404.3	Enhance product output by selection of appropriate method of enrichment operation
C404.4	Enhance product quality by appropriate method of purification operation
C404.5	Analyze industrial problems in fermentation process and solving.
C404.6	Designing Bioreactors using computer programming skills

Course Name: C405(Molecular Diagnostics -15BT753)

C405.1	Outline the basic concepts of health diagnostics.
C405.2	Explain the role & importance DNA-based and PCR-based diagnostic methods.
C405.3	Describe the diagnosis of disorders such as haemoglobinopathies, mucopolysaccharidoses, lipidoses, amyloidosis using biochemical & cell-based assays.
C405.4	Identify the different immunodiagnostics & imaging diagnostic techniques.
C405.5	Explain the different ways of product & assay development methods.
C405.6	Describe the application of biosensors in diagnostics.

Course Name: C406(Fermentation Technology Laboratory -15BTL76)

C406.1	Analyze and select appropriate unit operations for isolation and purification of bio molecules.
C406.2	Evaluate the bio-product using appropriate qualitative and quantitative analysis methods depending upon the chemical nature of analyte.
C406.3	Analyze, compare, and select a technique for concentrating biological products like extraction, drying, filtration, precipitation, membrane separation.
C406.4	Acquire the basic principles and techniques of chromatography to purify the biological products.
C406.5	Describe the basic principles of fermentation preparation and the requirements of downstream processing for biochemical product recovery.
C406.6	Analyze the kinetics and estimation of product produced using fermenter

Course Name: C407(Plant Biotechnology Laboratory -15BTL77)

C407.1	To explain the basic concepts of plant biotechnology in plant tissue culture
C407.2	To describe the various components of plant tissue culture media, like minerals, growth factors, hormones, and their significance
C407.3	To relate the various steps taken to establish and optimize media for purposes
C407.4	Explain and perform some of the more advanced techniques, e.g., embryo culture and protoplast isolation and regeneration
C407.5	To establish and maintain plants in tissue culture and micro propagation, including morphogenesis
C407.6	To adapt and apply plant tissue culture techniques to research problems in plant biology

Course Name: C408(Clinical & Pharmaceutical Biotechnology -15BT81)

C408.1	To Explain the significance of pharmaco-kinetic models
C408.2	To Explain the significance of pharmaco-dynamic principles
C408.3	To understand various dosage forms and formulation
C408.4	To Understand the specific techniques used in biotherapy & clinical Biotechnology
C408.5	Comprehend specific applications of pharmaceutical & clinical Biotechnology
C408.6	Able to implement experimental protocols, and adopt to plan and carry out pre-clinical& clinical investigations

Course Name: C409(Regulatory Affairs in Biotech Industry -15BT82)

C409.1	To educate students about regulatory rules governing biotech industry
C409.2	To create awareness about guidelines that specify parameters of the safety and quality standards in the biotech industry
C409.3	Outline the importance of the quality and compliance in the biotech industry
C409.4	Comprehend the various regulatory guidelines and rules as well as the organizations governing the same.
C409.5	To learn the documentation process pertaining to quality management, QA, quality policy and marketing.
C409.6	To understand the importance of quality auditing, process designing, validating master plans & commissioning

Course Name: C410(Metabolic Engineering -15BT832)

C410.1	To empower the students with the knowledge on metabolic engineering.
C410.2	To understand the basic concepts about enzymology
C410.3	Outline and understand the basics followed in primary and secondary metabolites biosynthesis.
C410.4	Understand the importance of bioconversions of substances into products.
C410.5	Understand the concepts involved in regulation of enzyme production
C410.6	Understand the technique involved in strain improvement with interest to develop it for industrial fermentation use

Course Name: C411(Project Work -15BT85)

C411.1	Identify a topic in relevant areas of Biotechnology
C411.2	Illustrate literature review to identify gaps and define objectives & scope of the work.
C411.3	Formulate the problem to meet the objectives of the proposed work
C411.4	Develop a prototypes/models, fabrication, experimental set-up/software systems necessary to meet the objectives
C411.5	Develop the work with a concern for society, environment, and ethics
C411.6	Analyze and discuss the results to draw valid conclusions.

Course Name: C412(Seminar -15BT86)

C412.1	Enables to update with present technologies and trends in real world
C412.2	Enables to improve ability of data collection and presentation
C412.3	Enables to overcome stage fear and improve communication skills
C412.4	Enables to face spontaneous queries
C412.5	Prepare and write the report as per recommended format.
C412.6	Help to develop vocabulary & demonstrate efforts put in comprehensive analysis & interpretation of data

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Department of Chemistry

Vision of the Institute

To be a respected and most sought after engineering educational institution engaged in equipping individuals capable of building learning organizations in the new millennium.

Mission of the Institute

To develop competent students with good value systems and face challenges of the continuously changing world.

Vision of the Department

Our vision is to give our students an in-depth exposure to the latest developments in Chemistry made by reputed scientists and experts in this field. To equip individuals capable of earning in the new millennium.

Mission of the Department

Our mission is to provide a contemporary foundation for addressing problems in Chemistry. Also, to develop competent engineers with good values and to equip them to face the challenges of the continuously changing world.

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Program Educational Objectives

PEO 1. Mater the basic knowledge of Engineering Chemistry for building technical Competence in industries, research, and development.

PEO 2. To develop knowledge in the fields of use of free energy in chemical Equilibrium, electrochemistry and energy storage systems, corrosion, and metal finishing.

PEO 3. To understand the importance of the energy systems, environmental pollution, waste management, water chemistry, Instrumental methods of analysis and nano-materials.

Program Specific Objectives

PSO 1: Understand the principles of electrochemistry & battery technology.

PSO 2: Apply the knowledge of Corrosion and metal finishing in solving environmental issues.

PSO 3: Utilize the knowledge of fuels and solar energy for various Engineering applications.

PSO 4: Utilize the knowledge of water technology for various engineering applications as wellas in daily life.

PSO 5: Develop solutions for problems associated with Nano technology.

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Course Name: 18CHE12/22 (ENGINEERING CHEMISTRY) -18CHE12/22

CO_1	Understanding the concept of free energy in equilibrium, rationalize bulk properties and processes using thermodynamic considerations.
CO_2	Apply the k knowledge of corrosion and electrochemical energy systems to modify surface properties of metals, to develop resistance to corrosion, wear, tear, impact etc. by electroplating and electroless plating.
CO_3	Understanding the difference between electrochemical cell, concentration cell, batteries, and fuel cell, and know its applications for the industrialization of country. Water chemistry and problems and types of water and various ways to make it
CO_4	Applying the knowledge of environmental pollution and waste management in controlling pollution.
CO_5	Understanding the different techniques of instrumental analysis.
CO6	To know the fundamental principles of Nanomaterials for building technical competence in industries and research.

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Department of Civil Engineering

Vision of the Institute

To be a respected and most sought after engineering educational institution engaged in equipping individuals capable of building learning organizations in the new millennium.

Vision of the Institute

To develop competent students with good value systems and face challenges of the continuously changing world.

Vision of the Institute

To impart very high-quality education to the students to make them do innovative sustainable engineering relevant to industry and people at large.

Mission of the Department

Mission 1. To emphasize on basics of engineering as well as their applications relevant to theindustry.

Mission 2. To serve the society with due consideration of economy, ecology and ethical issues of nation.

Mission 3. To sensitize the students and faculty to take up research and consultancy to be on par with international standards.

Program Educational Objectives

PEO 1.	Apply fundamental concepts of civil engineering in developing economically viable and sustainable sound solutions.
PEO 2.	To work collaboratively on multidisciplinary problems.
PEO 3.	To achieve their professional aims keeping good ethics.

Program Specific Objectives

PSO 1: To apply technical skills and modern engineering tools for civil engineering day to day practice.

PSO 2: To participate in critical thinking and problem solving of civil engineering field that needs analytical and design requirements.

PSO 3: To pursue lifelong learning and professional development to face the challenging and emerging needs of our society.

Course Name:232.1(Strength of Materials-18CV32)

C232.1	To understand the basic material properties of structural materials such as steel, aluminum, wood and their combinations under axial tension and compression.
C232.2	To learn methods of stress analysis after determining the internal forces under axial tension and compression, bending, shear and torsion.
C232.3	To evaluate the behavior and strength of structural elements under the action of compound stresses and thus understand failure criteria.
C232.4	To understand the methods of analyses of design of structural frames such as pin jointed trusses and portal frames both determinate and indeterminate.
C232.5	To understand the basic concept of instability analyses of structural elements such as columns and struts.
C232.6	To understand the basic concepts of torsion developed in circular shaft.

Course Name: 233.1(FLUIDS MECHANICS-18CV32)

C233.1	Possess a sound knowledge of fundamental properties of fluids and fluid continuum
C233.2	Compute and solve problems on hydrostatics, including practical applications
C233.3	Apply principles of mathematics to represent kinematic concepts related to fluid flow
C233.4	Apply fundamental laws of fluid mechanics and the Bernoulli's principle for practical applications
C233.5	Compute the discharge through pipes and over notches and weirs

Course Name: 234.1(BASIC SURVEYING -18CV34)

C234.1	Possess a sound knowledge of fundamental principles Geodetics[L1] [PO1]
C234.2	Measurement of vertical and horizontal plane, linear and angular dimensions to arrive at solutions to basic surveying problems.
C234.3	Capture geodetic data to process and perform analysis for survey problems
C234.4	Analyze the obtained spatial data and compute areas and volumes. Represent 3D data on plane figures as contours

Course Name: 235.1 (ENGINEERING GEOLOGY -18CV35)

C235.1	Students will be able to apply the knowledge of geology and its role in Civil Engineering
C235.2	Students will effectively utilize earth's materials such as mineral, rocks and water in civil engineering practices.
C235.3	Analyze the natural disasters and their mitigation.
C235.4	Assess various structural features and geological tools in ground water. exploration, Natural resource estimation and solving civil engineering problems

C235.5	Apply and asses use of building materials in construction and asses their properties

Course Name: 236.1 (Building Materials and Construction-18CV36)

C236.1	Select suitable materials for buildings and adopt suitable construction techniques.
C236.2	Adopt suitable repair and maintenance work to enhance durability of buildings.

Course Name: C242 (Analysis of Determinate Structures (18CV42

C242.1	To evaluate the forces in determinate trusses by method of joints and sections.
C242.2	To evaluate the deflection of cantilever, simply supported and overhanging beams by different methods
C242.3	To understand the energy principles and energy theorems and their applications to determine the deflections of trusses and bent frames.
C242.4	To determine the stress resultants in arches and cables.
C242.5	To understand the concept of influence lines and construct the ILD diagram for the moving loads.
C242.6	To know the comparison between moment area and conjugate beam method.

Course Name: C243(applied hydraulics 18CV43)

C243.1	Apply dimensional analysis to develop mathematical modeling and compute the parametric values in prototype by analyzing the corresponding model parameters
C213.2	Design the open channels of various cross sections including economical channel sections
C213.3	Apply Energy concepts to flow in open channel sections, Calculate Energy dissipation,
C213.4	Compute water surface profiles at different conditions
C213.5	Design turbines for the given data, and to know their operation characteristics under different operating conditions
C213.6	The working principles of the hydraulic machines for the given data and analyzing the performance of Turbines for various design data.

Course Name:C244 (concrete technology18CV44)

C244.1	Relate material characteristics and their influence on microstructure of concrete.
C244.2	Distinguish concrete behavior based on its fresh and hardened properties
C244.3	Illustrate proportioning of different types of concrete mixes for required fresh and hardened properties using professional codes.
C244.4	Adopt suitable concreting methods to place the concrete based on requirement.
C244.5	Select a suitable type of concrete based on specific application.

C244.6	Describe the physical & mechanical properties of aggregates

Course Name: C245 (Applied geotechnical Engineering 18CV45)

C245.1	Will acquire an understanding of the procedures to determine index properties of any type of soil, classify the soil based on its index properties
C245.2	Will be able to determine compaction characteristics of soil and apply that knowledge to assess field compaction procedures
C245.3	Will be able to determine permeability property of soils and acquires conceptual knowledge about stresses due to seepage and effective stress; Also acquire ability to estimate seepage losses across hydraulic structure
C245.4	Will be able to estimate shear strength parameters of different types of soils using the data of different shear tests and comprehend Mohr-Coulomb failure theory.
C245.5	Ability to solve practical problems related to estimation of consolidation settlemen deposits also time required for the same.
C245.6	To implement the knowledge attained in solving civil engineering problems of making roads, townships etc.

Course Name: C246 (Advanced Surveying 18CV46)

C246.1	Apply the knowledge of geometric principles to arrive at surveying problems
C246.2	Use modern instruments to obtain geo-spatial data and analyze the same to appropriate engineering problems.
C246.3	Capture geodetic data to process and perform analysis for survey problems with the use of electronic instruments;
C246.4	Design and implement the different types of curves for deviating type of alignments.
C246.5	To apply basic principles in analyzing position of celestial bodies
C246.6	To implement the knowledge attained in solving civil engineering problems of making roads, townships etc.
C245.1	Will acquire an understanding of the procedures to determine index properties of any type of soil, classify the soil based on its index properties
C245.2	Will be able to determine compaction characteristics of soil and apply that knowledge to assess field compaction procedures
C245.3	Will be able to determine permeability property of soils and acquires conceptual knowledge about stresses due to seepage and effective stress; Also acquire ability to estimate seepage losses across hydraulic structure
C245.4	Will be able to estimate shear strength parameters of different types of soils using the data of different shear tests and comprehend Mohr-Coulomb failure theory.
C245.5	Ability to solve practical problems related to estimation of consolidation settlemen deposits also time required for the same.

C245.6	To implement the knowledge attained in solving civil engineering problems of making roads, townships etc.

Course Name: C351 (Design of RC Structural Elements) 17CV52)

C252.1	Determine the moment in indeterminate beams and frames having variable moment of inertia and subsidence using slope defection method
C252.2	Determine the moment in indeterminate beams and frames of no sway and sway using moment distribution method.
C252.3	Construct the bending moment diagram for beams and frames by Kani's method.
C252.4	Construct the bending moment diagram for beams and frames using flexibility method
C252.5	Analyze the beams and indeterminate frames by system stiffness method

Course Name: C253: Applied Geotechnical Engineering-(17CV53)

C253.1	To evaluate the forces in determinate trusses by method of joints and sections.
C253.2	To evaluate the deflection of cantilever, simply supported and overhanging beams by different methods
C253.3	To understand the energy principles and energy theorems and their applications to determine the deflections of trusses and bent frames.
C253.4	To determine the stress resultants in arches and cables.
C253.5	To understand the concept of influence lines and construct the ILD diagram for the moving loads.

Course Name: C254 Computer Aided Building Planning and Drawing(17CV54)

C254.1	Ability to plan and execute geotechnical site investigation program for different civil engineering projects
C254.2	Understanding of stress distribution and resulting settlement beneath the loaded footings on sand and clayey soils
C254.3	Ability to estimate factor of safety against failure of slopes and to compute lateral pressure distribution behind earth retaining structures
C254.4	Ability to determine bearing capacity of soil and achieve proficiency in proportioning shallow isolated and combined footings for uniform bearing pressure
C254.5	Capable of estimating load carrying capacity of single and group of piles

Course Name: C355(Air pollution and Control (17CV551)

C355.1	Identify the major sources of air pollution and understand their effects on health and environment.

C355.2	Evaluate the dispersion of air pollutants in the atmosphere and to develop air quality models.
C355.3	Ascertain and evaluate sampling techniques for atmospheric and stack pollutants.
C355.4	Choose and design control techniques for particulate and gaseous emissions.

Course Name: C356(Traffic Engineering-(17CV561)

C356.1	Understand the human factors and vehicular factors in traffic engineering design.
C356.2	Conduct different types of traffic surveys and analysis of collected data using statistical concepts.
C356.3	Use an appropriate traffic flow theory and to comprehend the capacity & signalized intersection analysis.
C356.4	Understand the basic knowledge of Intelligent Transportation System.

Course Name: C361 (Construction Management & Entrepreneurship 17CV61)

C361.1	Understand the construction management process.
C361.2	Understand and solve variety of issues that are encountered by every professional in discharging professional duties.
C361.3	Fulfil the professional obligations effectively with global outlook
C361.4	Create a construction project and safety plan
C361.5	Apply construction management skills as a member of a multi-disciplinary team.
C361.6	To make them understand the concept of project management for planning and execution.

Course Name: C262 (Design of Steel Structural Elements 17CV62)

C362.1	Possess knowledge of Steel Structures Advantages and Disadvantages of Steel structures, steel code provisions.
C362.2	Possess knowledge of Plastic behavior of structural steel.
C362.3	Understand the Concept of Bolted and Welded connections,
C362.4	Understand the Concept of Design of compression members, built-up columns and columns splices.
C362.5	Understand the Concept of Design of tension members, simple slab base and gusseted base.
C362.6	Understand the Concept of Design of laterally supported and un-supported steel beams.

Course Name:C263 (Highway Engineering 17CV63)

C363.1	Acquire knowledge of different modes of transportation systems, history, development of highways and the organizations associated with research and development of the same in INDIA.
C363.2	Acquire the capability of proposing a new alignment or re-alignment of existing roads, conduct necessary field investigation for generation of required data.
C363.3	Evaluate the engineering properties of the materials and suggest the suitability of the same for pavement construction.
C363.4	Design road geometrics, structural components of pavement
C363.5	Design of highway drainage structural elements
C363.6	Evaluate the highway economics by few select methods and also will have a basic knowledge of various highway financing concepts.

Course Name: C264 (Water Supply and Treatment Engineering 17CV64)

C364.1	Estimate average and peak water demand for a community.
C364.2	Evaluate available sources of water, quantitatively and qualitatively and make appropriate choice for a community.
C364.3	Evaluate water quality and environmental significance of various parameters and plan
	suitable treatment system.
C364.4	Design a comprehensive water treatment and distribution system to purify and distribute water to the required quality standards.
C364.5	Study drinking water quality standards and to illustrate qualitative analysis of water
C364.6	Design physical, chemical and biological treatment methods to ensure safe and potable water Supply. Revise

Course Name:C265 (Solid Waste Management 17CV651)

C365.1	Analyze existing solid waste management system and to identify their drawbacks
C365.2	Evaluate different elements of solid waste management system.
C365.3	Suggest suitable scientific methods for solid waste management elements.
C365.4	Design suitable processing system and evaluate disposal sites.
C365.5	Analyze different processing technologies and to study conversion of municipal solid waste to compost or biogas.
C365.6	Evaluate landfill site and to study the sanitary landfill reactions.

Course Name:C261 (Water Resources Management 17CV661)

C3661.1	Assess the potential of groundwater and surface water resources.
C3661.2	Address the issues related to planning and management of water resources.
C3661.3	Know how to implement IWRM in different regions.

C3661.4	Understand the legal issues of water policy.
C3661.5	Select the method for water harvesting based on the area.
C3661.6	Understand the importance of water and manage the water resources effectively.

Course Name: C471 (MIWW-(15CV71)

C471.1	Acquires capability to design sewer and Sewerage treatment plant.
C471.2	Evaluate degree of treatment and type of treatment for disposal, reuse and recycle.
C471.3	Identify waste streams and design the industrial wastewater treatment plant.
C471.4	Manage sewage and industrial effluent issues.

Course Name: C472 Design of RCC and Steel Structures15CV72)

C472.1	Understand the importance of hydrology and its components.
C472.2	Measure precipitation and analyze the data and analyze the losses in precipitation.
C472.3	Estimate runoff and develop unit hydrographs.
C472.4	Find the benefits and ill-effects of irrigation.
C472.5	Find the quantity of irrigation water and frequency of irrigation for various crops. loads.
C472.6	Find the canal capacity, design the canal and compute the reservoir capacity.

Course Name: C473 Hydrology and Irrigation Engineering(15CV73)

C473.1	Understand the importance of hydrology and its components.
C473.2	Measure precipitation and analyze the data and analyze the losses in precipitation.
C473.3	Estimate runoff and develop unit hydrographs.
C473.4	Find the benefits and ill-effects of irrigation.
C473.5	Find the quantity of irrigation water and frequency of irrigation for various crops. loads.
C473.6	Find the canal capacity, design the canal, and compute the reservoir capacity.

Course Name 474 Ground Water & Hydraulics (15CV74)

C474.1	find the characteristics of aquifers.
C474.2	estimate the quantity of ground water by various methods.
C474.3	locate the zones of ground water resources.
C474.4	select particular type of well and augment the ground water storage.

Course Name:475 (Urban Transportation and Planning-15CV755)

C475.1	Design, conduct and administer surveys to provide the data required for transportation planning.
C475.2	Supervise the process of data collection about travel behavior and analyze the data for use in transport planning.
C475.3	Develop and calibrate modal split, trip generation rates for specific types of land use developments.
C475.4	Adopt the steps that are necessary to complete a long-term transportation plan.

course Name:C481(Quantity Surveying and Contracts Management 15CV81)

C481.1	. Prepare detailed and abstract estimates for roads and building.
C481.2	Prepare valuation reports of buildings
C481.3	Interpret Contract documents of domestic and international construction works
C481.4	Estimate the quantities of work, develop the bill of quantities, and arrive at the Cost of civil engineering Project
C481.5	Understand and apply the concept of Valuation for Properties
C481.6	Understand, Apply and Create the Tender and Contract document

Course Name:C482 Design of Pre-Stressed Concrete Elements 15CV82)

C482.1	Understand the requirement of PSC members for present scenario
C482.2	Analyze the stresses encountered in PSC element during transfer and at working
C482.3	Understand the effectiveness of the design of PSC after studying losses
C482.4	Capable of analyzing the PSC element and finding its efficiency.
C482.5	Design PSC beam for different requirements
C482.6	learn Design of Pre-Stressed Concrete Element

Course Name: C483 (Pavement Design 15CV833)

C483.1	Gain knowledge about the process of collecting data required for design, factors affecting pavement design, and maintenance of pavement.
C483.2	Systematically generate and compile required data for design of pavement (Highway & Airfield).
C483.3	Analyse stress, strain and deflection by bossiness's, bur mister's and Vestergaard's theory.
C483.4	Design rigid pavement and flexible pavement conforming to IRC58-2002 and IRC37-2001.

C483.5	Understand the requirements of various types of joints in pavements, which are provided to take care of climatic variations.
C483.6	Evaluate the performance of the pavement and develops maintenance statement based on site specific requirements.

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Department of Computer Science Engineering

Vision of the Institute

To be a respected and most sought after engineering educational institution engaged in equipping individuals capable of building learning organizations in the new millennium. To produce technocrats with creative technical knowledge and intellectual skills to sustain and excel in the highly demanding world with confidence.

Mission of the Institute

To develop competent students with good value systems and face challenges of the continuously changing world.

Vision of the Department

To produce technocrats with creative technical knowledge and intellectual skills to sustain and excel in the highly demanding world with confidence.

Mission of the Department

Mission 1. The department's aim is to develop the best computer science professionals who work creatively, communicate effectively & become technologically competent, and to mould them into good citizens by inculcating sense of ethical values in them.

Mission 2. To Encourage the students to build self-help, Power of initiative, courage to change and create new things.

Mission 3. To inculcates the spirit of cooperation and capacity for organization with special emphasis on their self-reliance and sustainability to meet ever changing requirements of local and global industries.

Program Educational Objectives

PEO To create graduates equipped with life-long learning skills and have a successful professional career in IT industry.

PEO To prepare graduates to pursue higher education and get inclined towards research & development in computer science engineering.

PEO To provide adequate training and opportunities, with exposure to emerging cutting-edge technologies and to work in teams on multidisciplinary projects with effective communication skills and leadership qualities.

Program Specific Objectives

PSO 1: To design efficient algorithms and develop effective code for real-time computations.

PSO 2: To apply software engineering principles in developing optimal software solutions.

Course Name:C231 (Transform Calculus, Fourier Series and Numerical Technique-18MAT31)

C231.1	Solving differential/ integral equation arising in network analysis, control systems and other fields of engineering by Laplace transform and inverse Laplace transform
C231.2	Employ Fourier series to study the behavior of periodic functions and their applications in system communications, digital signal processing and field theory.
C231.3	Analyze the concept of Fourier transform and Z-transform to illustrate discrete/continuous function arising in wave and heat propagation, signals, and systems.
C231.4	To solve the first and second order ordinary differential equations arising in engineering problems make use of single step and multistep numerical methods.

Course Name:C232 (Data Structures and Applications-18CS32)

C232.1	Use different types of data structures, algorithms, and their operations.
C232.2	Apply searching, sorting operation on files.
C232.3	Analyze the usage of stack, Queue, List, Trees and Graphs in problem solving.
C232.4	Use the hash function, concepts of collision and its resolution methods.

Course Name:C233 (Data Structure in C-18CS33)

C233.1	Comprehend/Perceivetheworkingprinciplesoffundamentalbuildingblocksofa nalog and Digital Systems.
C233.2	Develop truth tables, switching equations, state tables and diagrams for given clocked. Sequential circuits.
C233.3	Apply the knowledge of principles of Digital System Design in designing combinational. And Synchronous/Asynchronous sequential logic circuits.
C233.4	Applytheknowledgeofsemiconductordevicesandcircuitstodeterminecircuitparameter sandmathematical expressions for the same.

Course Name:C234 (Unix And Shell Programming-18CS34)

C234.1	Apply the basic concepts of sub system of a computer and machine instructions.
C234.2	Apply different algorithms used to perform arithmetic and logic operations.
C234.3	Analyze the importance of pipelining and processing unit.
C234.4	Analyze how to measure and improve the memory performance.

Course Name:C235 (Discrete Mathematical structures-18CS35)

C235.1	Apply software engineering technologies and ethics in professional responsibility.
C235.2	Apply software engineering practice over the entire software system life cycle.

C235.3	Analyze process activities for different software process models and system models.
C235.4	Analyze the techniques, skills, and modern engineering tools necessary for engineering practice.

Course Name:C236 (Discrete Mathematicalstructures-18CS36)

C236.1	Examine the correctness of an argument using propositional and predicate logic and truth tables. Construct proofs using direct proof, proof by contradiction,
C236.2	Apply the Knowledge to solve problems using counting techniques and combinatorics and application of different mathematical proofs techniques in proving theorems.
C236.3	Solve the problems using recurrence relations and generating functions. Also analyze the concept of discrete probability recursion.
C236.4	Use the knowledge of graphs theory and contrast the various types of graphs, trees and their applications.

Course Name:C241 (Engineering Mathematics-IV-17CS41)

C241.1	Understand the basic concept of complex variables, distribution, and special functions to solve mathematical problems.
C241.2	Apply the knowledge of numerical methods, sampling distribution to solve complex engineering problems.
C241.3	Analyze the probability distribution, sampling distribution and complex Variable through analytic function, Cauchy-Riemann equations, residues, Bilinear transformation for signal processing.
C241.4	Evaluate first and second order ordinary differential equations through single and multi-step method problems.

Course Name:C242 (Object Oriented Concepts-17CS42)

C242.1	Understand and Apply Object Oriented Programming concepts of C++ and java.
C242.2	Apply Object oriented concepts of C++ and java to solve simple problems.
C242.3	Analyze event driven simple GUI programs using java applets and swings.

Course Name:C243 (Design and Analysis of Algorithms-17CS43)

C243.1	Understand the analysis framework and computational solution to well-known problems with suitable data structure.
C243.2	Apply appropriate design strategies for problem solving.
C243.3	Analyze the performance of different algorithms.
C243.4	Design an efficient algorithm using appropriate design strategies for problem solving.

Course Name:C244 (Microprocessor and Microcontroller-17CS44)

C244.1	Understand the architecture and ARM processor and apply instruction set to process data.
C244.2	Apply suitable addressing modes, instructions, and interrupt functions for data processing.
C244.3	Analyze memory and Input Output interfacing for data transferring.
C244.4	Design memory address decoders and assembly language program for simple applications.

Course Name:C245 (Software Engineering-17CS45)

C245.1	Understand the software engineering technologies and apply in software development.
C245.2	Apply software engineering practice over the entire software system life cycle.
C245.3	Analyze process activities for different software process models and system models.
C245.4	Evaluate high-level and low-level design of an application from the identified software requirements.

Course Name:C246 (Data Communication-17CS46)

C246.1	Understand and apply the basic concepts of Data Communication and technologies
C246.2	Apply the appropriate methods and protocol suites to address the different data communication issues
C246.3	Analyze the significance of data network components
C246.4	Evaluate the functionalities of various layer protocols and network devices

Course Name:C351 (Management, Entrepreneurship for It Industry-17CS51)

C351.1	Understand the basic concepts of management functions, projects, ERP and outline their importance in entrepreneurship.
C351.2	Analyze the business opportunities, appropriate leadership
C351.3	Evaluate the importance of SSIs in economic development and its institutional support provided by government of India.
C351.4	Estimate the importance of IPRs and cyber-law to protect infringement of secret document.

Course Name:C352 (Computer Networks-17CS5)

C352.1	Understand the fundamentals of application layer, transport layer, network layers and apply the various protocols for data communication.
C352.2	Apply mobile, multimedia networking and network management mechanisms for data transfer.

C352.3	Analyze the difference between various routers address classes, Routing Algorithms, and compute shortest paths.
C352.4	Evaluate the suitability of data transfer protocols for transport layer services.

Course Name:C353 (Database Management System-17CS53)

C353.1	Apply the physical structure of the database to handle data, to define a problem at the view level.
C353.2	Apply the basics knowledge of relation algebra and SQL to construct queries.
C353.3	Analyze the concepts of Normalization and Transaction Management to structure the database.
C353.4	Examine Functional Dependencies, concurrency control, recovery, and security in formulating a familiar database for real world problem.

Course Name:C354 (Automata Theory and Computability-17CS54)

C354.1	Understand and apply the fundamental concepts of Automata theory and Computability.
C354.2	Apply analytical principle and fundamentals for different language classes.
C354.3	Analyze models of computation like Deterministic, Non-deterministic and software models for a given problem.
C354.4	Analyze the problem under study through formal reasoning and reduction techniques

Course Name:C355 (Object Oriented Modeling and Design-17CS55)

C355.1	Understand and apply the concepts of Object Oriented (OO) models and Design Pattern.
C355.2	Analyze the application Domain and Prepare models from different viewpoints.
C355.3	Design and draw class diagram, sequence diagrams and interaction diagrams for any software systems.
C355.4	Choose and apply design pattern for software applications

Course Name:C356 (.Net Framework for Application Devt-17CS56)

C356.1	Understanding visual studio .NET platform, syntax, and semantics of c# and applying framework tools efficiently.
C356.2	Analyze the object-oriented programming concepts in c# programming language.
C356.3	Design custom interfaces for windows form applications by using controls.
C356.4	Develop window form applications using c# programming language to resolve a given problems.

Course Name:C361 (Cryptography, Network security and Cyber law-**17CS61)**

C361.1	Understand the fundamentals of cryptography, network security, cyber laws and apply the cryptographic techniques for various ciphers.

C361.2	Apply principal concepts to solve a given problem under study.
C361.3	Investigate malwares, file infectors to check for viruses and bugs to eliminate the same.
C361.4	Evaluate the performance of different cryptographic techniques.

Course Name:C362 (File Structures-**17CS62)**

C362.1	Identify the appropriate concept of file structure design and secondary storage devices.
C362.2	Apply appropriate designs for storage and data manipulation with object-oriented programming.
C362.3	Analyze sorting, indexing, and hashing technique for data handling.
C362.4	Identify the appropriate concept of file structure design and secondary storage devices.

Course Name:C363 (Software Testing-17CS63)

C363.1	Understand the concepts of testing and apply to derive different testcases
C363.2	Apply the different testing techniques
C363.3	Analyze the appropriate testing techniques in classifying the problems
C363.4	Create appropriate document for the software artifact

Course Name:C364 (Operating Systems-17CS64)

C364.1	Understand fundamentals of operating systems and applying algorithms to solve given problems.
C364.2	Analyze process scheduling and process synchronization
C364.3	Apply suitable techniques for management of different resources.
C364.4	Compare various operating system platforms through case studies.

Course Name:C365 (Data Mining and Data Warehouse-17CS65)

C365.1	Understand the applicability of fundamental concepts of data ware house and data mining
C365.2	Apply classification and clustering algorithms for various problems
C365.3	Analyze the suitability of association rules for a given data pattern

Course Name:C366 (Python Application Programming-17CS66)

C366.1	Understand and apply the fundamentals of python programming language.
C366.2	Apply procedure and object-oriented concepts of python to solve simple problems.
C366.3	Analyze python program for Network Programming, Web services and Database applications.
C366.4	Understand and apply the fundamentals of python programming language.

Course Name:C371 (Web Technology and Its Applications-17CS71)

C371.1	Understand and apply the syntax, semantics of HTML and CSS.
C371.2	Apply basics to create forms and tables.
C371.3	Analyze JavaScript frameworks jQuery, Backbone MVC, AJAX and web services.
C371.4	Evaluate dynamic web pages using JavaScript and PHP.

Course Name:C372 (Software Architecture and Design Pattern-17CS72)

C372.1	Understand the range of design patterns and applying appropriate patterns to solve the given problem.
C372.2	Analyze various components of object-oriented system and patterns.
C372.3	Apply design principles in the design of object-oriented systems and distributed systems.
C372.4	Design and model object-oriented systems using different types of pattern.

Course Name:C373 (Machine Learning-17CS73)

C373.1	Understand the applicability of fundamental concepts, algorithms, associated procedures of machine learning.
C373.2	Apply the basic concepts of mathematics and machine learning Supervised, unsupervised and reinforcement learning algorithms.
C373.3	Analyze the usage of neural networks, Bayes classifier and k nearest neighbor for given problem under study to infer its efficacy.
C373.4	Evaluate the statistics to infer the correctness of the written machine learning algorithm for a given application.

Course Name:C374 (Unix System Programming-17CS74)

C374.1	Understand UNIX, ANSI, POSIX standards and apply file APIs to process files.
C374.2	Apply process concepts to demonstrate inter-process communications.
C374.3	Analyze Signal and Daemon processes for process controlling.

Course Name:C375 (Storage Area Networks-17CS75)

C375.1	Understand the fundamentals and applications of Storage area Network including storage architectures and storage networking techniques.
C375.2	Apply different techniques to provide business continuity capabilities and disaster recovery.
C375.3	Identify key challenges in virtualization and cloud computing.
C375.4	Analyze the suitable RAID technology for different application environments.

Course Name:C381 (Internet of Things Technology-17CS81)

C381.1	Apply the fundamental concepts of IOT architectural models, IOT network protocols and hardware and software tools
C382.2	Apply suitable IOT protocols for given network under study.
C383.3	Analyze the data Analytics in IOT to infer the security issue related to the IOT network.
C384.4	Evaluate the correctness of the chosen hardware and software tools to be used in constructing IOT model.

Course Name:C382 (Object System Simulation and Modeling-17CS82)

C382.1	Understand the basic concepts of warehousing, mining and apply Hadoop Distributed File System commands to manage data.
C382.2	Apply algorithms of warehousing, mining, and Hadoop Distributed File System for data analysis.
C382.3	Analyze Regression, Clustering, Artificial Neural Networks and Decision tree techniques for decision making.
C382.4	Evaluate different techniques of Mining, Association and Mapreduce framework.

Course Name:C383 (Big Data Analytics-17CS83)

C383.1	Describe the role of important elements of discrete event simulation and apply modeling paradigm.
C383.2	Apply functional modeling methods for statistical system activities to conceptualize real world situations.
C383.3	Analyze the modeled simulation results to resolve critical issues in areal-world environment
C383.4	Evaluate the simulation models using verification and validation methods

Course Name:C384 (Internship / Professional Practise-17CS84)

C384.1	Understand the key concerns, practices, Standard operating procedures protocols and new concepts of the company/ industry in which they have worked.
C384.2	Apply hands on experience, communication, interpersonal and other critical skills to integrate theory and practice in multidisciplinary area.
C384.3	Manage time, Analyze the skills which are transferable to new contexts and identify which appropriate engineering technology could be used to solve given problem.
C384.4	Understand the key concerns, practices, Standard operating procedures protocols and new concepts of the company/ industry in which they have worked.

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Recognised by UGC Under Section 2(f))
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Department of Electronics and Communication

EngineeringVision of the Institute

To be a respected and most sought after engineering educational institution engaged in equipping individuals capable of building learning organizations in the new millennium.

Mission of the Institute

To develop competent students with good value systems and face challenges of the continuously changing world.

Vision of the Department

To impart technical education par excellence and prepare leaders to serve the industries and society.

Mission of the Department

Mission 1. To Provide the world with a highly committed and quality conscious engineering workforce.

Mission 2. To Encourage the students to build self-help, Power of initiative, courage to change and create new things.

Mission 3. To inculcate the spirit of cooperation and capacity for organization with special emphasis on their self-reliance and sustainability to meet ever changing requirements of local and global industries.

Program Educational Objectives

PEO 1.	Graduates apply their knowledge of mathematics and science to identify, analyze and solve problems in the field of Electronics & communication to develop sophisticated communication systems.
PEO	Graduates to design and build up interdisciplinary systems by solving core engineering problems in communication systems which are technically sound, economically feasible and socially acceptable.
PEO	Graduates exhibit desire for life-long learning which directs them to obtain thorough knowledge in their chosen fields and motivate them for higher studies/research.

Program Specific Objectives

PSO 1: An ability to understand the basic core courses of Electronics & Communication Engineering and to relate them to various areas of application like Communication Systems, control system, Signal processing, VLSI and Embedded systems.

PSO 2: Should have capability to apply modern tools to analyze and solve complex designs with optimal solutions for various real-world applications.

PSO 3: Excellent adaptability to changing work environment with good leadership qualities and zeal for social and environmental well-being.

Course Name: C104 (Basic Electronics-18ELN14/24)

C104.1	Describe the operation of diodes, BJT, FET and operational amplifiers
C104.2	Design and explain the construction of rectifiers, regulators, amplifiers, and oscillators
C104.3	Describe general operating principles of SCRs and its application
C104.4	Explain the working and design of fixed voltage IC regulator using 7805 and a stable oscillator using Timer IC555.
C104.5	Explain the different number systems and their conversions and construct simple combinational and sequential logic circuits using flip-flops.
C104.6	Describe the basic principle of operation of communication systems and mobile phone.

Course Name: C202 (Network Theory-18EC32)

C202.1	Determine currents and voltages using source transformation/ source shifting/ mesh/ nodal analysis and reduce given network using star-delta transformation/source transformation/ source shifting
C202.2	Solve network problems by applying Superposition/ Reciprocity/ Thevenin 's/ Norton 's/ Maximum Power Transfer/ Millman 's Network Theorems and electrical laws to reduce circuit complexities and to arrive at feasible solutions.
C202.3	Calculate current and voltages for the given circuit under transient conditions. Apply Laplace transform to solve the given network.
C202.4	Solve the given network using specified two port network parameter like Z or Y or T or h
C202.5	Understand the concept of resonance
C202.6	Determine the parameters that characterize series / parallel resonant circuit.

Course Name:C203(Electronic Devices -18EC33)

C203.1	Understand the principles of semiconductor Physics
C203.2	Understand the principles and characteristics of different types of semiconductor devices
C203.3	Understand the fabrication process of semiconductor devices
C203.4	Utilize the mathematical models of semiconductor junctions and MOS transistors for circuits and systems.
C203.5	Identify the mathematical models of MOS transistors for circuits and systems.
C203.6	Analyze the circuits and develop mathematical model of MOS transistors.

Course Name: C204 (Digital System Design-18EC34)

C204.1	Explain the concept of combinational and sequential logic circuits.
C204.2	Analyze and Design the combinational logic circuits.

C204.3	Describe and characterize flip-flops and its applications.
C204.4	Design the sequential circuits using SR, JK, D, T flip-flops.
C204.5	Design the sequential circuits using Mealy & Moore machines.
C204.6	Design applications of Combinational & Sequential Circuits.

Course Name:C205 (Computer Organization and Architecture-18EC35)

C205.1	Explain the basic organization of a computer system.
C205.2	Describe the addressing modes, instruction formats and program control statements.
C205.3	Explain different ways of accessing an input / output device including interrupts.
C205.4	Illustrate the organization of different types of semiconductor and other secondary storage memories.
C205.5	Illustrate simple processor organization based on hardwired control.
C205.6	Illustrate simple processor organization based on micro programmed control.

Course Name: C206 (Power Electronics and Instrumentation-18EC36)

C206.1	Build and test circuits using power electronic devices.
C206.2	Analyze and design-controlled rectifier, DC to DC converters, DC to AC inverters and SMPS.
C206.3	Analyze the instrument characteristics and errors.
C206.4	Describe the principle of operation and Develop circuits for multirange Ammeters, Voltmeters and Bridges to measure passive component values and frequency.
C206.5	Explain the principle, design and analyze the transducers for measuring physical Parameters.
C206.6	Design bridge circuits using instrumentation transducers.

Course Name: C212 (Analog Circuits -18EC42)

C212.1	Understand the characteristics of BJTs and FETs.
C212.2	Design and analyze BJT and FET amplifier circuits.
C212.3	Design sinusoidal and non-sinusoidal oscillators.
C212.4	Understand the functioning of linear ICs.
C212.5	Design of Linear IC based circuits.
C212.6	Develop amplifier circuits using BJT and FET.

Course Name: C213 (Control Systems -18EC43)

C213.1	Develop the mathematical model of mechanical and electrical systems.
C213.2	Develop transfer function for a given control system using block diagram reduction techniques and signal flow graph method.

C213.3	Determine the time domain specification s for first and second order systems.
C213.4	Determine the stability of a system in the time domain using Routh-Hurwitz criterion.
C213.5	Determine the stability of a system in the time domain using Root-Locus technique.
C213.6	Determine the s stability of a system in the frequency domain using Nyquist and bode plots.

Course Name: C215 (Signals and Systems -18EC45)

C215.1	Analyze the different types of signals and systems.
C215.2	Determine the linearity, causality, time-invariance, and stability properties of continuous and discrete time systems.
C215.3	Evaluate the convolution sum and integral
C215.4	Represent continuous systems in time and frequency domain using different transforms
C215.5	Represent discrete systems in time and frequency domain using different transforms
C215.6	Analyze discrete Fourier time signals and systems using Z-Transforms.

Course Name: C216 (Microcontroller -18EC46)

C216.1	Explain the difference between Microprocessors & Microcontrollers, Architecture of 8051 Microcontroller, Interfacing of 8051 to external memory and Instruction set of 8051.
C216.2	Write 8051 Assembly level programs using 8051 instruction set.
C216.3	Explain the Interrupt system, operation of Timers/Counters and Serial port of 8051.
C216.4	Write 8051 Assembly language programs to generate square wave on 8051 I/O port pin using interrupt and C Programme to send & receive serial data using 8051 serial port.
C216.5	Interface simple switches, simple LEDs, ADC 0804, LCD and Stepper Motor to 8051 using 8051 I/O ports.

Course Name:C301 (Management & Entrepreneurship-17ES51)

C301.1	Understand the fundamental concepts of Management and Entrepreneurship
C301.2	Select a best Entrepreneurship model for the required domain of establishment
C301.3	Describe the functions of Managers, Entrepreneurs, and their social responsibilities
C301.4	Compare various types of Entrepreneurs
C301.5	Analyze the various roles of Entrepreneurs and Various small-scale businesses.
C301.6	Analyze the Institutional support by various state and central government agencies

Course: C302(Digital Signal Processing -17EC52)

C302.1	Determine response of LTI systems using time domain and DFT techniques.

C302.2	Compute DFT of real and complex discrete time signals.
C302.3	Computation of DFT using FFT algorithms
C302.4	Computation of DFT using linear filtering approach.
C302.5	Solve problems on digital filter design and realize using digital computations.
C302.6	Analyze the various DSP processors and its floating-point processors

Course Name: C303(Verilog HDL-17EC53)

C303.1	Write Verilog programs in gate, dataflow (RTL), behavioral and switch modeling levels of Abstraction.
C303.2	Write simple programs in VHDL in different styles.
C303.3	Design and verify the functionality of digital circuit/system using test benches.
C303.4	Identify the suitable Abstraction level for a particular digital design.
C303.5	Write the programs more effectively using Verilog tasks and directives.
C303.6	Perform timing and delay Simulation.

Course Name:C304(Information Theory & Coding -17EC54)

C304.1	Explain concept of Dependent & Independent Source, measure of information, Entropy, Rate of Information and Order of a source
C304.2	Represent the information using Shannon Encoding, Shannon Fano, Prefix and Huffman Encoding Algorithms
C304.3	Model the continuous and discrete communication channels using input, output and joint probabilities
C304.4	Determine a codeword comprising of the check bits computed using Linear Block codes, cyclic codes & convolutional codes
C304.5	Design the encoding and decoding circuits for Linear Block codes, cyclic codes, convolutional codes.
C304.6	Design the encoding and decoding circuits BCH and Golay codes.

Course Name:C305 (Operating System-17EC553)

C305.1	Explain the goals, structure, operation and types of operating systems.
C305.2	Apply scheduling techniques to find performance factors.
C305.3	Explain organization of file systems and IOCS.
C305.4	Describe message passing, deadlock detection and prevention methods
C305.5	Apply suitable techniques for contiguous and non-contiguous memory allocation

Course Name: C306 (Object Oriented Programming Using C++-17EC562)

C306.1	Explain the basics of Object-Oriented Programming concepts

C306.2	Apply the object initialization and destroy concept using constructors and destructors.
C306.3	Apply the concept of polymorphism to implement compile time polymorphism in programs by using overloading methods and operators.
C306.4	Use the concept of inheritance to reduce the length of code and evaluate the usefulness
C306.5	Apply the concept of run time polymorphism by using virtual functions, overriding functions and abstract class in programs.
C306.6	Use I/O operations and file streams in programs

Course Name:C311 (Digital Communication-17EC61)

C311.1	Associate and apply the concepts of Bandpass sampling to well specified signals and channels.
C311.2	Analyze and compute performance parameters and transfer rates for low pass and bandpass symbol under ideal and corrupted non-band limited channels.
C311.3	Describe low pass and bandpass symbol under ideal and corrupted non-band limited channels.
C311.4	Test and validate symbol processing at the receiver under ideal and corrupted bandlimited channels.
C311.5	Test and validate performance parameters at the receiver under ideal and corrupted bandlimited channels.
C311.6	Demonstrate by simulation and emulation that bandpass signals subjected to corrupted and distorted symbols in a bandlimited channel, can be demodulated and estimated at receiver to meet specified performance criteria.

Course Name: C312 (ARM Microcontroller & Embedded Systems-17EC62)

C312.1	Describe the architectural features and instructions of 32-bit microcontroller ARM Cortex M3.
C312.2	Apply the knowledge gained for Programming ARM Cortex M3 for different applications.
C312.3	Understand the basic hardware components and their selection method based on the characteristics and attributes of an embedded system.
C312.4	Develop the hardware co-design and firmware design approaches.
C312.5	Explain the need of real time operating system for embedded system applications.
C313.6	Develop the software co-design and firmware design approaches.

Course Name:C313(VLSI Design-17EC63)

C313.1	Demonstrate understanding of MOS transistor theory, CMOS fabrication flow and technology scaling.

C313.2	Draw the basic gates using the stick and layout diagrams with the knowledge of physical design aspects
C313.3	Interpret Memory elements along with timing considerations
C313.4	Demonstrate knowledge of FPGA based system design
C313.5	Interpret testing and testability issues in VLSI Design
C313.6	Analyze CMOS subsystems and architectural issues with the design constraints.

Course Name: C314 (Computer Communication Networks - 17EC64

C314.1	Identify the protocols and services of Data link layer.
C314.2	Identify the protocols and functions associated with the transport layer services.
C314.3	Describe the layering architecture of computer networks and distinguish between the OSI reference model and TCP/IP protocol suite.
C314.4	Distinguish the basic network configurations and standards associated with each network
C314.5	Analyze and design a network model using Dijkstra's algorithm.
C314.6	Construct a network model and determine the routing of packets using different routing algorithms.

Course Name:C315(Digital Switching Systems-17EC654)

C315.1	Describe the electromechanical switching systems and its comparison with the digital switching.
C315.2	Determine the telecommunication traffic and its measurements.
C315.3	Define the technologies associated with the data switching operations.
C315.4	Describe the software aspects of switching systems and its maintenance.

Course Name:C316(Digital System Design using Verilog-17EC663)

C316.1	Construct the combinational circuits, using discrete gates and programmable logic devices.
C316.2	Describe Verilog model for sequential circuits and test pattern generation.
C316.3	Design a semiconductor memory for specific chip design.
C316.4	Design embedded systems using small microcontrollers, larger CPUs/DSPs, or hard or soft processor cores. ·
C316.5	Synthesize different types of processors that are used in embedded system.
C316.6	Synthesize different types of I/O controllers that are used in embedded system

Course Name:C401(Microwave and Antennas -15EC71)

C401.1	Describe the use and advantages of microwave transmission.
C401.2	Analyze various parameters related to microwave transmission lines and waveguides
C401.3	Identify microwave devices for several applications.
C401.4	Analyze various antenna parameters necessary for building an RF system.
C401.5	Recommend various antenna configurations according to the applications
C401.6	Design/Simulate an antenna configuration according to the applications.

Course Name:C402(Digital Image Processing-15EC72)

C402.1	Understand image formation and the role human visual system plays in perception of gray and color image data.
C402.2	Apply image processing techniques in both the spatial and frequency (Fourier) domains.
C402.3	Design image analysis techniques in the form of image segmentation
C402.4	Evaluate the various Methodologies for segmentation.
C402.5	Describe Image Enhancement techniques.
C402.6	Conduct independent study and analysis of Image Enhancement techniques.

Course Name:C403(Power Electronics-15EC73)

C403.1	Describe the characteristics of different power devices and identify the various applications associated with it
C403.2	Illustrate the working of power circuit as DC-DC converter
C403.3	Illustrate the operation of inverter circuit and static switches.
C403.4	Determine the output response of a thyristor circuit with various triggering options
C403.5	Determine the response of controlled rectifier with resistive and inductive loads.
C403.6	Analyze the various types of inverters and develop SMPS.

Course Name:C404(Multimedia Communication - 15EC741)

C404.1	Understand basics of different multimedia networks and applications.
C404.2	Understand different compression techniques to compress audio and video.
C404.3	Describe multimedia Communication across Networks.
C404.4	Analyze different media types to represent them in digital form.
C404.5	Compress different types of text and images using different compression techniques and analyses DMS.

Course Name:C405(Satellite Communication - 15EC755

C405.1	Describe the satellite orbits and its trajectories with the definitions of parameters associated with it.
C405.2	Describe the electronic hardware systems associated with the satellite subsystem and earth station.
C405.3	Describe the various applications of satellite with the focus on national satellite system.
C405.4	Analyze the applications on national satellite system.
C405.5	Describe multiple access techniques.
C405.6	Compute the satellite link parameters under various propagation conditions with the illustration of multiple access techniques.

Course Name:C411(Wireless Cellular and LTE 4G Broadband -15EC81

C411.1	Understand the system architecture and the functional standard specified in LTE 4G.
C411.2	Analyze the role of LTE radio interface protocols and EPS Data convergence protocols to set up, reconfigure and release data and voice from users.
C411.3	Demonstrate the UTRAN and EPS handling processes from set up to release including mobility management for a variety of data call scenarios.
C411.4	Describe Resource management, packet data processing.
C411.5	Test the Performance of resource management and packet data processing and transport algorithms.
C411.6	Evaluate the Performance of resource management and packet data processing and transport algorithms.

Course Name:C412(Fiber Optics & Networks- 15EC82)

C412.1	Classification and working of optical fiber with different modes of signal propagation.
C412.2	Describe the transmission characteristics and losses in optical fiber communication.
C412.3	Describe the construction and working principle of optical connectors, multiplexers and amplifiers.
C412.4	Describe the constructional features and the characteristics of optical sources and detectors.
C412.5	Illustrate the networking aspects of optical fiber.
C412.6	Describe various standards associated with networking.

Course Name:C413(Radar Engineering- 15EC833)

C413.1	Understand the radar fundamentals and radar signals
C413.2	Explain the working principle of pulse Doppler radars, their applications and limitations
C413.3	Describe Radar applications and limitations.
C413.4	Analyze radar transmitters and receivers.
C413.5	Describe the working of various radar transmitters and receivers.
C413.6	Analyze the range parameters of pulse radar system which affect the system performance

CHILDREN'S EDUCATION SOCIETY (Regd.)
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Department of Electrical and Electronics

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To be a respected and most sought after engineering educational institution engaged in equipping individuals capable of building learning organizations in the new millennium.

Mission of the Institute

To develop competent students with good value systems and face challenges of the continuously changing world.

Vision of the Department

To meet the educational and research needs of the student community and staff through collaboration with other academic and technical institutions, industry and government agencies and make the students to face problems of the country and society.

Mission of the Department

M1 - To develop and train competent Electrical and Electronics Engineers with adequate practical skills.

M2 - To provide state-of-the-art resources that contribute to achieve excellence in teaching-learning, research, and development activities.

M3 - To inculcate, ethics, leadership, moral values, and social activities.

Program Educational Objectives

PEO 1.	Be able to apply the fundamental knowledge of mathematics, science, electrical and electronics engineering to analyze and solve the complex problem in electrical, electronics and allied interdisciplinary areas.
PEO 2.	Possess good leadership skills, function ethically in multidisciplinary areas to develop sustainable solutions for global, environmental, and social issues. Be able to inculcate lifelong learning to maintain and enhance professional skills.

Program Specific Objectives

PSO 1: Apply fundamental knowledge to identify, formulate, design, and investigate various problems of electrical and electronic circuits, power electronics, control systems and power systems.

PSO 2: Apply modern software tools for design, simulation, and analysis of electrical systems to engage in life- long learning and to successfully adapt in multi-disciplinary environments.

PSO 3: Solve ethically and professionally various Electrical Engineering problems in societal and environmental context and communicate effectively by applying project management techniques to complex engineering problems.

Course Name:18EE32/ELECTRIC CIRCUIT ANALYSIS

C232.1	Understand the basic concepts, basic laws, reduce the complexity of the network using source transformation and source shifting, network reduction using star/delta transformations and understand the analysis of dc and ac networks
C232.2	Discuss the resonance in series and parallel circuits
C232.3	Solve complex electric circuits using superposition, Thevenin's and Norton's theorems
C232.4	Solve complex electric circuits using Reciprocity, Millman's and Maximum power transfer theorems
C232.5	Synthesize typical waveforms using Laplace transforms
C232.6	Evaluate the performance of two port networks and transient analysis

Course Name:18EE33–Transformers and Generators

C233.1	Understand the construction and operation of 1-phase, 3-Phase transformers and Autotransformer.
C233.2	Analyze the performance of transformers by polarity test, Sumner's Test, phase conversion, 3-phase connection, and parallel operation.
C233.3	Understand the construction and working of AC and DC Generators.
C233.4	Analyze the performance of the AC Generators on infinite bus and parallel operation.
C233.5	Determine the regulation of AC Generator by Slip test, EMF, MMF, and ZPF Methods.
C233.6	Performance of Synchronous Generators, Power angle characteristics.

Course Name: Analog Electronic Circuits / 18EE34

C234.1	Utilize the characteristics of transistor for different applications.
C234.2	Design and analyze biasing circuits for transistor.
C234.3	Observe the effect of negative feedback, different types of negative feedback topologies.
C234.4	Design and analyze and test transistor circuitry as amplifiers and oscillators.
C234.5	Design and working of different oscillators using BJT's.
C234.6	Develop the ability to understand the design and working of FET amplifiers.

Course Name:18EE35– Digital System Design

C235.1	Develop simplified switching equation using Karnaugh Maps
C235.2	Develop simplified switching equation using Quine McClusky techniques and Design of Adder circuits
C235.3	Design Multiplexer, Encoder, Decoder, Subtractors and Comparator as digital combinational control circuits.

C235.4	Design flip flops, counters, shift registers as sequential control circuits
C235.5	Design of Counters
C235.6	Develop Mealy/Moore Models and state diagrams for the given clocked sequential circuits and Explain the functioning of Read only and Read/Write Memories,
	Programmable ROM, EPROM and Flash memory

Course Name:18EE36 - Electrical &Electronics Measurements

C236.1	Measure resistance, inductance and capacitance using bridges and determine earth resistance.
C236.2	Construction and operation of single-phase and three phase Electrodynamometer P. Meter, Weston frequency meter and Phase sequence indicator
C236.3	Explain the working of various meters used for measurement of Power, Energy & understand the adjustments, calibration & errors in energy meters.
C236.4	Understand methods of extending the range of instruments & instrument transformers
C236.5	Explain the working of different electronic instruments
C236.6	Explain the working of different display and recording devices

Course Name:18EEL37–Electrical Machines Lab

C238.1	Evaluate the performance of transformers from the test data obtained. •
C238.2	Connect and operate two single phase transformers of different KVA rating in parallel.
C238.3	Connect single phase transformers for three phase operation and phase conversion.
C238.4	Compute the voltage regulation of synchronous generator using the test data obtained in the laboratory.
C238.5	Evaluate the performance of synchronous generators from the test data and assess the performance of synchronous generator connected to infinite bus.
C238.6	Evaluate the performance of transformers from the test data obtained. •

Course Name:18EEL38–Electrical Machines Lab

C238.1	Evaluate the performance of transformers from the test data obtained. •
C238.2	Connect and operate two single phase transformers of different KVA rating in parallel.
C238.3	Connect single phase transformers for three phase operation and phase conversion.
C238.4	Compute the voltage regulation of synchronous generator using the test data obtained in the laboratory.
C238.5	Evaluate the performance of synchronous generators from the test data and assess the performance of synchronous generator connected to infinite bus.
C238.6	Evaluate the performance of transformers from the test data obtained. •

Course Name:18EE42 – Power Generation and Economics

C242.1	Describe the working of hydroelectric, power plants and state functions of major equipment of the power plants.
C242.2	Describe the working of steam power plants and state functions of major equipment of the power plants
C242.3	Describe the working of Diesel, Gas Turbine, power plants and state functions of major equipment of the power plants
C242.4	Describe the working of nuclear power plants and state functions of major equipment of the power plants.
C242.5	Classify various substations and explain the functions of major equipment's in substations. • Explain the types of grounding and its importance.
C242.6	Infer the economic aspects of power system operation and its effects. • Explain the importance of power factor improvement.

Course Name: Transmission and Distribution / 18EE43

C243.1	Understand the concepts of various methods of generation of power.
C243.2	Parameters associated with transmission line.
C243.3	Design and analyze the overhead transmission line for different configuration.
C243.4	Calculate the parameters of transmission line for different configuration.
C243.5	Understand the use of underground cable.
C243.6	Evaluate different types of distributors.

Course Name: Electric Motors / 18EE44

C244.1	Explain the constructional features of motors and drive for specific applications.
C244.2	Analysis the performance characteristic of DC motors.
C244.3	Explain the constructional features of 3-phase and single-phase induction motors.
C244.4	Control the speed of induction motor by suitable method
C244.5	Explain the operation of synchronous motor and special motors.
C244.6	Control the speed of motor by suitable method.

Course Name: Field theory / 18EE45

C245.1	To study different coordinate systems for understanding the concept of gradient, divergence, and curl of a vector.
C245.2	To study, apply coulomb's law and gauss laws for electric field produced by different charge configuration.
C245.3	To evaluate the energy and potential due to a system of charges.
C245.4	To study the behavior of electric field across a boundary between a conductor and dielectric and between two different dielectrics.

C245.5	To study the magnetic fields and magnetic materials.
C245.6	To study the time varying fields and propagation of wave of different media.

Course Name: Opamp / 18EE46

C246.1	Explain the representation, characteristics and equivalent circuit and application.
C246.2	Designing of first, second order filters, voltage regulators using OPAMP.
C246.3	Use of OPAMP in signal generation, comparator, and converter circuits.
C246.4	Use of OPAMP in signal processing, A/D and D /A converter circuits.
C246.5	Discussion of PLL, its components and performance factors.
C246.6	Discussion of 555 timers an its application in signal generation.

Course Name: Electrical Machines Lab – 2 / 18EEL47

C247.1	Test dc machines to determine their characteristics
C247.2	Control the speed of dc motor
C247.3	Pre-determine the performance characteristics of dc machines by conducting suitable tests.
C247.4	Perform load test on single phase and three phase induction motor to assess its performance
C247.5	Conduct test on induction motor to pre-determine the performance characteristics
C247.6	Conduct test on synchronous motor to draw the performance curves.

Course Name: Opamp& LIC Laboratory / 18EEL48

C247.1	To conduct experiment to determine the characteristic parameters of OP-Amp
C247.2	To design test the OP-Amp as Amplifier, adder, subtractor, differentiator and integrator
C247.3	To design test the OP-Amp as oscillators and filters.
C247.4	Design and study of Linear ICs as multivibrator power supplies.
C247.5	Use of OPAMP in signal generation, comparator, and converter circuits.
C247.6	Use of OPAMP in signal processing, A/D and D /A converter circuits.

Course Name:17EE51 - Management & Entrepreneurship

C351.1	Explain the field of management, task of the manager, planning and the need of proper staff, recruitment, and selection process.
C351.2	Discuss work allocation, the structure of organization, the modes of communication and importance of managerial control in business.
C351.3	To explain need of coordination between the manager and staff in exercising the authority and delegating duties.
C351.4	To explain the social responsibility of business and leadershipconcepts of entrepreneurship and the role and importance.

C351.5	Show an understanding of the role and importance of Small-Scale Industries, business plan and its presentation.
C351.6	Discuss the concepts of project management, capitol building process, project feasibility study, project appraisal and project financing.

Course Name: - Microcontroller

C352.1	To explain the internal or organization and working of computers, microcontrollers and embedded processors also to compare and contrast the various members of the 8051 family.
C352.2	To explain in detail the execution of 8051 assembly language instructions and data types and to explain loop, conditional and unconditional jump and call, handling and manipulation of I / O instructions.
C352.3	To explain develop 8051C programs for time delay, I/O operations, I/O bit manipulation, logic, arithmetic operations, and data conversions.
C352.4	To explain develop 8051C serial port programming.
C352.5	To explain in detail the interfacing of various devices with 8051 C processor.
C352.6	To explain about various interrupt routines

Course Name:17EE53–Power Electronics

C353.1	- To explain application area of power electronics, types of power electronic circuits and switches their characteristics and specifications.
C353.2	To explain types of power diodes, their characteristics, and the effects of power diodes on RL circuits.
C353.3	To explain the techniques for design, operation, and analysis of single-phase diode rectifier circuits
C353.4	To explain steady state, switching characteristics and gate control requirements of different power transistors and their limitations.
C353.5	To discuss different types of Thyristors, their operation, gate characteristics and gate control requirements
C353.6	To explain designing, analysis techniques and characteristics of thyristor-controlled rectifiers.

Course Name:17EE54 – Signals and Systems

C354.1	Basics of signals and system, Classification of signals and system
C354.2	To explain in detail the basic operations on signals and properties of system
C354.3	To explain the use convolution in both continuous and discrete domain for the analysis of systems given the impulse response of a system. Provide block diagram representation of LTI system.

C354.4	To explain use Z-transform and properties of Z-transform for the analysis of discrete time systems
C354.5	To explain in detail the continuous time Fourier transform representation to study signals and linear time invariant systems
C354.6	To explain to apply Discrete time Fourier transform representation to study signals and linear time invariant systems

Course Name:17EE553 – Electrical Estimation & Costing

C355.1	Explain the purpose of estimation and costing.
C355.2	Discuss AE act and IE rules.
C355.3	Discuss energy distribution in a building, wiring, cable, fuses, lightning, points, circuits, sub circuits.
C355.4	Discuss types of service mains and estimation of service mains and power circuits.
C355.5	Discuss estimation of overhead transmission and distribution system and its components.
C355.6	Discuss main components of substation, preparation of single line diagram and ear thing of a substation.

Course Name:17EE563 – Renewable Energy Sources

C356.1	Discuss energy scarcity, solution, availability of renewable energy.
C356.2	Explain about sun, earth relationship, types of solar collectors.
C356.3	Discuss solar cell components, characteristics, application, and configuration.
C356.4	Discuss hydrogen, wind energy production, site selection, storage.
C356.5	Discuss biomass, biogas composition types, production, advantages, and disadvantages.
C356.6	Discuss availability, generation, devices for tidal, sea wave and wave and ocean thermal energy.

Course Name:17EEL57 – Microcontroller Lab

C357.1	Write Assembly language Program for arithmetic and data transfer Instructions
C357.2	Write Assembly language Program for Logical and Branching Instructions
C357.3	Write Assembly/ C language Program for Counters
C357.4	Write Assembly / C language Program for generating Delays
C357.5	Interface External control and Display devices
C357.6	To work in a team and present report

Course Name:17EEL58 – Power Electronics Lab

C358.1	To conduct experiments on semiconductor devices to obtain their static characteristics.

C358.2	To study different methods of triggering the SCR
C358.3	To study the performance of single phase controlled full wave rectifier and AC voltage controller with R and RL loads
C358.4	To control the speed of a dc motor, universal motor, and stepper motors
C358.5	To study single phase full bridge inverter connected to resistive load.
C358.6	To study protection circuit

Course Name: Control Systems / 17EE61

C361.1	Discuss the effect of feedback and types of control systems, evaluate the transfer function.
C361.2	Evaluate the stability of linear time invariant systems.
C361.3	Apply block diagram manipulation and signal flow graph.
C361.4	Demonstrate the model of control system using mathematical modeling.
C361.5	Determine the transient and steady state time response.
C361.6	Investigate the performance of the given system in time and frequency domain-based design of controller or compensator configuration.

Course Name: Power System Analysis / 17EE62

C362.1	Show understanding of per unit system, its advantages and computation.
C362.2	Perform short circuit analysis on a synchronous machine and simple power system to select a circuit breaker for the system.
C362.3	Evaluate symmetrical components of voltages and currents in un-balanced three phase circuits.
C362.4	Explain the concept of sequence impedance and sequence networks of power
	system components and power system.
C362.5	Analyse three phase synchronous machine and simple power systems for different unsymmetrical faults using symmetrical components.
C362.6	Discuss the dynamics of synchronous machine, stability, and types of stability.

Course Name: Digital Signal Processing / 17EE63

C363.1	Compute the DFT of various signals using its properties.
C363.2	Use the DFT to compute the linear and circular convolution and linear filters of long sequence.
C363.3	Apply fat and efficient algorithm for computing DFT and IDFT.
C363.4	Design of IIR Butterworth digital filters using impulse invariant/BT.
C363.5	Design of IIR digital filter using Impulse invariant/Bilinear transformation.
C363.6	Design of FIR filters using wind functions and frequency sampling method and realization of IIR and FIR filters

Course Name: Electrical Machine Design / 17EE64

C364.1	To know the properties of electrical and magnetic materials.
C364.2	To design the machines as in modern trend.
C364.3	Selection of loading for various machines
C364.4	To discuss the main dimensions of machines.
C364.5	To discuss design of AC and DC machines.
C364.6	To know the short circuit ration and performance.

Course Name: Computer Aided Electrical Drawing / 17EE651

C365.1	Discuss the terminology and types of DC and AC armature windings.
C365.2	Develop armature winding diagram for AC and DC machines.
C365.3	Develop layout of substation using standard symbols.
C365.4	Draw sectional views of transformer using design data.
C365.5	Draw sectional views of assembled DC machine or its parts.
C365.6	Draw sectional views of assembled alternator or its parts.

Course Name:17EE654 – Solar and Wind Energy

C362.1	Explain the importance of energy in human life, relationship among economy and environment with energy use and increasing role of renewable energy.
C362.2	Explain the concept of energy storage and the principles of energy storage devices.
C362.3	To discuss solar radiation on horizontal and tilted surface, its characteristics, measurement, and analysis of radiation data.
C362.4	Describe the process of harnessing solar energy and its applications in heating and cooling.
C362.5	Discuss fabrication, operation of solar cell, electrical characteristics, sizing and design of solar PVsystems and their applications.
C362.6	Explain basic Principles of Wind Energy Conversion, collection of wind data, energy estimation and site selection. Discuss the performance of Wind-machines, energy

	storage, applications of Wind Energy and environmental aspects.

Course Name: Sensors and Transducers / 17EE662

C366.1	Discuss need of transducers, classification, advantages, disadvantages, working.
C366.2	Discuss recent trends in sensor technologies of their selection.
C366.3	Discuss basics of signal codes equipment.
C366.4	Discuss configuration of DAS and data conversion.
C366.5	Show knowledge of data transmission &telemetry.
C366.6	Express measurement of non-electrical quantities.

Course Name: Control Systems Lab / 17EEL67

C367.1	Use software package or discrete components in assessing the time and frequency domain reposes of a given second order system
C367.2	Design and analyze Lead, Lag and Lag – Lead compensators for given specifications
C367.3	Determine the performance characteristics of ac and dc servomotors and synchro-transmitter receiver pair used in control systems
C367.4	Simulate the DC position and feedback control system to study the effect of P, PI, PD and PID controller and Lead compensator on the step response of the system
C367.5	Write a script files to plot root locus, bode plot, Nyquist plots to study the stability of the system using a software package
C367.6	Work with a small team to carryout experiments and prepare reports that present lab work

Course Name: Digital Signal Processing Lab / 17EEL68

C368.1	Give physical interpretation of sampling theorem in time and frequency domains.
C368.2	Evaluate the impulse response of a system
C368.3	Perform convolution of given sequences to evaluate the response of a system.
C368.4	Compute DFT and IDFT of a given sequence using the basic definition and/or fast methods
C368.5	Provide a solution for a given difference equation
C368.6	Design and implement IIR and FIR filters

Course Name:15EE71 - Power System Analysis-2

C471.1	Formulate network matrices and models for solving load flow problems
C471.2	Perform steady state power flow analysis of power systems using numerical iterative techniques
C471.3	Suggest a method to control voltage profile

C471.4	Show knowledge of optimal operation of generators on a bus bar, optimal unit commitment; discuss optimal scheduling for hydrothermal system, power system security and reliability
C471.5	Analyze short circuit faults in power system networks using bus impedance matrix
C471.6	Perform numerical solution of swing equation for multi – machine stability

Course Name:15EE72 - Power System Protection

C472.1	To discuss performance of protective relays, components of protection scheme and relay terminology and to explain relay construction and operating principles.
C472.2	To explain Overcurrent protection using electromagnetic and static relays and Overcurrent protective schemes
C472.3	To discuss types of electromagnetic and static distance relays, effect of arc resistance, power swings, line length and source impedance on performance of distance relays
C472.4	To discuss pilot protection, wire pilot relaying and carrier pilot relaying. And also, to discuss construction, operating principles and performance of various differential relays for differential protection
C472.5	To discuss protection of generators, motors, Transformer and Bus Zone Protection.
C472.6	To explain the principle of circuit interruption and different types of circuit breakers and to describe the construction and operating principle of different types of fuses and to give the definitions of different terminologies related to a fuse

Course Name:15EE73 – HIGH VOLTAGE ENGG

C473.1	Explain the Conduction and Breakdown phenomenon in gases, liquid dielectrics
C473.2	Explain the Conduction and Breakdown phenomenon in gases, solid dielectrics.
C473.3	To discuss the generation of high Voltages and currents.
C473.4	To discuss the measurement techniques for high voltages and currents.
C473.5	To discuss over voltage phenomenon and Insulation coordination in Electric power system.
C473.6	To discuss testing of materials and Electric apparatus and high voltage testing of Electric apparatus.

Course Name:15EE742 – Utilization of Electrical Energy

C4742.1	Able to discuss electric heating, air-conditioning and electric welding.
C4742.2	To explain laws of electrolysis, extraction and refining of metals and electro deposition, terminology of illumination, laws of illumination, construction and working of electric lamps.
C4742.3	Able to Design interior and exterior lighting systems- illumination levels for factory lighting- flood lighting-street lighting.

C4742.4	To discuss systems of electric traction, speed time curves and mechanics of train movement.
C4742.5	Able to Explain the motors used for electric traction and their control and discuss braking of electric motors, traction systems and power supply and other traction systems
C4742.6	Able to explain the working of electric and hybrid electric vehicles

Course Name:15EE752 – Testing and Commissioning of Power System Apparatus

C4752.1	Describe the process to plan, control and implement commissioning of electrical equipment's.
C4752.2	Differentiate the performance specifications of transformer and induction motor
C4752.3	Demonstrate the routine tests for synchronous machine, induction motor, transformer & switchgears.
C4752.4	Describe corrective and preventive maintenance of electrical equipment's
C4752.5	Explain the operation of an electrical equipment's such as isolators & circuit breakers
C4752.6	Explain the operation of an electrical equipment's such as induction motor and synchronous machines.

Course Name:15EEL76-Power System Simulation Lab

C476.1	Develop a program in MATLAB to assess the performance of medium and long transmission lines.
C476.2	Develop a program in MATLAB to obtain the power angle characteristics of salient and non-salient pole alternator and assess the transient stability under three phase faults at different locations in a of radial power systems.
C476.3	Develop programs in MATLAB to formulate bus admittance and bus impedance matrices of interconnected power systems.
C476.4	Use Mi-Power package to solve power flow problem for simple power systems.
C476.5	Use Mi-Power package to study unsymmetrical faults at different locations in radial power systems
C476.6	Use of Mi-Power package to study optimal generation scheduling problems for thermal power plants

Course Name: 15EEL77-High Voltage &Relay Lab

C477.1	Experimentally verify the characteristics of over current, over voltage, under voltage and negative sequence relays both electromagnetic and static type
C477.2	Experimentally verify the characteristics of microprocessor based over current, over voltage, under voltage relays and distance relay. Show knowledge of protecting
C477.3	Analyze the spark over characteristics for both uniform and non-uniform configurations using High AC and DC voltages.

C477.4	Measure high AC and DC voltages and breakdown strength of transformer oil.
C477.5	Draw electric field and measure the capacitance of different electrode configuration models.
C477.6	Show knowledge of generating standard lightning impulse voltage to determine efficiency, energy of impulse generator and 50% probability flashover voltage for air insulation.

Course Name:15EEP78-Project Work – Phase 1

C478.1	Demonstrate a sound technical knowledge of their selected project topic
C478.2	Undertake problem identification, formulation, and solution.
C478.3	Design engineering solutions to complex problems utilizing a systems approach.
C478.4	Communicate with engineers and the community at large in written an oral form.
C478.5	Demonstrate the knowledge &skills of a professional engineer.
C478.6	Demonstrate the attitudes of a professional engineer.

Course Name: Power System Operation and control / 15EE81

C481.1	Describe various levels of controls in power systems, the vulnerability of the system, components, architecture, and configuration of SCADA and Solve unit commitment problems
C481.2	Explain issues of hydrothermal scheduling and solutions to hydrothermal problems
C481.3	Explain basic generator control loops, functions of Automatic generation control, speed governors
C481.4	Develop and analyze mathematical models of Automatic Load Frequency Control
C481.5	Explain automatic generation control, voltage and reactive power control in an interconnected power system.
C481.6	Explain reliability, security, contingency analysis, state estimation and related issues of power systems.

Course Name: Industrial Drives / 15EE82

C482.1	Explain the advantages and choice of electric drive.
C482.2	Explain dynamics and different modes of operation of electric drives.
C482.3	Analyze the performance of induction motor drives under different conditions.
C482.4	Control induction motor, synchronous motor, and stepper motor drives.
C482.5	Suggest a motor for a drive and control of dc motor using controlled rectifiers
C482.6	Suggest a suitable electrical drive for specific application in the industry

Course Name: Smart Grid / 15EE831

C4831.1	Discuss the progress made by different stakeholders in the design and development of smart grid and Explain measurement techniques using Phasor Measurement Units and smart meters
C4831.2	Discuss tools for the analysis of smart grid and design, operation, and performance
C4831.3	Discuss classical optimization techniques and computational methods for smart grid design, planning and operation.
C4831.4	Explain predictive grid management and control technology for enhancing the smart grid performance
C4831.5	Discuss the computational techniques, communication, measurement, and monitoring technology tools essential to the design of the smart grid.
C4831.6	Explain methods to promote smart grid awareness and making the existing transmission system smarter by investing in new technology

Course Name: Internship / 15EE84

C484.1	Gain practical experience within industry in which the internship is done
C484.2	Apply knowledge and skills learned to classroom work
C484.3	Develop a greater understanding about career options while more clearly defining personal career goals
C484.4	Develop and refine oral and written communication skills.
C484.5	Expand intellectual capacity, credibility, judgment, intuition.
C484.6	Acquire the knowledge of administration, marketing, finance, and economics

Subject Name/ Subject Code: Project Work/ 15EEP85

C485.1	Present the project and be able to defend it
C485.2	Make links across different areas of knowledge and to generate, develop and evaluate ideas and information to apply these skills to the project task
C485.3	Habituated to critical thinking and use problem solving skills
C485.4	Communicate effectively and to present ideas clearly and coherently in both the written and oral forms
C485.5	Work in a team to achieve common goal.
C485.6	Learn on their own, reflect on their learning and take appropriate actions to improve it

Course Name: Seminar/ 15EES86

C486.1	Attain, use, and develop knowledge in the field of electrical and electronics engineering and other disciplines through independent learning and collaborative study
C486.2	Identify, understand, and discuss current, real-time issues

C486.3	Improve oral and written communication skills
C486.4	Explore an appreciation of the self in relation to its larger diverse social and academic contexts.
C486.5	Apply principles of ethics and respect in interaction with others
C486.6	Work in a team to achieve common goal.

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Department of Information

TechnologyVision of the Institute

To be a respected and most sought after engineering educational institution engaged in equipping individuals capable of building learning organizations in the new millennium.

Mission of the Institute

To develop competent students with good value systems and face challenges of the continuously changing world.

Vision of the Department

To meet the educational, research & service needs of the region through collaboration with academic, technical institutions, businesses, government agencies & cultural organizations, thereby, providing a platform that encourages students & faculty to continue their intellectual & professional growth.

Mission of the Department

To develop the best Information Science Professionals, who work creatively, communicate effectively & become technologically competent and to mould them into good citizens by inculcating sense ethical values in them.

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E-mail: engprincipal@theoxford.edu Web: www.theoxfordengg.org

Program Educational Objectives

PEO 1.	Be capable of understanding, analyzing, and applying current & emerging technologies to design and develop solutions to IT/ITES/Software/Telecom related problems and acquire value and employment.
PEO 2.	To have sound foundation in mathematical, scientific and Information science engineering fundamentals necessary to formulate, solve and analyze practical problems and to prepare students for further studies and research.
PEO 3.	Function effectively as individuals and team members in the workplace, growing into highly technical or project management and leadership roles, in various organizations. Create an awareness of the life-long learning process, to communicate effectively, learn necessary tools to successfully identify and adapt to ever changing technologies, by ethical means and code of professional practice.

Program Specific Objectives

PSO 1.	Provide effective and efficient real time solutions with the application of knowledge in IT, ITES, Networking and Software domains.
PSO	Demonstrate the ability to work in a team, with professional ethics, good communication and documentation skills in designing, implementation and management of software products and services, at optimal cost.
PSO	Proven capability to exchange views/concepts, incubate ideas and to carry out lifelong learning with zeal, to be aware of the state of art technologies and their development.

Course Name: C202 Data Structures and Applications 18CS32

C202.1	Use different types of data structures, operations, and algorithms
C202.2	Apply searching and sorting operations on files
C202.3	Use stack, Queue, Lists, Trees and Graphs in problem-solving
C202.4	Implement all data structures in a high-level language for problem-solving.

Course Name: C203 Analog and Digital Electronics 18CS33

C203.1	Design and analyze application of analog circuits using photo devices, timer IC, power supply and regulator IC and-amp.
C203.2	Explain the basic principles of A/D and D/A conversion circuits and develop the same.
C203.3	Simplify digital circuits using Karnaugh Map, and Quine-McClusky Methods
C203.4	Explain Gates and flip flops and make us in designing different data processing circuits, registers and counters and compare the types.
C203.5	Develop simple HDL programs

Course Name: C234 Computer Organization 18CS34

C234.1	Explain the basic organization of a computer system.
C234.2	Demonstrate functioning of different sub systems, such as processor, Input/output, and memory.
C234.3	Illustrate hardwired control and micro programmed control, pipelining, embedded and other computing systems.
C234.4	Design and analyses simple arithmetic and logical units.

Course Name:C205Software Engineering 18CS35

C205.1	Design a software system, component, or process to meet desired needs within realistic constraints.
C205.2	Assess professional and ethical responsibility
C205.3	Function on multi-disciplinary teams
C205.4	Use the techniques, skills, and modern engineering tools necessary for engineering practice
C205.5	Analyze, design, implement, verify, validate, implement, apply, and maintain software systems or parts of software systems

Course Name:C206 Discrete Mathematical Structures 18CS36

C206.1	Use propositional and predicate logic in knowledge representation and truth verification.

C206.2	Demonstrate the application of discrete structures in different fields of computer science.
C206.3	Solve problems using recurrence relations and generating functions.
C206.4	Application of different mathematical proofs techniques in proving theorems in the courses.
C206.5	Compare graphs, trees, and their applications.

Course Name: C212 Design and Analysis of Algorithms 18CS42

C212.1	Describe computational solution to well-known problems like searching, sorting etc.
C212.2	Estimate the computational complexity of different algorithms.
C212.3	Devise an algorithm using appropriate design strategies for problem-solving.

Course Name: C213 Operating Systems 18CS43

C213.1	Demonstrate need for OS and different types of OS
C213.2	Apply suitable techniques for management of different resources
C213.3	Use processor, memory, storage, and file system commands
C213.4	Realize the different concepts of OS in platform of usage through case studies

Course Name:C214 Microcontroller and Embedded System 18CS44

C214.1	Describe the architectural features and instructions of ARM microcontroller
C214.2	Apply the knowledge gained for Programming ARM for different applications.
C214.3	Interface external devices and I/O with ARM microcontroller.
C214.4	Interpret the basic hardware components and their selection method based on the characteristics and attributes of an embedded system.
C214.5	Develop the hardware /software co-design and firmware design approaches.
C214.6	Demonstrate the need of real time operating system for embedded system applications

Course Name: C215 Object Oriented Concepts 18CS45

C215.1	Explain the object-oriented concepts and JAVA.
C215.2	Develop computer programs to solve real world problems in Java.
C215.3	Develop simple GUI interfaces for a computer program to interact with users, and to understand the event-based GUI handling principles using swings.

Course Name: C216 Data Communication 18CS46

C216.1	Explain the various components of data communication.
C216.2	Explain the fundamentals of digital communication and switching.
C216.3	Compare and contrast data link layer protocols.

C216.4	Summarize IEEE 802.xxstandards

Course Name:C301 (Management & Entrepreneurship-17CS51**)**

C301.1	Define management, organization, entrepreneur, planning, staffing, ERP and outline their importance in entrepreneurship
C301.2	Utilize the resources available effectively through ERP
C301.3	Make use of IPRs and institutional support in entrepreneurship

Course Name: C302 Computer Networks

C302.1	Explain principles of application layer protocols
C302.2	Outline transport layer services and infer UDP and TCP protocols
C302.3	Classify routers, IP and Routing Algorithms in network layer
C302.4	Explain the Wireless and Mobile Networks covering IEEE 802.11Standard

Course Name:C303 Database Management System 18CS51

C303.1	Define management, organization, entrepreneur, planning, staffing, ERP and outline their importance in entrepreneurship
C303.2	Utilize the resources available effectively through ERP
C303.3	Make use of IPRs and institutional support in entrepreneurship

Course Name:C304 Automata Theory and Computability17cs54

C304.1	Explain how to translate between different models of Computation (e.g., Deterministic and Non-deterministic and Software models).
C304.2	Interpret Grammars and Automata (recognizers) for different language classes and become knowledgeable about restricted models of Computation (Regular, Context Free) and their relative powers.
C304.3	Develop skills in formal reasoning and reduction of a problem to a formal model, with an emphasis on semantic precision and conciseness.
C304.4	Classify a problem with respect to different models of Computation

Course Name:C305 Object Oriented Modeling and Design17cs551

C305.1	Describe the concepts of object-oriented and basic class modelling.
C305.2	Draw class diagrams, sequence diagrams and interaction diagrams to solve problems.
C305.3	Choose and apply a befitting design pattern for the given problem.

Course Name: C306 Advanced Java and J2ee17CS553

C306.1	Interpret the need for advanced Java concepts like enumerations and collections in developing modular and efficient programs
C306.2	Build client-server applications and TCP/IP socket programs

C306.3	Illustrate database access and details for managing information using the JDBCAPI
C306.4	Describe how servlets fit into Java-based web application architecture
C306.5	Develop reusable software components using JavaBeans

Course Name:C311 Programming in Java17CS561

C311.1	Explain the object-oriented concepts and JAVA.
C311.2	Develop computer programs to solve real world problems in Java.
C311.3	Develop simple GUI interfaces for a computer program to interact with users

Course Name:Dot Net Framework For Application Development 17CS564

C312.1	Build applications on Visual Studio .NET platform by understanding the syntax and semantics of C#
C312.2	Demonstrate Object Oriented Programming concepts in C# programming language
C312.3	Design custom interfaces for applications and leverage the available built-in interfaces in building complex applications.
C312.4	Illustrate the use of generics and collections in C#
C312.5	Compose queries to query in-memory data and define own operator behavior

Course Name:C313Cryptography, Network Security and Cyber Law 17CS61

C313.1	Discuss cryptography and its need to various applications. Design and develop simple cryptography algorithms
C313.2	Understand cyber security and need cyber-Law

Course Name: C314 File Structures 17IS62

C314.1	Discuss appropriate file structure for storage representation.
C314.2	Illustrate a suitable sorting technique to arrange the data.
C314.3	lain indexing and hashing techniques for better performance to a given problem.

Course Name:C315 Software Testing 17IS63

C315.1	Discuss test cases for any given problem
C315.2	Compare the different testing techniques
C315.3	Illustrate the problem into suitable testing model
C315.4	Understand the appropriate technique for the design of flowgraph.
C315.5	gn and Develop appropriate document for the software artefact.

Course Name:C316 Operating Systems 17CS64

C316.1	Demonstrate need for OS and different types of OS
C316.2	Discuss suitable techniques for management of different resources

C316.3	Illustrate processor, memory, storage, and file system commands
C316.4	Explain the different concepts of OS in platform of usage through case studies

Course Name:C401 Data Mining and Data Warehousing 17CS651

C401.1	Understand data mining problems and implement the Datawarehouse
C401.2	Demonstrate association rules for a given data pattern.
C401.3	uss between classification and clustering solution.

Course Name: C402 System Software 17IS652

C402.1	Explain system software such as assemblers, loaders, linkers and macroprocessors
C402.2	Design and develop lexical analyzers, parsers, and code generators
C402.3	Understand lex and yacc tools for implementing different concepts of system software

Course Name: C403 Python Application Programming 17CS664

C403.1	Understand Python syntax and semantics and be fluent in the use of Python flow control and functions.
C403.2	Demonstrate proficiency in handling Strings and Filesystems.
C403.3	Implement Python Programs using core data structures like Lists, Dictionaries and use Regular Expressions.
C403.4	Interpret the concepts of Object-Oriented Programming as used in Python.

Course Name:C404Multi-Core Architecture and Programming 17CS666

C404.1	Identify the issues involved in multicore architectures
C404.2	Explain fundamental concepts of parallel programming and its design issues
C404.3	Solve the issues related to multiprocessing and suggest solutions
C404.4	Discuss the salient features of different multicore architectures and how they exploit parallelism
C404.5	Illustrate OpenMP and programming concept

Course Name: Web Technology and Its Applications /15CS71

C371.1	Adapt HTML and CSS syntax and semantics to build web pages.
C371.2	Construct and visually format tables and forms using HTML and CSS
C371.3	Develop Client-Side Scripts using JavaScript and Server-Side Scripts using PHP to generate and display the contents dynamically
C371.4	Appraise the principles of object-oriented development using PHP
C371.5	Inspect JavaScript frameworks like jQuery and Backbone which facilitates developer to focus on core features

Course Name Software Architecture and Design Patterns /15IS72

C372.1	Design and implement codes with higher performance and lower complexity
C372.2	Be aware of code qualities needed to keep code flexible
C372.3	Experience core design principles and be able to assess the quality of a design with respect to these principles.
C372.4	Capable of applying these principles in the design of object-oriented systems.
C372.5	Demonstrate an understanding of a range of design patterns. Be capable of comprehending a design presented using this vocabulary
C372.6	Be able to select and apply suitable patterns in specific contexts

Course Name Machine Learning / 15CS73

C373.1	Identify the problems for machine learning. And select the either supervised, unsupervised or reinforcement learning
C373.2	Explain theory of probability and statistics related to machine learning
C373.3	Investigate concept learning, ANN, Bayes classifier, k nearest neighbor, Q,

Course Name Cloud Computing and Its Applications / 15CS742

C374.1	Explain cloud computing, virtualization and classify services of cloud computing
C374.2	Illustrate architecture and programming in cloud
C374.3	Describe the platforms for development of cloud applications and List the application of cloud.

Course Name Storage Area Networks / 15CS754

C375.1	Identify key challenges in managing information and analyze different storage networking technologies and virtualization
C375.2	Explain components and the implementation of NAS
C375.3	Describe CAS architecture and types of archives and forms of virtualization
C375.4	Illustrate the storage infrastructure and management activities

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Department of Mathematics

Vision of the Institute

To be a respected and most sought after engineering educational institution engaged in equipping individuals capable of building learning organizations in the new millennium.

Mission of the Institute

To develop competent students with good value systems and face challenges of the continuously changing world.

Vision of the Department

We envision that our department will continue to grow as an intellectually stimulating environment that attracts engineers who have a knack for interdisciplinary research. We hope that the department will play a central role in bridging fundamental sciences and engineering.

Mission of the Department

Our mission is educating our students to excel in their work as well as mentor the next generation of engineers. We provide engineering Mathematics with theoretical and application- oriented technique and making them successful personally & professionally.

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Recognised by UGC Under Section 2(f))
Bommanahalli, Hosur Road, Bangalore - 560 068.
Ph: 080-61754601/602, Fax: 080 - 25730551
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Program Educational Objectives

PEO	Be able to apply the fundamental knowledge of mathematics to analyze and solve the complex problem in electrical, electronics and allied interdisciplinary areas.
PEO	Possess good leadership skills, function ethically in multidisciplinary areas to develop sustainable solutions for global, environmental, and social issues.
PEO	Be able to inculcate lifelong learning to maintain and enhance professional skills.

Course Name: 18MAT11 (Advanced calculus and linear algebra)

CO1	Apply the knowledge of calculus to solve problems related to polar curves and its applications in determining the bentness of the curve.
CO2	Learn the notion of partial differentiation to calculate rate of change f multivariate functions and solve problems related to composite functions and Jacobeans.
CO3	Apply the concept of change of order of integration and variables to evaluate multiple integrals and their usage in computing the area and volumes.
CO4	Solve first order linear/nonlinear differential equations analytically using standard methods.
CO5	Make use of matrix theory for solving system of linear equations and compute Eigen values and Eigen vector required for matrix diagonalization process.
CO6	Understanding and Applying the real-world problem through engineering techniques.

Course Name: 18MAT31 (Transform calculus, Fourier series and numerical techniques)

CO1	Use Laplace transform and inverse Laplace transform in solving differential/integral equation arising in network analysis, control systems and other fields of engineering.
CO2	Demonstrate Fourier series to study the behavior of periodic functions and their applications in system communications, digital signal processing and field theory.
CO3	Make use of Fourier and Z- transforms to illustrate discrete/continuous function arising in wave and heat propagation, signals, and systems.
CO4	Solve first and second order ordinary differential equations arising in engineering problems using single step and multistep numerical methods.
CO5	Determine the extremals of functional using calculus of variations and solve problems arising in dynamics of rigid bodies and vibrational analysis.
CO6	Understanding the Euler's equations, Geodesics under the variational problems.

Course Name: 18MAT21 (Advanced calculus and numerical methods)

CO1	Illustrate the applications of multivariate calculus to understand the solenoidal and irrotational vectors and exhibit the inter dependence of line, surface, and volume integrals.
CO2	Demonstrate various physical models through higher order differential equations and solve such linear ordinary differential equations.
CO3	Construct a variety of partial differential equations and solution by exact methods/ methods of separation of variables.
CO4	Explain the applications of infinite series and obtain series solution of ordinary differential equations.
CO5	Apply the knowledge of numerical methods in the modeling of various physical and engineering phenomena.
CO6	To study the behavior of LCR circuits and oscillations of springs using ODE.

Course Name: 18MAT41 (Complex analysis, probability and statistical methods

CO1	Use the concept of analytic function and complex potentials to solve the problems arising in electromagnetic field theory.
CO2	Utilize conformal transformation and complex integral arising in aero foil theory, fluid flow visualization and image processing.
CO3	Apply discrete and continuous probability distributions in analyzing the probability models arising in engineering field.
CO4	Make use of the correlation and regression analysis to fit a suitable mathematical model for the statistical data.
CO5	Construct joint probability distributions and demonstrate the validity testing hypothesis.
CO6	Understanding and applying the real-world problem using through different mathematical models.

Course Name: 18CS36 (Discrete mathematical structures)

CO1	Use of propositional and predicate logic in knowledge representation and truth verification.
CO2	Demonstrate the applications of discrete structures in different fields of computer science.
CO3	Solve problems using recurrence relations and generating functions.
CO4	Apply different mathematical proofs and techniques in proving theorems in the courses.
CO5	Compare graphs trees and their applications.
CO6	Understand and analyze prefix code and design the algorithm.

CHILDREN'S EDUCATION SOCIETY (Regd.)
THE OXFORD COLLEGE OF ENGINEERING
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Department of Mechanical Engineering

Vision of the Institute

To be a respected and most sought after engineering educational institution engaged in equipping individuals capable of building learning organizations in the new millennium.

Mission of the Institute

To develop competent students with good value systems and face challenges of the continuously changing world.

Vision of the Department

To become a center of excellence providing state of the art engineering education in mechanical engineering and making individual to be capable of building nation in the new millennium.

Mission of the Department

Mission 1: To provide an excellent teaching and learning process for the students to meet the needs and standards of the current industries and higher learning process.

Mission 2: To promote research and development activity in the recent emerging trends of the mechanical engineering department.

Mission 3: To provide the students with good communication skill, lifelong learning, team spirit and leadership qualities to face the current society.

Program Educational Objectives

PEO 1: Graduates in Mechanical Engineering will apply the basic technical knowledge for design, product development and analysis of mechanical engineering systems.
PEO 2: Graduates in Mechanical Engineering will demonstrate skill for research, innovation, higher studies, and entrepreneurship.
PEO 3: Graduates in Mechanical Engineering will demonstrate good communication skills, dynamic leadership qualities and awareness about environmental protection. blended with ethics and human values.

Program Specific Outcomes

PSO1	Apply Mechanical Engineering knowledge to address wide range of technical and societal problems with lifelong learning and professional development creativity, imagination, confidence, and responsibility.
PSO2	To understand the concept of manufacturing and design analysis of Mechanical components in various industrial sectors and development of the products in mechanical engineering
PSO3	Analyzing, evaluating thermal aspects for design and development of engineering products like I.C Engines, Refrigeration, Air-conditioning, Conventional and Non-Conventional Power Generating Systems.

Course Name: Elements of Mechanical Engineering-18EME14/24

C104.1	Understand the concept of nonrenewable and renewable energy and the working principles of different types of boilers and accessories.
C104.2	Learn the basic principles of operations of steam, water and gas turbines, IC Engines
C104.3	Understand the concept of refrigeration and air conditioning systems
C104.4	Gains knowledge on material joining processes, understands the concept of lubrication and different types of bearings.
C104.5	Get exposure to machining operations on lathe,milling,drilling, and grinding machines
C104.6	Understands the principle of power transmissions through belt drives and gear trains

Course Name: Workshop Practice-18WSL16/26

C108.1	Identify the fitting tools and instruments.
C108.2	Apply knowledge of fitting tools and measuring instruments for getting an object of required shape and size
C108.3	Acquire the skill required for carrying out the welding using electric arc welding process.
C108.4	Applying the skill acquired for preparing the different welding joints.
C108.5	Demonstrate the sheet metal working and joining by soldering processes.
C108.6	Understand the working of various power tools and its applications in mechanical engineering.

Course Name: Computer Aided Engineering Drawing-18CED14

C112.1	Understand the importance of engineering drawing as language of engineers.
C112.2	Able to draw the front, top and side views of points and straight lines.
C112.3	Able to draw the orthographic projections of regular plane surfaces in different orientations.
C112.4	Develops skill to imagine and draw the projections of regular solids.
C112.5	Understand the concept of the development of lateral surfaces of regular solids.
C112.6	Develop skill to generate 3D views like isometric projection of different types of solids and combination solids.

Course Name: Material Science & Metallurgy-10ME32A

C202.1	An understanding of the basic concepts of heat treatment process and its influences on properties of metal.
C202.2	An understanding of types of structures, imperfections in metals, diffusion mechanism, evaluation of mechanical properties by subjecting to various stresses and failure mechanism.

C202.3	An understanding of the basic concepts of phase transformation during solidification, phase diagrams, iron carbon equilibrium diagram, classifications of steel, iron, AL, CU, and it's alloys.
C202.4	An understanding of the basic concepts of classification, fabrication, and applications of composite materials.
C202.5	To understand the various processes for manufacturing of composites and obtain a knowledge of contemporary issues and an ability to use the skills and techniques in engineering practice
C202.6	An ability to use the techniques, skills, and modern engineering tools necessary for engineering practice and lifelong learning.

Course Name: Basic Thermodynamics-18ME33

C203.1	Understand the fundamentals of thermodynamics.
C203.2	Demonstrate the work and heat transfer in thermodynamic systems.
C203.3	Formulate the heat, work, and energy of the system for various thermodynamic processes.
C203.4	Evaluate the performance of heat engines, heat pumps and refrigerators.
C203.5	Analyze the entropy change for various thermodynamic processes and thermodynamic properties of pure substances.
C203.6	Impart the knowledge in thermodynamic relations and distinguish between ideal and real gases.

Course Name: Mechanics of Materials-18ME34

C204.1	Learn basic concepts of simple stress and strain.
C204.2	Understand importance of stresses in composite sections, principal stresses and strains.
C204.3	Analyze the stresses in thick and thin cylinders.
C204.4	Draw shears force and bending moments.
C204.5	Gain knowledge on bending and shear stresses, deflection of beams.
C204.6	Impart knowledge of torsion of circular shafts and stability of columns.

Course Name: Manufacturing Process-I-18ME35

C205.1	Understand basic concept of foundry technology and identify various types of patterns, binders, additives, core, molding machines.
C205.2	Analyze working principle of gating and reserving systems, special molding processes
C205.3	Describe different furnaces used for melting of metals and special types of casting process.

C205.4	Demonstrate different methods of welding in the application of fabrication works and joining of two metals/alloys.
C205.5	Apply the concept of special types of welding, brazing, and soldering.
C205.6	Enhance the knowledge of metallurgical aspect in welding.

Course Name: Computer Aided Machine Drawing-18ME36A

C206.1	Student will be able to sketch sections of solids of various polyhedrons and visualize and draw orthographic views of simple machine parts.
C206.2	Student can understand and draw various thread forms, standard keys,
C206.3	Understanding of various types riveted joints and their drawings, couplings using memorable drawing
C206.4	The students can visualize and prepare detailed drawing of a given part and draw
C206.5	CO-5 Read and interpret a given drawing and Create 2-D and 3-D models using solid edge software with manufacturing purposes.
C206.6	Producing detailed sectional views drawing of a 3-D models using solid edge Software with parts list.

Course Name: Metallography & Material Testing Lab-18MEL37A

C207.1	e Students will be able to demonstrate the knowledge and the skills required for the conduction of Tensile, Shear and Compression test.
C207.2	The students will be able to determine the torsional and bending strength of different materials.
C207.3	e students will learn Identification of metals based on Microstructures.
C207.4	e students will be capable of detecting the defects like cracks, flaws in materials by using different NDT methods.
C207.5	e students will know the material behavior for impact and wear loads.
C207.6	e students will be capable of determining hardness of metals using different methods.

Course Name: Foundry & Forging Lab-18MEL38A

C208.1	Demonstrate various skills of sand preparation, molding.
C208.2	Conduct tests on foundry sands to determine properties for different ingredient compositions.
C208.3	Apply knowledge of design and practices of mold and pattern making.
C208.4	Analyze the design of gating system.
C208.5	Demonstrate various skills of forging operations.
C208.6	Work as a team keeping up ethical principles.

Course Name: Mechanical Measurements & Metrology-18ME42B

C210.1	Students shall demonstrate the knowledge associated with Comparators (Mech, Optical, and Electrical& Pneumatic), Use of Sine bar, Interferometer, and measurement of Screw threads & Gear tooth parameters.
C210.2	Students shall demonstrate the knowledge associated with Generalized Measurement system, Transducers, CRO, Oscillographs, and XY Plotters.
C210.3	Students shall demonstrate the knowledge associated with Measurement of Force, Torque, and Temperature& Strain measurement.
C210.4	Students shall demonstrate the knowledge associated with various Standards of length, use of slip gauges, and System of limits, fits and tolerance and Design of Gauges.
C210.5	Students will be able to work in Quality control and quality assurances divisions in
	industries.
C210.6	Students will be able to design a sensors and transducers used for stress analysis, design a measuring equipment's for the measurement of temperature and flow, to maintain quality in engineering products.

Course Name: Applied Thermodynamics-18ME43

C211.1	Describe the application; apply the concepts of combustion thermodynamics in engineering field.
C211.2	Analyze and implement various aspects of air standard cycles and basic concepts of gas power cycles.
C211.3	Evaluate the performance of various working aspects of internal combustion engines
C211.4	Understand the different concepts and implement various vapor power cycles, Analyze the concepts and functioning of reciprocating compressors.
C211.5	Apply knowledge of working procedure of gas turbine and Jet and Rocket Propulsion system.
C211.6	Describe the various psychometric processes; understand the working of air conditioning systems and refrigeration systems.

Course Name: Kinematics of Machines-18ME44

C212.1	To identify and select the proper mechanisms for the application in real life situations.
C212.2	Calculate mobility for various mechanisms and enumerate rigid links and types of joints within mechanisms.
C212.3	Explain different mechanisms and conduct a velocity and acceleration analysis of the different mechanisms.
C212.4	Construct CAM profile for the specific follower motion.

C212.5	To identify different gear trains for various practical applications and solve simple problems.
C212.6	To classify gears and calculate the various spur gear dimensions.

Course Name: Manufacturing Process-II18ME45

C213.1	Understand metal cutting principles, cutting tool materials, properties,and fluid selection.
C213.2	Classify and understand the principle and constructional features, operations performed on Lathe & drilling machine.
C213.3	Understand and to operate the Milling machine and to know the concept of indexing mechanism and its methods.
C213.4	Understand the concept of Grinding machines and its constructional features. And, to know the selection of grinding wheel.
C213.5	Understand the principles, applications, and features of super finishing, polishing and buffing operations, honing etc.
C213.6	Select the types of non-traditional machines and methods of operations along with applications.

Course Name: Fluid Mechanics18ME46B

C214.1	To impart basic knowledge of fluid, its properties and recognize the various types of fluid flow, also variation of Pressure in a fluid is at rest.
C214.2	To made them understand the concept of Euler's equation and extracting Bernoulli's equation also to understand and analyze the Head losses in laminar and turbulent flow through pipes.
C214.3	To Contend the importance of flow measurement and use of dimensional analysis to design physical or numerical experiments and to apply dynamic similarity.
C214.4	Can understand the reasons for Major and minor loss of energy through pipe
C214.5	To understand and analyze the Head losses in laminar and turbulent flow through pipes.
C214.6	To learn the concept of Buoyancy and importance of continuity equation and can implement the compressible flow and flow around immersed bodies.

Course Name: Mech. Measurements & Metrology Lab18MEL47B

C215.1	Understand the basic measurement units and calibrate various measuring devices.
C215.2	Use various measuring tools such as Sine Bar, Sine Center, Bevel Protractor to find taper and included angles.
C215.3	Gain knowledge on Optical Microscope, Tool Maker Microscope to measure screw thread parameters.
C215.4	Learn basic concepts of measuring temperature, pressure and strain using different methods.

C215.5	Gain knowledge on various measuring equipment's applied to engineering analysis in industries.
C215.6	Impart knowledge of error and correction factors of various measuring devices.

Course Name: Machine Shop18MEL48B

C216.1	Describe the knowledge and the skills required with respect to the operation, procedure, conduction and analyzing the results of experiments.
C216.2	Perform the operations in lathe machine.
C216.3	Analyze the operations in milling machine and its mechanism.
C216.4	To know the concepts of grooving operations using Shaping machine.
C216.5	Demonstrate of operations on drilling machine.
C216.6	Impart the knowledge of Eccentric turning using four jaw chuck

Course Name: Management and Entrepreneurship17AL51

C301.1	Understand the basic concepts of management and development of effective planning process.
C301.2	Understand the principles of organization and Illustrate different organizational structures.
C301.3	Understand the staff selection process, recruitment process and project selection process as well as directing, motivating, and controlling.
C301.4	To know how to motivate, directing and controlling the managers and management.
C301.5	Develop entrepreneurship and its concepts pertaining to small scale industries for sustainable development.
C301.6	Understand different schemes of government support to small scale industries and preparation of project report.

Course Name: Design of Machine Elements-I17ME52

C302.1	Apply the concept of mechanics of materials to estimate the stresses in a machine element & predict failure of components.
C302.2	Analyze failure of components using different theories of failure for static loadings
C302.3	Determine the stress concentration factor for different irregularities and strength of components under different impact loadings.
C302.4	Design the machine components for fatigue failure & also for threaded fasteners.
C302.5	Design of keys, Shafts, cotter & knuckle joint & couplings used for power transmission
C302.6	Design & Analyze the power screws and welded joints for different applications.

Course Name: Energy Engineering17ME53

C303.1	Describe the working principle of steam power plant and ability to solve problems involving height of chimney to produce a given draft.

C303.2	Apply knowledge of super heater, De-super heater, control of super heaters, economizer
C303.3	Evaluate the various methods of starting diesel engines and need for lubrication.
C303.4	Import the knowledge of Hydrograph, how to draw the hydrograph, flow duration and mass curve and its applications.
C303.5	Apply the knowledge of nuclear energy, solar energy and wind energy.
C303.6	Demonstrate the various energy conversion methods such as Tidal power energy, Ocean thermal energy conversion, geothermal energy and photosynthesis.

Course Name: Dynamics of Machines17ME54

C304.1	Students will be able to do static and dynamic analysis of different mechanisms subjected to forces using various principles.
C304.2	Students will be able to analyze the concept of friction in different bearings and belt drive.
C304.3	Students will be able to solve the problems on balancing of rotating masses in same and different planes.
C304.4	Analyze the concept of primary & secondary forces of reciprocating masses in different engines.
C304.5	Students will be able to determine the various parameters of governors and its usage.
C304.6	Course content helps the students to analyze gyroscopic effect on different vehicles and Analysis of Cams.

Course Name: Manufacturing Process-III17ME55

C305.1	Students will be able to understand necessity of forming process compared with other manufacturing techniques, and the knowledge of parameters effect on the processing of the wrought products.
C305.2	Students will be able to determine the process, load required and possible reasons for the formation of defects in forged components.
C305.3	Students will be able to identify the process, load calculations and reasons for defective rolled products.
C305.4	Students will be able to apply the knowledge of drawing and extrusion to find out defects and problems occurred in the processes.
C305.5	Students will be able to select the different process, related equipment's, and parameters for the fabrication of various sheet metal components.
C305.6	Students will be able to select the different high energy rate forming process and powder metallurgy for the fabrication of bulk components.

Course Name: Turbo Machines 17ME56

C306.1	Understanding the comparison of positive displacement machine and turbo machine.
C306.2	Gain the knowledge of working of centrifugal pumps.
C306.3	Study the performance of various hydraulic turbines.
C306.4	Impart the knowledge of performance of steam turbines.
C306.5	Sound knowledge of energy transfer in turbomachinery.
C306.6	Sound knowledge about stage efficiency, reheat factor and preheat factors in turbines and pumps, compression and expansion processes, the working of centrifugal and axial compressors.

Course Name: Fluid Mechanics & Machines Lab17MEL57

C307.1	Students will be able to analyze fluid flow principles.
C307.2	Gain the knowledge in analyzing the performance of turbines and pumps.
C307.3	Able to determine coefficient of friction, minor losses in flow through the pipes.
C307.4	Students will be able to calibrate flow measuring devices such as orifice meter, venture meter and V- Notch and performance of centrifugal pumps.
C307.5	Students will have the ability to test the performance of turbines like Pelton wheel, Francis turbine and Kaplan turbine.
C307.6	Students will have the ability to test the performance of two stages reciprocating air compressor and air blower.

Course Name: Energy Conversion Lab17MEL58

C308.1	At the end of the course, students will be able to determine the Flash point, Fire point, calorific value, and viscosity of various lubrication oils.
C308.2	Students will have the knowledge of engine operation through valve timing diagram.
C308.3	To conduct performance test on Two stroke Petrol Engine.
C308.4	To conduct performance test on 4 stroke Diesel Engine, Four Stroke Petrol Engines.
C308.5	Students able to draw valve timing and port timing diagram.
C308.6	Impart the knowledge of application of planimeter.

Course Name: Computer Integrated Manufacturing17ME61

C309.1	Understand basic concepts of computer integrated Manufacturing**,** utilization parameters of machine and their capabilities
C309.2	Apply different work transfer methods and mechanism for high volume production
C309.3	Design automated assembly systems for high volume production and analyzes single station, MultiTaction and automated guided vehicle system.
C309.4	Development of various types of computer aided manufacturing and planning systems
C309.5	Enhance various terminology, programming methods of robot and write part program in Robotics & CNC machine.

C309.6	Analyze flow lines and solve problems through line balancing methods for manufacturing

Course Name: Design of Machine Elements-II17ME62

C310.1	Demonstrate the fundamentals of stress analysis, different stress in curved beams and Design and select power transmission elements.
C310.2	Make proper assumptions with respect to material, size, static and dynamic loads for springs, clutches, and brakes.
C310.3	To change the existing design with minimum effort for better result/performance of IC-Engine parts
C310.4	Design of spur and helical gears for different power transmission ratio and to find BHN.
C310.5	Design bevel and worm gears based on strength, dynamic and wear loads.
C310.6	Performance of the rotating components can be increased with better knowledge of lubrication

Course Name: Heat & Mass Transfer17ME63

C311.1	Provide sound understanding of the basic principles and laws, modes of heat transfer, different types of Fins and fin efficiency.
C311.2	Capability to analyze transient mode of heat transfer and use of Heiselers Charts.
C311.3	To know various heat transfer processes and heat exchangers.
C311.4	Able to analyze different regimes of boiling and condensation.
C311.5	To impart the knowledge of natural and forced convection and non-dimensional numbers associated with it.
C311.6	Understand the concept of radiation heat transfer.

Course Name: Finite Element Methods17ME64

C312.1	Learn basic principles of finite element method for analysis of structures.
C312.2	Understand importance of principle of minimum potential energy, Raleigh's Ritz and Galperin's method to solve engineering problems.
C312.3	Analyze the finite element formulation of 2-D elements and higher order elements.
C312.4	Get exposure the finite element analysis of bars in engineering field.
C312.5	Gain knowledge on the finite element analysis of trusses.
C312.6	Impart knowledge of finite element analysis of beams and heat transfer problems.

Course Name: Mechatronics & Microprocessor17ME65

C313.1	Learn basic concepts of Mechatronics systems.
C313.2	Understand importance of Transducers and Sensors.

C313.3	Gain knowledge on electrical actuation system and signal conditioning.
C313.4	Learn basic concepts of Microprocessor and number system, logic gates.
C313.5	Gain knowledge on logic function of INTEL 8085A Microprocessor.
C313.6	Impart knowledge of CPU, organization, and programming of Microprocessor.

Course Name: TOE17ME66X

C314.1	Develop equations of equilibrium, Mohr's diagram & characteristic equation of principal stress for 2D & 3D stress systems
C314.2	Able to identify the possible strain field using compatibility equations. Reducing the complexity by assuming plane stress & plane strain condition.
C314.3	Derive the solutions for a two-dimensional problem in Cartesian coordinates using Airy's stress function method and to develop equations of equilibrium for 2D stress system in Polar co-ordinate system.
C314.4	Identify the stress distribution of different parts such as rotating disks & rotating cylinders. To derive equations for torsion of thin open sections & tubes.
C314.5	Derive equation for Radial & Circumferential stresses for disk, cylinders & sphere subjected to thermal loading.
C314.6	Understand the importance of basic theorems to solve practical problems.

Course Name: NTM17ME665

C314.1	To appreciate the importance of NTM methods and their advantages over conventional methods.
C314.2	To demonstrate the working of USM processes.
C314.3	To operate with the elements of AJM & WJM processes.
C314.4	To gain the knowledge of elements related to ECM & Chemical machining processes.
C314.5	To select an appropriate NTM process for the machining of the components and suitable electrodes of EDM.
C314.6	To correlate specific applications of PAM, LBM and EBM process.

Course Name: Heat & Mass Transfer Lab17MEL67

C315.1	Understand the concept and mechanism of forced, natural convection taking place in objects of different geometries, the various empirical correlations used in different fluid flow situations.
C315.2	Learn the thermal performance analysis of heat exchangers, their practical applications.
C315.3	At the end of the course, students will be able to understand conduction phenomenon thoroughly in objects of different geometries they can determine the thermal conductivity of composite wall, lagging material and critical heat flux.

C315.4	Understand the performance analysis of vapor compression refrigeration cycle and air conditioning system.
C315.5	Understand the concept of radiation heat transfer.
C315.6	To impart the knowledge non-dimensional numbers associated with natural and forced convection.

Course Name: CAMA Lab17MEL68

C316.1	le to define the different element types, properties and material models to the different structures being analyzed.
C316.2	dents can be able to do the stress analysis of bar, truss, beam and simple mechanical structures and validate the results with theoretical results.
C316.3	dents will carry out static and dynamic analysis of simple beams and bars.
C316.4	dents will be able to analyze the thermal problems like conduction and convection using ANSYS.
C316.5	dents will be able to do Air flow analysis of pipe and flat plate.
C316.6	Student will be able to solve thermal and mechanical stress problems**.**

Course Name: Engineering Economics 15ME71

C401.1	Students will be able to understand types of interest and its factors and use them in EMI and loan calculations.
C401.2	Students will be able to characterize different assets based on their Present, equivalent, and future worth and judge the best alternative.
C401.3	Students will be able to appreciate depreciation, costing, and estimation procedure.Perform tax analysis.
C401.4	Students will be able to Analyze the financial concepts and prepare financial statements for the company.
C401.5	Students will be able to use the knowledge of financial ratios for determining the firm's earning power.
C401.6	Students will be able to demonstrate the concepts of financial and profit planning through suitable budgeting.

Course Name: Mechanical Vibrations 15ME72

C402.1	Understand basic concepts of vibrations & learns to use the Fourier series method to idealize any motion in terms of sine & cosine curves which can be used in vibration analysis
C402.2	Able to write a mathematical model of undamped systems and can deploy the proper method to obtain the natural frequency of the system, which is required in failure analysis.
C402.3	Gains insight into the damped, forced vibrations and develops the skill to utilize the over, under and critically damped systems in different applications

C402.4	Realize the importance of vibration measuring, condition monitoring and methods to avoid vibrations.
C402.5	Learn to idealize any physical system into two DOF systems and determine their natural frequencies & mode shapes
C402.6	Able to solve multi DOF system and obtain their natural frequencies by numerical methods which helps the engineer to design stable system

Course Name: Hydraulics and Pneumatics 15ME73

C403.1	Describe the working principles of hydraulic and pneumatic system and its applications.
C403.2	Apply knowledge of pumps, motors and its application.
C403.3	Evaluate the various types of valves and its applications.
C403.4	Import the knowledge of circuit design, control valves and its applications
C403.5	Learn and apply multi-purpose cylinder applications
C403.6	Describe the working principles of hydraulic and pneumatic system and its applications.

Course Name: Operation Research-15ME74

C404.1	Ability to understand and analyze solution for linear programming problems in industry so that they can use resources (capitals, men, machine and materials) more effectively.
C404.2	Students will have the knowledge of optimizing the transportation models, assignment and travelling salesman problems. **Solve** the problem of transporting the products from origins to destinations with least transportation cost.
C404.3	Students will have the analysis of optimizing the Integer Programming models and Queuing theory.
C404.4	Students will have the Understand of Project management techniques: PERT-CPM & crashing techniques to reduce the man, machine, and material to increase the profits and reduce the losses.
C404.5	Students will have the knowledge of Game Theory analytical and graphical method problems solving for different types of Job's.
C404.6	Students will have the Describe the Sequencing of different types of Job's to reduce man, machine and material cost to increase the profit.

Course Name: Non-Conventional Energy Sources 15ME754

C405.1	Understand the present energy scenario and the available non-conventional energy sources.
C405.2	Describe the basics of solar radiation geometry and various measurement techniques.
C405.3	Analyze the knowledge gained in tapping the solar energy through solar thermal devices, PV conversion and their performance analysis.
C405.4	Demonstrate the various energy conversion methods such as Wind, Tidal, OTEC and Geothermal.
C405.5	Apply knowledge of Biomass and Hydrogen energy and their impact on environment and sustainability.
C405.6	Understand the present energy scenario and the available Non-conventional energy sources.

Course Name: Theory of Plasticity 15ME752

C405.1	Get exposed to concepts of theory of elasticity, importance of stress and strains which are needed to understand the theory of plasticity.
C405.2	They knew about types of strain and plastic deformation of ductile materials.
C405.3	Use different yield criteria and its importance.
C405.4	Realize the importance of experimental verification of stress- strain relationship and bending of beams and use it in design of mechanical components.
C405.5	They can analyze stress; shear and residual stresses are distributed on the different types of beam.
C405.6	Gain knowledge on torsion of circular &non-circular shafts.

Course Name: Experimental Stress Analysis 15ME761

C406.1	ility to brief about types, mounting and performance of strain gages and wheat stone bridge circuits.
C406.2	dents can be aware of about different configurations of strain rosettes and its error minimization.
C406.3	dents can brief about concepts of Photoelasticity, polar scope and calibration of different models.
C406.4	get exposure on Two- and Three-Dimensional photoelasticity models and techniques
C406.5	ey will understand about Birefringent and Brittle coating methods used in ESA.
C406.6	They can use moiré techniques for finding stresses and displacements.

Course Name: Design Lab 15MEL77

C407.1	Understand the concept of natural frequency and damping coefficient in a single DOF vibrating system.

C407.2	To analyze the balancing of rotating masses by using static and dynamic balance.
C407.3	To demonstrate the concept of stress concentration for photo- elastic materials.
C407.4	To determine pressure distribution in journal bearings.
C407.5	To find the principal stresses using strain gauges.
C407.6	Knowing the concepts of whirling of shaft, governor, and gyroscope.

Course Name: CIM & Automation Lab 15MEL78

C408.1	To practically relate to concepts discussed in Computer Integrated Manufacturing Course.
C408.2	To write CNC part programs for simulation of machining operations such as Turning, Drilling & Milling.
C408.3	Ability to identify the type of machining center for the geometry given (cylindrical or prismatic), write the part program, explain the instructions, examine for the error in the program and choose right G and M codes to optimize the program and construct the final geometry by running the simulation using the software.
C408.4	To understand & write programs for Flexible Manufacturing Systems & Robotics.
C408.5	To understand the operating principles and practical applications of hydraulics, pneumatics and electro–pneumatic systems.
C408.6	To apply these learning's to automate & improve efficiency of manufacturing process.

Course Name: Operations Management 15ME81

C409.1	Understand the history and development of Operation Management. Able to apply the Operation Management principles in manufacturing and service activities. Getting exposure to Environmental and contemporary issues. Understands the Importance of Productivity and able to apply mathematics to improve productivity.
C409.2	Gets exposure to Decision making process in an industry under different environments, importance of decision making. Able to apply Mathematical models like Break even analysis and tradeoffs.
C409.3	Understands about the importance of forecasting, different methods of Fore casting. Able to apply forecasting methods like qualitative or quantity. Getting exposed to Measure and controlling of forecasting. Understands the use of Aggregate and Master Scheduling Techniques.
C409.4	Learns about the importance of Purchasing and Supply Chain Management. Gets exposure to different Methods of Procurement, Tendering process, vendor development. Understands the importance of maintaining Transparency in Purchasing activity and able to apply Procurement methods in an Industry or Service Sector.

C409.5	Gets exposure to the various skills required finding out the Capacity requirement of Plant and Machinery, Plant location, and Plant lay out. Able to apply the acquired skill in an Industry or Service Sector.
C409.6	Gets exposure in material requirement, inventory, importance of MRP and Able to apply the recent management techniques like MRP-1 and ERP in an industry or service sector. Able to apply different Inventory methods in a manufacturing or Service activity.

Course Name: Control Engineering 15ME82

C410.1	Describe the concept of control action, types of controllers and its applications relevant to the system.
C410.2	Apply the many inter-relationships in mechanical and electrical models.
C410.3	Evaluate the concept of block diagram reduction technique and SFG.
C410.4	Import the knowledge the step, ramp, and impulse input concepts by stability analysis
C410.5	apply the importance of root locus and bode plots
C410.6	Import the knowledge of lead-lag compensator and frequency response analysis.

Course Name: Power Plant Engineering 15ME831

C411.1	derstand Types of fuels and Equipment used for burning of coal in steam power plant.
C411.2	ppose ash handling, coal handling method in a thermal power plant.
C411.3	ferentiate Diesel engine power plants and Gas turbine power plants.
C411.4	lculate performance of a hydro-electric plant.
C411.5	plain working principle of different types of nuclear power plant.
C411.6	ect the suitability of site for a power plant and Indicate safety aspects of power plant.

Course Name: TRIBOLOGY 15ME831

C411.1	Describe the viscosity, Newton's law of viscosity.
C411.2	Apply knowledge of Hydrostatic and hydro dynamic lubrications.
C411.3	Evaluate the various types of bearing and its applications.
C411.4	Import the knowledge of oil flow and thermal equilibrium of journal bearing
C411.5	apply load carrying capacity and coefficient of friction
C411.6	Describe the wear, wear rate and its effects.

Course Name: Foundry Technology 15ME838

C411.1	Students can be able to demonstrate the Oxidation of liquid metals, gas dissolution in liquid metals, methods of degassing, fluidity, factors affecting fluidity, fluidity tests, hot tearing, shrinkage of liquid metals.
C411.2	Students can be able to understand the concept of Crystallization and development of cast structure and concept of progressive and directional solidification, need of gating system and rise ring system in casting methods.
C411.3	Students can be able to demonstrate the Special Molding Techniques for manufacturing different components by using different pattern, Developments in cupola melting–hot blast cupola, water cooled cupola, balanced blast cupola, coke less cupola, cupola charge calculations.
C411.4	Ferrous Foundry: Melting procedures, casting characteristics, production, specification, and properties of some ferrous metals.
C411.5	Students can be able to demonstrate the Non-Ferrous Foundry: Melting procedures, casting characteristics, production, specification, and properties of some typical aluminum, copper and magnesium-based alloy castings.
C411.6	Modernization and Mechanization in foundry techniques in molding, core, material handling equipment's.

Course Name: Biomass Energy System 15ME843

C412.1	Knowledge about the various biomass resources and its energy content.
C412.2	Analyze the conversion of biomass to biofuels for combustion process.
C412.3	Evaluate the performance of biomass-based steam power plant for power generation.
C412.4	Demonstrate the concepts of bio-Methanization process.
C412.5	Apply knowledge of biofuels in IC Engine Combustion.
C412.6	Know the biogas production.

Course Name: Project Work 15ME85L

C413.1	Applying knowledge emerging areas of engineering and technology.
C413.2	Students able to apply engineering concepts with respect to different mechanical streams.
C413.3	Students focusing on more efficiency at most economically.
C413.4	Students improve communication skills, problem analyzing ability, design, and development skills.
C413.5	Developing new ideas, creative thinking, improvement in reverse engineering in mechanical engineering related technology.
C413.6	Improve their skills to work in a team as a member, to manage project in interdisciplinary environment and to draw appropriate conclusion.

Course Name: Seminar 15ME86L

C414.1	Enhancing knowledge in emerging area of technology.
C414.2	Students self-learning through seminar which may enable in lifelong learning.
C414.3	Improve their skills to work in a team.
C414.4	Improve their knowledge in project management and brought out their concern for ethical valve.
C414.5	Develop new ideas, creative thinking, improve in reverse engineering in related technology.
C414.6	Reduce the stage fear in leadership qualities.

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Department of Mechatronics

Vision of the Institute

To be a respected and most sought after engineering educational institution engaged in equipping individuals capable of building learning organizations in the new millennium.

Mission of the Institute

To develop competent students with good value systems and face challenges of the continuously changing world.

Vision of the Department

To develop the Mechatronics Engineering Department as a leading educational and research department with innovation in the design and development of electro-mechanical systems, intelligent machines, and products.

Mission of the Department

Mission 1. To provide an outstanding education in Mechatronics Engineering with a rich diversity of skills.

Mission 2. To contribute to the community prosperity through professional services and research.

Mission 3.To prepare graduates with ability to engage in life-long learning and capable ofcarrying out engineering practice with competence.

Program Educational Objectives

PEO 1.	Inculcate knowledge of basic engineering sciences and fundamentals of mechanical, electrical and computer systems.
	Create ability in graduates to design, develop product and applications in the field of Automation and Mechatronics and be able to use engineering tools that will enhance their productivity.
PEO	Prepare graduates to be effective engineers with good analytical and problem-solving skill to innovate, research and develop in a multidisciplinary Mechatronics environment.

Program Specific Objectives

PSO 1: An ability to understand the concepts of Mechatronics Engineering and to apply them to various areas like Mechanical, Electrical machines, Signal processing, Embedded systems, Communication Systems, Digital & Analog Devices, Computer fields etc.

PSO 2: An ability to solve complex Mechatronics Engineering problems, using latest hardware and software tools, along with analytical skills to arrive cost effective and appropriate solutions.

PSO 3: Excellent adaptability to changing work environment with good leadership qualities and zeal for social and environmental well-being.

Course Name:18MT32 - Material Science & Technology

C232.1	Appreciate the necessity of engineering materials, Smart Sensors, and its applications in various fields.
C232.2	Identify possible cause of failure due to fatigue and Creep.
C232.3	Demonstrate the knowledge of nucleation, Crystal growth, Solid solution, and Phase diagrams.
C232.4	Appreciate the significance and applications of Various heat treatment processes.
C232.5	Explain the definition and classification and fabrication processes of composite materials.
C232.6	Identify the role of Carbon content in the material and accordingly the type of material and properties of material changes like steel and cast iron

Course Name: 18MT33-Machanics Of Materials

C233.1	Analyze the normal stresses and strains for axially loaded members using Hooke's law
C233.2	Enumerate principal stresses and shear stresses for simple two-dimensional loadings
C233.3	Elucidate the stresses and strains in thick and thin cylindrical pressure vessels.
C233.4	Perform analysis of beams for static loading.
C233.5	Design torsional shafts and structural columns
C233.6	Calculate and represent the stress diagrams in bars and simple structures

Course Name: 18MT34- Control Systems

C234.1	Apply modeling knowledge in implementation physical systems.
C234.2	Understand the reduction of block diagram & analyze using Signal flow graph.
C234.3	Comment on performance of a system by evaluating various parameters.
C234.4	Model a system by applying the concept of State Space analysis
C234.5	Determine the time and frequency-domain responses of first and second-order systems to step and sinusoidal (and to some extent, ramp) inputs.
C234.6	Apply root-locus technique to analyze and design control systems

Course Name: 18MT35 - Analog & Digital Electronics

C235.1	Analyze the Importance & Applications of Diode as Rectifiers, Filters, Zener Diode Regulators & Switching Circuits.
C235.2	With the Knowledge of Active Filters & Oscillators students can better understand the Real-time Communication Systems
C235.3	Students are prepared to Understand, Analyze & Design Various Analog Electronics circuits if recruited to Analog Electronics Industry.

C235.4	Students are prepared to Understand, Analyze & Design Digital Circuits, if interested to work in VLSI Industry
C235.5	Formulate and employ a Karnaugh Map to reduce Boolean expressions and logic circuits to their simplest forms.
C235.6	Design and implement combinational logic circuits using reprogrammable logic devices. Content

Course Name: 18MT36 - Computer Organization

C236.1	Define Basic structure of computers, machine instructions and assembly language programs
C236.2	Ability to differentiate Addressing modes, output operations, Stacks and Queues has been described
C236.3	Understand the role and responsibilities of OS in the computer system.
C236.4	I/O Devices, Interrupts, Direct Memory Access, Busses, Interface Circuits, and Standard I/O Devices has been described
C236.5	Analyze the working of the memory system and basic processing unit.
C236.6	Understand the interfacing concepts in input and output module.

Course Name: 18MT42 - Fluid Mechanics and Machines

C242.1	Appreciate the fluid mechanics fundamentals, including concepts of mass and energy conservation.
C242.2	Apply the fundamentals to flow measurement problems.
C242.3	Perform dimensional analysis for problems in fluid mechanics.
C242.4	Appreciate the understanding of turbo machines and principles of energy transfer in turbo machines.
C242.5	Apply the fundamentals for energy transfer problems in various turbo machines.
C242.6	Identify the role of Carbon content in the material and accordingly the type of material and properties of material changes like steel and cast iron

Course Name: 18MT43 – Microcontroller

C243.1	Understand the difference between microprocessor and microcontroller, operation of Peripherals of controller, and be able to program a microcontroller system in assembly code and C.
C243.2	Interface the system to switches, keypads, displays, A/D and D/A converters and build a microcontroller-based Robot.
C243.3	Design and Develop a microcontroller-based system.
C243.4	Understand of 8051 Microcontroller concepts, architecture, programming and application of Microcontrollers.
C243.5	Understand the basic idea about the data transfer schemes and its applications

C243.6	Impart the knowledge about the instruction set

Course Name: 18MT44 - Manufacturing Technology

C244.1	Understand the principles and techniques of casting, forging, rolling & drawing.
C244.2	Apply the knowledge of metal working process.
C244.3	To express the different techniques of joining process for metal &non-metals.
C244.4	Understanding and applying knowledge to execute CNC machining programs
C244.5	Calculate and understand appropriate single-point machining relationships taking tool
	material and machine constraints into consideration.
C244.6	Understand the principles and appropriateness of non-traditional machining processes

Course Name: 18MT45 - Theory of Machines

C245.1	Explain the concepts of mechanism, machines, and types of motion, and calculate the mobility of a mechanism.
C245.2	Explain basic cam terminology, analyze various types of CAMS, and draw CAM profile diagrams.
C245.3	Determine the positions, velocities, and accelerations of links of simple mechanisms by using graphical approach.
C245.4	Demonstrate the knowledge of various transmission mechanisms like gears and belts and apply them for simple problems.
C245.5	Appreciate the principles of Balancing, Governors, and Gyroscope, and their applications
C245.6	Understand the fundamentals of machine design for desired kinematic or dynamic performance.

Course Name: 18MT46Instrumentation and Measurements

C246.1	Measure various electrical parameters with accuracy, precision, resolution.
C246.2	Use AC and DC bridges for relevant parameter measurement.
C246.3	Select appropriate passive or active transducers for measurement of physical phenomenon.
C246.4	Understand the errors in measurements and their rectification
C246.5	Understand the various measurement techniques available
C246.6	Understand the basic working of instruments used for measurement

Course Name: 17MT51 -Design of Machine Elements

C351.1	Have knowledge of theories of failures, stress concentration, power screws, shafts, keys, couplings, gears, bearings, and springs.

C351.2	Understand the technique of theories of failure, stress concentration, fatigue strength etc.
C351.3	Calculate the stresses; parameters of machine elements subjected to various loads also make proper assumptions with respect to material, FOS for various machine components.
C351.4	Design machine elements like couplings, gears, bearings ad springs
C351.5	Design machine elements like power screws.
C351.6	Design machine elements like shafts, keys.

Course Name: 17MT52 - Virtual Instrumentation

C352.1	Gain knowledge of Virtual Instrumentation and Lab View domain on various I/O Module, Sensor, DAQ Devices, Communication and Measurement System
C352.2	Understanding the basic programming concepts and various logical Instructions.
C352.3	Determine the extent and nature of electronic circuitry in Virtual Instrumentation
C352.4	Recognize the components of virtual instrumentation and use them for PC based Measurement.
C352.5	Publish Vis front panels on the web, view and control them remotely from LabVIEW or from a web
C352.6	Develop real time application using LabVIEW

Course Name: 17MT53 - Hydraulics& Pneumatics

C353.1	Engineering applications of hydraulic system
C353.2	Engineering applications of pneumatic system
C353.3	Gain knowledge of basis of hydraulic system
C353.4	Gain knowledge of basis of pneumatic system
C353.5	Understanding the working principle of hydraulic system
C353.6	Understanding the working principle of pneumatic system

Course Name: 17MT54Micro and Smart system technology

C354.1	Know the basic concept of micro and smart system technology.
C354.2	Understand the need of micro size machines and devices.
C354.3	Know how this micro system technology is evolved in all fields of science AMD technology
C354.4	Know the smart materials and their characteristics for the smart system applications.
C354.5	Understand the working of different sensors for smart system applications.
C354.6	Know how the different components of smart systems ate integrated with each other.

Course Name: 17MT551Wireless Network & Communication

C355.1	Have Knowledge of the fundamental concepts of wireless communication and networks.
C355.2	To understand the basics of wireless voice and data communication
C355.3	Differentiation between Wireless LAN, Wireless MAN, Wireless WAN
C355.4	Understand the working of modern network architectures from a design and performance perspective.
C355.5	Design requirements of network architectures
C355.6	Brief description regarding different wireless networks.

Course Name: 17MT562- Automation in Manufacturing

C356.1	Know the fundamentals of automation in manufacturing
C356.2	Need of automation in manufacturing
C356.3	Types of automation process and its requirement
C356.4	Knowledge about quality control and its requirement
C356.5	Understand the techniques of automation in manufacturing
C356.6	Operations performed in manufacturing industry

Course Name: 17MT61 - PLC &SCADA

C361.1	Describe typical components of a Programmable Logic Controller.
C361.2	Explain the basic concepts of a Programmable Logic Controller.
C361.3	Use timer, counter, and other intermediate programming functions.
C361.4	Design and program basic PLC circuits for entry-level PLC applications.
C361.5	Design and program a small, automated industrial production line.
C361.6	Explain SCADA basic concept and application process,

Course Name: 17MT62 -Embedded System (ARM)

C362.1	Gain the knowledge of various RISC and CISC architectures of processors
C362.2	Know the different register usage in processor core
C362.3	Know the function of Embedded system hardware and software components,
C362.4	Have knowledge of embedded system based on the ARM processor, various cache methods and instruction set.
C362.5	Understand the various instruction set for writing and optimizing ARM assembly and C code
C362.6	Able to optimize error in programming and debug error code in efficient way.

Course Name: 17MT63- Power Electronics

C363.1	Have knowledge of power semiconductor devices, thyristors, AC voltage controllers.
C363.2	Have knowledge of choppers and inverters.
C363.3	Understand the characteristics and working principle of thyristors, AC voltage controllers.
C363.4	Understand the characteristics and working principle of choppers and inverters.
C363.5	Apply control techniques to meet desired switching objectives.
C363.6	Analyst the importance and applications of diode as rectifiers, filters, Zener diode, regulators and switching circuits.

Course Name: 17MT64Computer Aided Machine Drawing

C364.1	Have knowledge about Engineering Drawing
C364.2	Understand the concepts of sections of solids, orthographic views.
C364.3	Understand the concepts of threads, fasteners, couplings.
C364.4	Understand the concepts of joints and assembly drawing.
C364.5	Understand the concepts of Detailing.
C364.6	Students will be able to demonstrate the usage of CAD software

Course Name: 17MT652- Rapid Prototyping

C365.1	Have fundamental knowledge of modeling and simulation.
C365.2	Understand the techniques of discrete event simulation, random number generation.

C365.3	Understand the techniques to test for random number,
C365.4	Understand the techniques of random variants used in simulation study & simulation packages.
C365.5	Apply simulation packages for queuing system.
C365.6	Apply simulation packages for production system and maintenance system.

Course Name: 17MT662- Process Instrumentation

C366.1	Have the knowledge of Joints, Links.
C366.2	Have the knowledge of Sensors.
C366.3	Have the knowledge of Control units
C366.4	Have the knowledge of Actuators.
C366.5	Have the knowledge of Elements of Automation.
C366.6	**D**escribe motions and control system of Robots**.**

Course Name: 15MT71- : Industrial Robotics

C471.1	Gain knowledge of Robotics
C471.2	Gain knowledge of robotics in Automation
C471.3	Understand the working Methodology of Robotics and Automation
C471.4	Knowledge of robotics motion and sensors
C471.5	Write the program for Robot for various Application
C471.6	Knowledge of Robotic Control system and machine vision

Course Name: 15MT72: Thermal Engineering

C472.1	Understand the concepts of systems, energy interaction in systems and types
C472.2	Understand the energy interaction and thermodynamics equilibrium
C472.3	Know the thermodynamics concepts related terms
C472.4	Understand the difference between heat and work different process related to work
C472.5	Know the first law of thermodynamics to cyclic process and properties
C472.6	Understand steady flow energy equation for open system

Course Name: 15MT73 -Signal Processing

C473.1	Gain the Knowledge of signals and system transformation and filter
C473.2	Understand timedomain, frequency domain signals analog and digital system
C473.3	Operate on signals and systems to bring out this characteristicsand desired information
C473.4	Design Analog and Digital filters and implement discrete time systems
C473.5	Understand the basics of convolution sum and integral
C473.6	Properties of signals signal operation

Course Name: 15MT743- Real Time System

C474.1	Explain the types of real time systems and their properties
C474.2	Know concept of computer control
C474.3	Understand hardware and software requirements
C474.4	Know the languages for real time application
C474.5	Know the concept & working operation of operating systems
C474.6	Design RTSS and RTS developing Methodologies

Course Name: 15MT753 Safety & Security of System

C475.1	Have knowledge of IC Engines
C475.2	Have knowledge of Fuel, ignition, Lighting System
C475.3	Understand the working principle of Transmission System
C475.4	Understand the working principle of gear box
C475.5	Understand the working principle of Lubrication System
C475.6	Know about CMV safety rules

Course Name: 15MT81 Automotive Electronics & Hybrid vehicles

C481.1	Have knowledge of automotive electronics domain of various engine parts
C481.2	Have knowledge of automotive electronics sensors and types of sensors
C481.3	Know the electronics domain of various engine parts sensors, actuators, communication, and measurement system
C481.4	Understanding engine parameters and a critical awareness of current problems within the automotive electronics domain using various measurement technology
C481.5	Determine the extent and nature of electronic circuitry in automotive system including monitoring and control circuits for engines transmissions, brakes, steering, suspension, climate control system
C481.6	Understand the monitoring and control circuits for engines and instrumentations and radios and accessories involved in automotive industry

Course Name: 15MT-82- Communication System

C482.1	Know about communication systems, transmitter, receiver, and modulation in communication system.
C482.2	Know concepts of amplitude modulation and its types, coherent detection of different signals.
C482.3	Gain knowledge on angle modulation and demodulation, FM, and its types.
C482.4	Gain knowledge on phase locked loop, linear and nonlinear effects in FM systems.
C482.5	Know different waveform coding techniques.
C482.6	Gain knowledge on spread spectrum modulation, digital multiplexers, and its types.

Course Name: 15MT83 –Artificial Intelligence

C483.1	Understand the importance of Artificial systems, their domain details.
C483.2	Analyze the different Techniques used and algorithm applied to the system along with the system characteristics.
C483.3	Gain Knowledge of Artificial Intelligence, Production Rules, Search Algorithms, Expert System & its architectures, Machine Learning.
C483.4	Understand the working methodology of Search Algorithms, Expert System & Machine Learning.
C483.5	Ability to apply Artificial Intelligence techniques for problem solving.
C483.6	Explain the limitations of current Artificial Intelligence techniques.

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Department of Physics

Vision of the Institute

To be a respected and most sought after engineering educational institution engaged in equipping individuals capable of building learning organizations in the new millennium.

Mission of the Institute

To develop competent students with good value systems and face challenges of the continuously changing world.

Vision of the Department

To inculcate interest in Physics and promote the understanding of it, and to develop observational and computational skills, which will take the development in technology to new heights.

Mission of the Department

The department has been working towards fulfilling its vision through a synergic combination of teaching and research. The department also strives to promote excellence in technical education and scientific research through the effective use of Physics in real time engineering problems.

Program Educational Objectives

PEO 1.	Inculcate knowledge of basic engineering sciences and fundamentals of mechanical, electrical and computer systems.
PEO 2.	Create ability in graduates to design, develop product and applications in the field of Automation and Mechatronics and be able to use engineering tools that will enhance their productivity.
	Prepare graduates to be effective engineers with good analytical and problem-solving skill to innovate, research and develop in multidisciplinary Mechatronics environment.

Program Specific Objectives

PSO 1:Learn & understand more about basic principles & to develop problem solving skills and implementation in technology.

PSO 2: Study of material properties and their applications is the prime role to understand and usein engineering applications and studies.

PSO 3: Develop skills to impart practical knowledge in real time solution.

PSO 4: Understand measurement technology, usage of new instruments and real time applications in engineering studies.

Course Name: 18CHE12/22 (Engineering Physics)

CO1	Apprehend theoretical background of laser, construction and working of different types of laser and its applications in different fields and Compute Eigen values, Eigenfunctions, momentum of Atomic and subatomic particles using Time independent 1-D Schrodinger's wave equation.
CO2	Understand various electrical and thermal properties of materials like conductors, semiconductors, dielectrics using different theoretical models.
CO3	Understanding different types of optical fibers and their applications
CO4	Realize the interrelation between time varying electric field and magnetic field, thetransverse nature of the EM waves and their role in optical fiber communication.
CO5	Understand various types of oscillations and their implications, the role of Shock waves in various fields.
CO6	Recognize the elastic properties of materials for engineering applications

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PG Course Outcomes

MBA

Vision of the Institute

To be a respected and sought-after group of educational institutions, we are very much engaged in equipping individuals to be capable of building learning organization in the new millennium.

Mission of the Institute

Our mission is to develop competent students with good value systems to face challenges of the continuously changing world.

Vision of the Department

To impart value-based management education to the students, to nurture and enhance their competencies and to prepare them to face the challenges of industry, society, and country.

Mission of the Department

To provide integrated knowledge and demonstrated ability to the students and to groom them towards building their careers as well equipped professional. To foster a passion for learning, creative thinking, leadership skills that helps in developing entrepreneurial abilities among the students.

Program Educational Objectives

PEO1: To equip the students with necessary knowledge and managerial skills to occupy positions of management and administration in business, industry, public system, and the government.

PEO2: To inculcate appropriate ethical values and attitudes among students to function effectively in the work environment.

PEO3: To provide a right mix of managerial and business exposure to function effectively in various domains of management.

Program Specific Outcomes

PSO1.To attain sufficient theoretical knowledge in areas of General Management, Marketing, Finance, Human Resources, Economics, Statistics, and its application to solve practical problems in business.

PSO2. An ability to demonstrate interpersonal skills, problem solving skills, and leadership qualities to facilitate management graduates to adapt to changes in the environment for self-sustenance and to enable lifelong learning.

PSO3. To instill a practice of professional standards and ethics and a sense of social responsibility in every management graduate.

2019-20

Course Name:18MBA11(Management & Organizational Behavior)

C111.1	Comprehend & correlate all the management functions which are happening around with fundamental concepts and principles of management.
C111.2	Understand the overview of management, theory of management and practical applications of the same.
C111.3	Effectively use their skills for self-grooming, working in groups and to achieve organizational goals
C111.4	Demonstrate their acumen in applying managerial and behavioral concept in real world/situation.
C111.5	Understand and demonstrate their exposure on recent trends in management.

Course Name:18MBA12(Managerial Economics)

C112.1	Understand the application of Economic Principles in Management decision making
C112.2	Acquire knowledge of micro economic concepts and apply them for effective functioning of a Firm and Industry
C112.3	Ability to understand, assess and forecast Demand.
C112.4	Apply the concepts of production and cost for optimization of production.
C112.5	Design Competitive strategies like pricing, product differentiation etc. And marketing according to the market structure.
C112.6	Design Competitive strategies like pricing, product differentiation etc. And marketing according to the market structure.
C112.7	Able to identify, assess profits and apply BEP for decision making.

Course Name:18MBA13(Accounting for Managers)

C113.1	Demonstrate theoretical knowledge and its application in real time accounting.
C113.2	Demonstrate knowledge regarding accounting principles and its application.
C113.3	Capable of preparing financial statement of sole trading concerns and companies.
C113.4	Independently undertake financial statement analysis and take decisions
C113.5	Comprehend emerging trends in accounting and computerization of Accounting systems.

Course Name:18MBA14(Business Statistics& Analytics)

C114.1	Facilitate objective solutions in business decision making under subjective conditions.
C114.2	Demonstrate different statistical techniques in business/real-life situations.
C114.3	Understand the importance of probability in decision making.
C114.4	Understand the need and application of analytics

C114.5	Understand and apply various data analysis functions for business problems.

Course Name:18MBA15(Marketing Management)

C115.1	Develop an ability to assess the impact of the environment on marketing function.
C115.2	To formulate marketing strategies that incorporate psychological and sociological factors which influence buying.
C115.3	Explain how companies identify attractive market segments, differentiate and position their products for maximum competitive advantage in the marketplace.
C115.4	Build marketing strategies based on product, price, place, and promotion objectives
C115.5	Synthesize ideas into a viable marketing plan.

Course Name:18MBA16(Managerial Communication)

C116.1	Awareness of the communication skills and know their potential to become successful managers.
C116.2	To get enabled with the mechanics of writing and can compose the business letters in English precisely and effectively.
C116.3	Introduced to the managerial communication practices in business those are in vogue.
C116.4	Trained in the art of business communication with emphasis on analyzing business situations
C116.5	Exposure in drafting business proposals to meet the challenges of competitive environment.

Course Name:18MBA21(Human Resource Management)

C121.1	Understanding of HRM functions, principles, Job analysis that facilitates students to design a job description and job specification for various levels of employees.
C121.2	Synthesize knowledge on effectiveness of recruitment process, sources & understanding of systematic selection procedure
C121.3	Identify the various training methods and design a training program.
C121.4	Understand the concept of performance appraisal process in an organization.
C121.5	List out the regulations governing employee benefit practices

Course Name:18MBA22(Financial Management)

C122.1	Understand the basic financial concepts.
C122.2	Apply time value of money.
C122.3	Evaluate the investment decisions.
C112.4	Analyze the capital structure and dividend decisions.
C112.5	Estimate working capital requirements.

Course Name:18MBA23(Research Methodology)

C123.1	Understand various research approaches, techniques, and strategies in the appropriate in business.
C123.2	Apply a range of quantitative / qualitative research techniques to business and day to day management problems.
C123.3	Demonstrate knowledge and understanding of data analysis, interpretation and report writing.
C123.4	Develop necessary critical thinking skills to evaluate different research approaches in Business.

Course Name:18MBA24(Legal and Business Environment)

C124.1	Develop an understanding of the macro environment of Business and various macroeconomic concepts.
C124.2	Understand the industrial policies of the past and the present and the evolution over time, and how Indian Industrial structure evolved over time.
C124.3	Exposure to various economic policies of the country and the state of economy

Course Name:18MBA25 (Strategic Management

C125.1	Understanding the concept of Strategic Management, its relevance, Characteristics, process nature and purpose.
C125.2	Understanding of how firms successfully institutionalize a strategy and create an organizational structure for domestic and overseas operations and gain competitive advantage
C125.3	An insight on strategy at different levels of an organization to gain competitive advantage.
C125.4	Understanding the strategic drive-in multinational firms and their decisions in different markets.
C125.5	Gain knowledge of strategy implementation and the control measures for effective decision-making.

Course Name:18MBA26 (Entrepreneurship Development)

C126.1	Display keen interest and orientation towards entrepreneurship, entrepreneurial opportunities to setup a business.
C126.2	As an entrepreneur learn to think creatively and understand the components in developing a Business plan
C126.3	Become aware about various sources of funding and institutions supporting entrepreneurs.
C126.4	Gain consciousness towards social entrepreneurship and rural entrepreneurship opportunities.

Course Name:18MBAMM301(Consumer Behavior)

C231.1	Explain the background and concepts vital for understanding Consumer Behavior.
C231.2	Identify the role of variables that determines Consumer Behavior in Social & cultural domain
C231.3	Identifying the psychological and behavioral practices adopted by organizations to enhance the Consumer Behavior.

Course Name:18MBAMM302(Retail Management)

C232.1	Ability to identify the contemporary retail management, issues, and strategies.
C232.1	Evaluate the recent trends in retailing and its impact in the success of modern business.
C232.3	Relate store management and visual merchandising practices for effective retailing.

Course Name:18MBAMM303(Services Marketing)

C233.1	Develop an understanding about the various concepts and importance of Services Marketing.
C233.2	Enhance knowledge about emerging issues and trends in the service sector.
C233.3	Learn to implement service strategies to meet new challenges.

Course Name:18MBAFM301(Banking and Financial Services)

C234.1	Acquainted to various Banking and Non-Banking financial services in India
C234.2	Understand the activities of Merchant Banking and credit rating
C234.3	Equipped to understand micro financing and other financial services in India.
C234.4	Understand how to evaluate and compare leasing & hire purchase

Course Name:18MBAFM302(Investment Management)

C235.1	Understand the capital market and various Instruments for Investment
C235.2	Ability to assess the risk and return associated with investments and methods to value securities.
C235.3	Ability to analyses the Economy, Industry and Company framework for Investment Management.
C235.4	Learn the theories of Portfolio management and also the tools and techniques for efficient portfolio management.

Course Name: 18MBAFM303(Direct Taxation)

C236.1	Understand the basics of taxation and process of computing residential status
C236.2	Calculate taxable income under different heads.
C236.3	Understand deductions and calculation of tax liability of Individuals.
C236.4	Gain knowledge of the corporate tax system.

Course Name:18MBAHR301(Recruitment& Selection)

C237.1	Gain the insights of various principles and practices of recruitment and selection in an industry.
C237.2	Equip students with various selection procedure practiced in industry.
C237.3	Develop students with latest selection tools in the corporate sector.
C237.4	Develop students with various testing of job recruitment and selection

Course Name:18MBAHR302(HR Analytics)

C238.1	Understanding of How HR function adds value and demonstrates the value in business terms
C238.2	Measure the value of Intangibles that HR helps builds for the organization given a particular business context to facilitate decision making
C238.3	Convert soft factors in a people management context into measurable variables across various domains.
C238.4	Devise, conduct and analyses a study on employees or any other related to the HR
	context in an organization.

Course Name:18MBAHR303(Compensation& Reward System)

C239.1	Gain insights of various conceptual aspects of Compensation and Benefits to achieve organizational goals
C239.2	Determine the performance-based compensation system for business excellence and solve various cases
C239.3	Designing the compensation strategies for attraction, motivation and retaining high quality workforce.
C239.4	Understand the Legal & Administrative Issues in global compensation to prepare compensation plan, CTC, wage survey and calculate various bonus.

Course Name:18MBAOS307(Organization Study)

C2310.1	Exposure to the working culture of the organization
C2310.2	Application of theoretical culture to real life situation at the workplace
C2310.3	Understanding of the various functions of the organization
C2310.4	Use of McKinsey's 7S framework and Porter's five force model
C2310.5	Analysis of the financial statements

Course Name:18MBAMM401(Sales Management)

C241.1	Understand the apply the selling techniques in an organization.
C241.2	Develop a plan for organizing staffing & training sales force.
C241.3	Organize sales territories to maximize selling effectiveness.

C241.4	Evaluate sales management strategies.

Course Name:18MBAMM402(Integrated Marketing Communication)

C242.1	Define and apply knowledge of various aspects of managerial decision making related to marketing communications strategy and tactics.
C242.2	Ability to create an integrated marketing communications plan which includes promotional strategies.
C242.3	Explain the role of IMC in the overall marketing &Use effectiveness measures to evaluate IMC strategies.
C242.4	Prepare advertising copy and design other basic IMC tools.

Course Name:18MBAMM403(Digital& Social Media Marketing)

C243.1	Recognize appropriate e-marketing objectives.
C243.2	Appreciate the e-commerce framework and technology.
C243.3	Illustrate the use of search engine marketing, online advertising, and marketing strategies.
C243.4	Use social media & create templates
C243.5	Develop social media strategies to solve business problems.

Course Name:18MBAFM401(Mergers, Acquisitions & Corporate Restructuring)

C244.1	Understand Mergers & Acquisitions with its different classifications, strategies, theories, synergy etc.
C244.2	Conduct financial evaluation of M&A
C244.3	Analyze the results after evaluation
C244.4	Critically evaluate different types of M&A, takeover, and antitakeover strategies.

Course Name:18MBAFM402(Risk Management and Insurance)

C245.1	Understand various types of risks.
C245.2	Assess the process of identifying and measuring the risk.
C245.3	Acquaint with the functioning of life Insurance in risk management.
C245.4	Understand general insurance contract

Course Name:18MBAFM403(Indirect Taxation)

C246.1	Have clarity about GSTsystem in India.
C246.2	Understanding of levy and collection of GSTin India.
C246.3	Have an overview of customs duty in India.
C246.4	Understanding of valuation for customs duty.

Course Name:18MBAHR401(Public Relations)

C247.1	To demonstrate an understanding of the fundamental's tools of public relations practices.
C247.2	To describe the various emerging trends in the field of public relations.
C247.3	To analyze the importance of employee communication and organizational change
C247.4	To evaluate the importance of community relations.

Course Name:18MBAHR402(Organizational Leadership)

C248.1	Comprehend & correlate organizational leadership styles which are happening around with fundamental concepts of team leadership.
C248.2	Understand the overview of leadership behavior and motivation in organization
C248.3	Effectively use their skills for self-grooming on leadership traits and ethics that influences them to effectively work in groups to achieve organizational goals.
C248.4	Demonstrate their acumen in applying their knowledge in organizational leadership and behavioral concept in real world/situation

Course Name:18MBAHR403(International Human Resource Management)

C249.1	Analyze the impact of contemporary issues and global imperatives on Human Resource concepts, policies, and practices.
C249.2	Apply concepts and knowledge in deployment, expatriate on international assignments.
C249.3	Evaluate the effects of different human resource and international industrial relations
C249.4	Develop students to adopt international industrial relation strategies.

Course Name:18MBAPR407(Project Work)

C2410.1	To understand the working of the organization/Company/industry
C2410.2	To take up an in-depth study of an issue/problem in the area of Marketing/Finance/Human Resources
C2410.3	Ability to analyze using statistical tools and statistical packages
C2410.4	Knowledge of comprehending the data collected and editing, tabulating and presenting for analysis.

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MCA

Vision of the Institute

To be a respected and sought-after group of educational institutions, we are very much engaged in equipping individuals to be capable of building learning organization in the new millennium.

Mission of the Institute

Our mission is to develop competent students with good value systems to face challenges of the continuously changing world.

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Program Educational Objectives

PEO1: Exhibit their expertise in problem Solving skills through design, analysis, Implementation and evaluation of hardware and software systems.

PEO2: Engage in the Computer Science and Applications related Profession locally and globally by contributing ethically to the competent and professional practices.

PEO3: Effectively adapt as individuals and as team members in multidisciplinary projects involving technical, managerial, economic, and social constraints.

PEO4: Demonstrate Leadership and Entrepreneurship Skills by incorporating organizational goals and providing facilities for peer members with defined objective.

Program Specific Outcomes

PSO1. The graduates of the Program will have firm foundation in understanding and applying the principles of mathematics, computing techniques and its applications.

PSO2. The graduates of the Program will have skills to develop, deploy and maintain applications for desktop, web, mobile, cloud and cross platforms using modern tools and technologies.

PSO3. The graduates of the Program will be prepared to achieve their career goals in the software industry or pursue higher studies and enhance their professional knowledge.

Course Name: Data Structures with Algorithms(20MCA11)

CO1	Demonstrate different data structures, its operations using C programming.
CO2	Analyze the performance of Stack, Queue, Lists, Trees, Hashing, Searching and Sorting techniques
CO3	Implement some applications of data structures in a high-level language such as C/C++
CO4	Design and apply appropriate data structures for solving computing problems
CO5	Compute the efficiency of algorithms in terms of asymptotic notations for the given problem.

Course Name: Operating System with UNIX (20MCA12)

CO1	Analyze the basic Operating System Structure and concept of Process Management
CO2	Analyze the given Synchronization/ Deadlock problem to solve and arrive at valid conclusions.
CO3	Analyze OS management techniques and identify the possible modifications for the given problem context.
CO4	Demonstrate the working of basic commands of Unix environment including file processing
CO5	Demonstrate the usage of different shell commands, variable and AWK filtering to the given problem

Course Name: Computer Networks(20MCA13)

CO1	Apply the basic concepts of networking and to analyze different parameters such as bandwidth, delay, throughput of the networks for the given problem
CO2	Apply different techniques to ensure the reliable and secured communication in wired and wireless communication
CO3	Analyze the networking concepts of TCP/IP for wired and wireless components
CO4	Identify the issues of Transport layer to analyze the congestion control mechanism
CO5	Design network topology with different protocols and analyse the performance usingNS2

Course Name: Mathematical Foundation for Computer Applications(20MCA14)

CO1	Apply the fundamentals of set theory and matrices for the given problem.
CO2	Apply the types of distribution, evaluate the mean and variance for the given casestudy/ problem.
CO3	Solve the given problem by applying the Mathematical logic concepts
CO4	Model the given problem by applying the concepts of graph theory.
CO5	Design strategy using gaming theory concepts for the given problem.

CO6	Identify and list the different applications of discrete mathematical concepts in computer science.

Course Name: Research Methodology and IPR (20MCA15)

CO1	Identify the suitable research methods and articulate the research steps in a proper sequence for the given problem.
CO2	Carry out literature survey, define the problem statement and suggest suitable solution for the given problem and present in the format of the research paper (IEEE).
CO3	Analyze the problem and conduct experimental design with the samplings
CO4	Perform the data collection from various sources segregate the primary and secondary data
CO5	Apply some concepts/section of Copy Right Act /Patent Act /Cyber Law/Trademark to the given case and develop –conclusions

Course Name: Data Structures with Algorithms Lab(20MCA16)

CO1	Implement sorting / searching techniques, and validate input/output for the given problem
CO2	Implement data structures (namely Stacks, Queues, Circular Queues, Linked Lists, and Trees), its operations and algorithms.
CO3	Implement the algorithm to find whether the given graph is connected or not and conclude on the performance of the technique implemented.
CO4	Design and apply appropriate data structures for solving computing problems
CO5	Implement the techniques for evaluating the given expression.

Course Name: Unix Programming Lab(20MCA17)

CO1	Demonstrate the working of basic commands of Unix environment including file processing
CO2	Apply Regular expression to perform pattern matching using utilities like grep, sed and awk.
CO3	Implement Unix commands/ system calls to demonstrate process management
CO4	Demonstrate the usage of different shell commands, variable and AWK filtering too the given problem.
CO5	Develop shell scripts for developing the simple applications to the given problem.

Course Name: Computer Networks Lab(20MCA19)

CO1	Apply the basic concepts of networking and to analyze different parameters such as bandwidth, delay, throughput of the networks for the given problem.
CO2	Apply different techniques to ensure the reliable and secured communication in wired and wireless communication
CO3	Analyze the networking concepts of TCP/IP for wired and wireless components

CO4	Identify the issues of Transport layer to analyze the congestion control mechanism
CO5	Design network topology with different protocols and analyse the performance using any simulator

Course Name: Bridge Course: Basics of Programming and Computer Organisation(20MCA19-BC)

CO1	Demonstrate the key concepts introduced in C programming by writing and executing the programs.
CO2	Demonstrate the concepts of structures and pointers for the given application/ problem.
CO3	Implement the single/multi-dimensional array for the given problem.
CO4	Demonstrate the application of logic gates in solving some societal/industrial problems.
CO5	Analyse how memory organization, operations, instruction sequencing, and interrupts are useful in executing the given program.

Course Name: Database Management System(20MCA21)

CO1	Apply the basic concepts of database management in designing the database for the given problem
CO2	Design entity-relationship diagrams to the given problem to develop database application with appropriate fields and validations.
CO3	Implement a database schema for the given problem domain
CO4	Formulate and execute SQL queries to the given problem.
CO5	Apply normalization techniques to improve the database design to the given problem.

Course Name: Object Oriented Programming with Java(20MCA22)

CO1	Demonstrate the basic programming constructs of Java and OOP concepts to develop Java programs for a given scenario
CO2	Illustrate the concepts of generalization and run time polymorphism applications to develop reusable components.
CO3	Demonstrate the usage of Packages, Interfaces, Exceptions and Multithreading in building given applications.
CO4	Apply Enumerations, Wrappers, Auto boxing, Collection framework and I/O operations for effective coding to the given problem.
CO5	Implement the concepts of Applets, and networking using Java network classes for developing the distributed applications to the given problem.

Course Name: Web Technologies(20MCA23)

CO1	Apply the features jQuery for the given web-based problem.
CO2	Demonstrate the development of XHTML documents using JavaScript and CSS
CO3	Illustrate the use of CGI and Perl programs for different types of server side applications

CO4	Design and implement user interactive dynamic web-based applications.
CO5	Demonstrate applications of Angular JS and jQuery for the given problem

Course Name: Software Engineering(20MCA24)

CO1	Identify and define different requirements for the given problem and present in the IEEE format.
CO2	Use modern tool to create dynamic diagrams to represent the design for the given problem.
CO3	Draw class diagram, analyze the different types of association that exists as per the given problem and represent them using UML notations
CO4	Analyze the given system to identify actors, use cases to design use case diagrams for the given problem using RSA/open-source tool.
CO5	Design the static/dynamic models to meet application requirements of the given system and generate code (skeleton) using the modern tool.

Course Name: Cyber Security(20MCA251)

CO1	Apply IT ACT (Cyber law) to the given case/problem and infer from the given case and analyze the gap if exists.
CO2	Analyze the working of cyber security principles in designing the system.
CO3	Analyze the given problem (cybercrime, vulnerability, threat), develop a strategy (physical, logical or administrative controls) to mitigate the problem and articulate consequences on Society and National Economy.
CO4	Examine relevant network defense / web application tool to solve given cyber security problem and evaluate its suitability.
CO5	Evaluate provisions available in Indian cyber law to handle infringement of intellectual property rights that happen on the cyber platform.

Course Name: User Interface Design(20MCA254)

CO1	Analyze the new technologies that provide interactive devices and interfaces.
CO2	Apply the guidelines to develop the UID and evaluate for the given problem.
CO3	Apply the development methodologies with an analysis of the social impact and legal issues Understand Direct Manipulation and Virtual Environment
CO4	Discuss the command, natural languages, and issues in design for maintaining QoS
CO5	Demonstrate techniques for information search and visualization for the given problem.

Course Name: Mobile Applications Development(20MCA263)

CO1	Develop effective user interfaces that leverage evolving mobile devices

CO2	Develop applications using software development kits (SDKs), frameworks and toolkits.
CO3	Implement suitable methods to integrate database and server-side technologies
CO4	Design and develop open-source software based mobile application to the given problem.
CO5	Build and deploy competent mobile application to solve the societal/industrial problems.

Course Name: Natural Language Processing(20MCA265)

CO1	Apply parsing technique to the given problem and verify the output and give valid conclusions
CO2	Illustrate the approaches to syntax and semantics in NLP.
CO3	Formulate solutions for a range of natural language components using existing algorithms, techniques and frameworks, including part-of-speech tagging, language modelling, parsing and semantic role labelling.
CO4	Evaluate NLP solutions of the given problem and arrive at valid conclusions
CO5	Illustrate information retrieval techniques.

Course Name: Database Management Systems Laboratory(20MCA27)

CO1	Design entity-relationship diagrams to solve given database applications
CO2	Implement a database schema for a given problem.
CO3	Formulate SQL queries in Oracle for the given problem.
CO4	Apply normalization techniques to improve the database design for the given problem.
CO5	Build database and verify for its appropriate normalization for any given problem

Course Name: Java Programming Lab(20MCA28)

CO1	Demonstrate the fundamental data types and constructs of Java Programming by writing executable/interpretable programs.
CO2	Illustrate the object-oriented principles with the help of java programs.
CO3	Develop reusable and efficient applications using inheritance and multi-threading concepts of java.
CO4	Apply client-side programming and networking concepts to develop distributed applications.
CO5	Write java programs to demonstrate the concepts of interfaces, inner classes and I/Ostreams

Course Name: Web Technologies Laboratory(20MCA29)

CO1	Apply the concept and usages web-based programming techniques

CO2	Learning and Developing XHTML documents using JavaScript and CSS.
CO3	To be familiar in the use of CGI and Perl programs for different types of server side applications.
CO4	Design and implement user interactive dynamic web-based applications.

Course Name: Data Analytics using Python(20MCA31)

CO1	Demonstrate basic data analytics principles and techniques
CO2	Apply control structures to the given problems
CO3	Apply the concepts of inheritance and overloading for a given problem.
CO4	Demonstrate the concepts of learning and decision trees for a given problem.
CO5	Demonstrate the concepts of neural networks and genetic algorithms for a given problem

Course Name: Internet of Things(20MCA32)

CO1	Analyze the IoT architecture and design along with functional/compute stack and data management.
CO2	Apply IOT architecture for a given problem
CO3	Analyze the application protocol, transport layer methods for the given business case.
CO4	Analyze the application of data analytics for IOT for a given
CO5	Analyse the architecture and develop programming using modern tools for the given use case

Course Name: Advances in Java(20MCA33)

CO1	Apply the concept of Servlet and its life cycle to create web application
CO2	Apply JSP tags and its services to web application.
CO3	Create packages and interfaces in the web application context.
CO4	Build Database connection for the web applications.
CO5	Develop enterprise applications using Java Beans concepts for the given problem.

Course Name: Cloud Computing(20MCA342)

CO1	Demonstrate the system & software models and mechanisms that support cloud computing
CO2	Classify various cloud services and their providers
CO3	Compare various cloud deployment models
CO4	Differentiate various types of computing environments
CO5	Identify enabling technologies of cloud computing.

Course Name: Software Testing20MCA344)

CO1	Acquire knowledge of basic principles and knowledge of software testing and debugging and test cases.
CO2	Will be able to understand the perceptions on testing like levels of testing, generalized pseudo code and with related examples.
CO3	To study the various types of testing.
CO4	Differentiate between functional testing and structural testing.
CO5	Analyse the performance of fault-based testing, planning and Monitoring the process, Documentation testing.

Course Name: Deep Learning(20MCA351)

CO1	Demonstrate the basics of deep learning for a given context.
CO2	Implement various deep learning models for the given problem
CO3	Realign high dimensional data using reduction techniques for the given problem
CO4	Analyze optimization and generalization techniques of deep learning for the given problem.
CO5	Evaluate the given deep learning application and enhance by applying latest techniques.

Course Name: Big data Analytics(20MCA352)

CO1	Identify the business problem for a given context and frame the objectives to solve it through data analytics tools
CO2	Apply various algorithms for handling large volumes of data.
CO3	Illustrate the architecture of HDFS and explain functioning of HDFS clusters.
CO4	Analyze the usage of Map-Reduce techniques for solving big data problems.
CO5	Conduct experiment with various datasets for analysis / visualization and arrive at valid conclusions.

Course Name: Data Analytics Lab(20MCA36)

CO1	Develop python program to perform search/sort on a given data set
CO2	Demonstrate object-oriented principles
CO3	Demonstrate data visualization using NumPy for a given problem
CO4	Demonstrate regression model for a given problem
CO5	Design and develop an application for the given problem

Course Name: Mini project with IOT Lab(20MCA37)

CO1	Demonstrate the IoT architecture design for a given problem
CO2	Apply IOT techniques for a given problem

CO3	Analyze the application protocol, transport layer methods for the given business case.
CO4	Design and develop an application for the given problem for the societal/industrial problems
CO5	Develop python program by applying suitable feature for the given problem and verify the output

Course Name: Advances in Java Lab(20MCA38)

CO1	Apply the concept of Servlet and its life cycle to create web application.
CO2	Apply JSP tags and its services to web application
CO3	Create packages and interfaces in the web application context.
CO4	Build Database connection for the web applications.
CO5	Develop application programs using beans concept.

Course Name: Advances in Web Technologies(20MCA41)

CO1	Build the Web Applications using jQuery, PHP, XML for the given problem
CO2	Design the Web Pages using AJAX for the given problem
CO3	Analyze the advances in Web2.0 and demonstrate its usage for the problem considered
CO4	Analyze the web services and demonstrate its usage for the problem considered.
CO5	Design responsive web applications using Bootstrap for the given problem.

Course Name: Programming using C#(20MCA42)

CO1	Analyze C#andclient-serverconceptsusing. Net Framework Components.
CO2	Apply delegates, eventandexceptionhandlingtoincorporatewithASP, WinForms, ADO.NET
CO3	Analyzetheuseof.NetComponentsdependingontheproblemstatement.
CO4	Implement&developawebbasedandConsolebasedapplicationwithDatabase connectivity
CO5	Implement & develop a web-based application with Database connectivity

Course Name: Industry Internship(20MCA43)

CO1	Analyze the real-time industry/research work environment with emphasis on organizational structure/job process/different departments and functions / tools/technology.
CO2	Develop applications using modern tools and technologies
CO3	Demonstrate self-learning capabilities with an effective report and detailed presentation.

Course Name: Project Work(20MCA44)

CO1	Identify a suitable problem making use of the technical and engineering knowledge gained from previous courses with the awareness of impact of technology on the society and their ethical responsibilities.
CO2	Work as an individual and team to segregate work and execute/implement projects using appropriate tools.
CO3	Develop skills to disseminate technical and general information by means of oral as well as written presentation and professional skills
CO4	To conduct testing of application using appropriate techniques and tools.
CO5	To enhance interpersonal skills and group cohesion among the peers during the project work

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M. Tech in Digital Electronics & Communication

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To be a respected and most sought after engineering educational institution engaged in equipping individuals capable of building learning organizations in the new millennium.

Mission of the Institute

To develop competent students with good value systems and face challenges of the continuously changing world.

Vision of the Department

To impart technical education par excellence and prepare leaders to serve the industries and society.

Mission of the Department

Mission 1. To Provide the world with a highly committed and quality conscious engineering workforce.

Mission 2. To Encourage the students to build self-help, Power of initiative, courage to change and create new things.

Mission 3. To inculcate the spirit of cooperation and capacity for organization with special emphasis on their self-reliance and sustainability to meet ever changing requirements of local and global industries.

Program Educational Objectives

Graduates apply their knowledge of mathematics and science to identify, analyze and solve problems in the field of Electronics & communication to develop sophisticated communication systems.

Graduates to design and build up interdisciplinary systems by solving core engineering problems in communication systems which are technically sound, economically feasible and socially acceptable.

Graduates exhibit desire for life-long learning which directs them to obtain thorough knowledge in their chosen fields and motivate them for higher studies/research.

Program Specific Objectives

PSO 1: An ability to understand the basic core courses of Electronics & Communication Engineering and to relate them to various areas of application like Communication Systems, control system, Signal processing, VLSI and Embedded systems.

PSO 2: Should have capability to apply modern tools to analyze and solve complex designs with optimal solutions for various real-world applications

PSO 3: Excellent adaptability to changing work environment with good leadership qualities and zeal for social and environmental well-being.

Program Outcomes

1. Engineering knowledge: Apply the knowledge of mathematics, science, engineering fundamentals, and an engineering specialization to the solution of complex engineering problems.

2. Problem analysis: Identify, formulate, review research literature, and analyze complex engineering problems reaching substantiated conclusions using first principles of mathematics, natural sciences, and engineering sciences.

3. Design/development of solutions: Design solutions for complex engineering problems and design system components or processes that meet the specified needs with appropriate consideration for the public health and safety, and the cultural, societal, and environmental considerations.

4. Conduct investigations of complex problems: Use research-based knowledge and research methods including design of experiments, analysis and interpretation of data, and synthesis of the information to provide valid conclusions.

5. Modern tool usage: Create, select, and apply appropriate techniques, resources, and modern engineering and IT tools including prediction and modelling to complex engineering activities with an understanding of the limitations.

6. The engineer and society: Apply reasoning informed by the contextual knowledge to assess societal, health, safety, legal and cultural issues and the consequent responsibilities relevant to the professional engineering practice.

7. Environment and sustainability: Understand the impact of the professional engineering solutions in societal and environmental contexts, and demonstrate the knowledge of, and need for sustainable development.

8. Ethics: Apply ethical principles and commit to professional ethics and responsibilities and norms of the engineering practice.

9. Individual and team work: Function effectively as an individual, and as a member or leader in diverse teams, and in multidisciplinary settings.

10. Communication: Communicate effectively on complex engineering activities with the engineering community and with society at large, such as, being able to comprehend and write effective reports and design documentation, make effective presentations, and give and receive clear instructions.

11. Project management and finance: Demonstrate knowledge and understanding of the engineering and management principles and apply these to one's own work, as a member and leader in a team, to manage projects and in multidisciplinary environments.

12. Life-long learning: Recognize the need for, and have the preparation and ability to engage in independent and life-long learning in the broadest context of technological change.

Course Name: C101 (Advanced Engineering Mathematics-18ELD11)

C101.1	Understand vector spaces, basis, linear transformations and the process of obtaining matrix of linear transformations arising in magnification and rotation of images.
C101.2	Apply the technique of singular value decomposition for data compression, least square approximation in solving inconsistent linear systems.
C101.3	Utilize the concepts of functional and their variations in the applications of communication systems, decision theory, synthesis and optimization of digital circuits.
C101.4	Learn the idea of random variables (discrete/continuous) and probability distributions in analyzing the probability models arising in control systems and system communications.
C101.5	Analyze random process through parameter-dependent variables in various random processes.

Course Name: C102 (Advanced Digital Signal Processing-18ECS12)

C102.1	Design adaptive filters for a given application
C102.2	Design multirate DSP Systems
C102.3	Implement adaptive signal processing algorithm
C102.4	Design active networks
C102.5	Understand advanced signal processing techniques, including multi-rate processing and time-frequency analysis techniques

Course Name: C103 (Advanced Embedded systems-18EVE13)

C103.1	Understand the basic hardware components and their selection method based on the characteristics and attributes of an embedded system.
C103.2	Explain the hardware software co-design and firmware design approaches.
C103.3	Acquire the knowledge of the architectural features of ARM CORTEX M3, a 32 bit Microcontroller including memory map, interrupts and exceptions.
C103.4	Apply the knowledge gained for Programming ARM CORTEX M3 for different Applications.

Course Name: C104 (Advanced Communication Systems-1-18ECS14)

C104.1	Explain the concept of low pass and Bandpass signals representations at the Transmitter, the process of Detection and Estimation at the receiver in the presence of AWGN only.
C104.2	Evaluate Receiver performance for various types of single carrier symbol modulations through ideal and AWGN Non-bandlimited and bandlimited channels.

C104.3	Design single carrier equalizers for various symbol modulation schemes and detection methods for defined channel models, and compute parameters to meet desired rate and performance requirements.
C104.4	Design and Evaluate Non band limited and Non-power limited spread spectrum systems for communications in a Jamming environment, multiuser situation and low power intercept environment.

Course Name:C105(Advanced Communication Networks-18ECS15)

C105.1	Choose appropriate Network Infrastructure and Networking Architectures which suits current practice in networking
C105.2	Identify the suitable random-access methods which suits wireless networks
C105.3	Identify IP configuration for the network with suitable routing mechanisms
C105.4	Analyze and develop various network traffic management and control techniques
C105.5	Analyze and develop various congestion and flow control

Course Name:C106 (Advanced Digital Signal Processing Lab-18ECSL16)

C106.1	Develop a Filter design
C106.2	Develop a Filter Realization
C106.3	Signal Manipulations using MATLAB
C106.4	Design using Wavelet Transforms
C106.5	Estimating PSD using various techniques

Course Name:C106 (Research Methodology and IPR-18RMI17)

C107.1	Discuss research methodology and the technique of defining a research problem
C107.2	Explain the functions of the literature review in research, carrying out a literature search, developing theoretical and conceptual frameworks and writing a review.
C107.3	Explain various research designs and their characteristics.
C107.4	Explain the art of interpretation and the art of writing research reports
C107.5	Discuss various forms of the intellectual property, its relevance

Course Name: C111 (Advanced Communication Systems-2 -18ECS21)

C111.1	Explain the concepts of multi-channel signaling (including OFDM) scheme and synchronization for carrier and symbol timing recovery at receiver.
C111.2	Evaluate the capacity and degradation in performance of various symbol signaling schemes in a multipath fading environment.
C111.3	Develop & analyze schemes to improve performance in a multipath fading environment including maximal ratio combining, RAKE receivers, OFDM and MIMO.
C111.4	Develop and evaluate the performance of a OFDM MIMO scheme to meet specified rate in a given multipath environment.

Course Name: C112 (Antenna Theory and Design -18ECS22)

C112.1	Classify different types of antennas
C112.2	Define and illustrate various types of array antennas
C112.3	Design antennas like Yagi-Uda, Helical antennas and other broad band antennas
C112.4	Describe different antenna synthesis methods
C112.5	Apply methods like MOM

Course Name: C113 (Error Control Coding-18ECS23)

C113.1	Analyze a discrete memoryless channel, given the source and transition probabilities.
C113.2	Apply the concept of modern linear algebra for the error control coding technique.
C113.3	Construct and Implement efficient LBC, Cyclic codes etc encoder and decoders.
C113.4	Apply decoding algorithms for efficient decoding of Block codes and Convolutional codes.

Course Name: C114 (Cryptography and Network Security-18ECS243)

C114.1	Use basic cryptographic algorithms to encrypt the data.
C114.2	Generate some pseudorandom numbers required for cryptographic applications.
C114.3	Provide authentication and protection for encrypted data.
C114.4	Provide Web security

Course Name: C115 (Multimedia Over Communication links-18ECS251)

C115.1	Understand basics of different multimedia networks and applications.
C115.2	Analyze media types like audio and video to represent in digital form.
C115.3	Understand different compression techniques to compress audio.
C115.4	Understand different compression techniques to compress audio video.
C115.5	Describe the basics of Multimedia Communication Across Networks

Course Name: C116 (Advanced Communication Lab-18ECSL26)

C116.1	Plot the radiation pattern of some antennas using MATLAB and wave guide setup
C116.2	Obtain the S-parameters of Magic tee and directional couplers.
C116.3	Test the IC CD4051 for modulation techniques.
C116.4	Study multiplexing techniques using OFC kit.

Course Name: C201 (LTE 4G Broadband-18ECS31)

C211.1	Understand the system architecture and the function standard specified components of the system of LTE 4G.
C211.2	Analyze the role of LTE radio interface protocols and EPS Data convergence protocols to set up, reconfigure and release data and voice from a number of users.

C211.3	Demonstrate the UTRAN and EPS handling processes from set up to release including mobility management for a variety of data call scenarios.
C211.4	Test and Evaluate the Performance of resource management and packet data processing and transport algorithms.

Course Name: C202 (Advances in Image Processing-18ECS321)

C212.1	Understand the representation of the digital image and its properties
C212.2	Apply pre-processing techniques required to enhance the image for its further analysis.
C212.3	Use segmentation techniques to select the region of interest in the image for analysis
C212.4	Represent the image based on its shape and edge information.
C212.5	Describe the objects present in the image based on its properties and structure.
C212.6	Use morphological operations to simplify images, and quantify and preserve the main shape characteristics of the objects.

Course Name: C203 (Pattern Recognition & Machine Learning -18ESP332)

C213.1	Identify areas where Pattern Recognition and Machine Learning can offer a solution.
C213.2	Describe the strength and limitations of some techniques used in computational Machine Learning for classification, regression and density estimation problems.
C213.3	Describe and model data.
C213.4	Solve problems in Regression and Classification.

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M. Tech in VLSI Design & Embedded System

Vision of the Institute

To be a respected and most sought after engineering educational institution engaged in equipping individuals capable of building learning organizations in the new millennium.

Mission of the Institute

To develop competent students with good value systems and face challenges of the continuously changing world.

Vision of the Department

To impart technical education par excellence and prepare leaders to serve the industries and society.

Mission of the Department

Mission 1. To Provide the world with a highly committed and quality conscious engineering workforce.

Mission 2. To Encourage the students to build self-help, Power of initiative, courage to change and create new things.

Mission 3. To inculcate the spirit of cooperation and capacity for organization with special emphasis on their self-reliance and sustainability to meet ever changing requirements of local and global industries.

Program Educational Objectives

Graduates apply their knowledge of mathematics and science to identify, analyze and solve problems in the field of Electronics & communication to develop sophisticated communication systems.

Graduates to design and build up interdisciplinary systems by solving core engineering problems in communication systems which are technically sound, economically feasible and socially acceptable.

Graduates exhibit desire for life-long learning which directs them to obtain thorough knowledge in their chosen fields and motivate them for higher studies/research.

Program Specific Objectives

PSO 1: An ability to understand the basic core courses of Electronics & Communication Engineering and to relate them to various areas of application like Communication Systems, control system, Signal processing, VLSI and Embedded systems.

PSO 2: Should have capability to apply modern tools to analyze and solve complex designs with optimal solutions for various real-world applications

PSO 3: Excellent adaptability to changing work environment with good leadership qualities and zeal for social and environmental well-being.

Program Outcomes

1. Engineering knowledge: Apply the knowledge of mathematics, science, engineering fundamentals, and an engineering specialization to the solution of complex engineering problems.

2. Problem analysis: Identify, formulate, review research literature, and analyze complex engineering problems reaching substantiated conclusions using first principles of mathematics, natural sciences, and engineering sciences.

3. Design/development of solutions: Design solutions for complex engineering problems and design system components or processes that meet the specified needs with appropriate consideration for the public health and safety, and the cultural, societal, and environmental considerations.

4. Conduct investigations of complex problems: Use research-based knowledge and research methods including design of experiments, analysis and interpretation of data, and synthesis of the information to provide valid conclusions.

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12. Life-long learning: Recognize the need for, and have the preparation and ability to engage in independent and life-long learning in the broadest context of technological change.

Course Name: C101 (Advanced Engineering Mathematics-18ELD11)

C101.1	Understand vector spaces, basis, linear transformations and the process of obtaining matrix of linear transformations arising in magnification and rotation of images.
C101.2	Apply the techniques of QR and singular value decomposition for data compression, least square approximation in solving inconsistent linear systems.
C101.3	Learn the idea of random variables (discrete/continuous) and probability distributions in analyzing the probability models arising in control systems and system communications.
C101.4	Utilize the concepts of functional and their variations in the applications of communication systems, decision theory, synthesis and optimization of digital circuits.
C101.5	Apply the idea of joint probability distributions and the role of parameter-dependent random variables in random process.

Course Name: C102 (ASIC Design -18EVE12)

C102.1	Describe the concepts of ASIC design methodology, data path elements, logical effort and FPGA architectures
C102.2	Analyze the design of FPGAs and ASICs suitable for specific tasks, perform design entry and explain the physical design flow.
C102.3	Design data path elements for ASIC cell libraries and compute optimum path delay.
C102.4	Create floor plan including partition and routing with the use of CAD algorithms.

Course Name: C103 (Advanced Embedded systems-18EVE13)

C103.1	Understand the basic hardware components and their selection method based on the characteristics and attributes of an embedded system.
C103.2	Explain the hardware software co-design and firmware design approaches.
C103.3	Acquire the knowledge of the architectural features of ARM CORTEX M3, a 32 bit Microcontroller including memory map, interrupts and exceptions.
C103.4	Apply the knowledge gained for Programming ARM CORTEX M3 for different Applications.

Course Name: C104 (VLSI Testing-18EVE14)

C104.1	Analyze the need for fault modeling and testing of digital circuits
C104.2	Generate fault lists for digital circuits and compress the tests for efficiency
C104.3	Create tests for digital memories and analyze failures in them
C104.4	Apply boundary scan technique to validate the performance of digital circuits
C104.5	Design built-in self-tests for complex digital circuits

Course Name: C105 (DVD-18EVE15)

C105.1	Analyze issues of On-chip interconnect Modeling and Interconnect delay calculation.
C105.2	Analyze the Switching Characteristics in Digital Integrated Circuits.
C105.3	Use the Dynamic Logic circuits in state-of-the-art VLSI chips.
C105.4	Study critical issues such as ESD protection, Clock distribution, Clock buffering, and Latch phenomenon
C105.5	Use Bipolar and Bi-CMOS circuits in very high-speed design.

Course Name:C106 (VLSI and ES Lab1-18EVEL16)

C106.1	Develop Verilog Code for the design of digital circuits
C106.2	Use FPGA/CPLD board and Logic Analyzer or Chip scope to verify the results
C106.3	Develop Assembly language programs for different applications using ARM Cortex M3 Kit and Keil uVision-4 tool.
C106.4	Develop C language programs for different applications using ARM-Cortex M3 Kit and Keil uVision-4 tool

Course Name:C107 (Research Methodology-18RMI17)

C107.1	Discuss research methodology and the technique of defining a research problem
C107.2	Explain the functions of the literature review in research, carrying out a literature search, developing theoretical and conceptual frameworks and writing a review.
C107.3	Explain various research designs and their characteristics.
C107.4	Explain the art of interpretation and the art of writing research reports
C107.5	Discuss various forms of the intellectual property, its relevance and business impact in the changing global business environment and leading International Instruments concerning IPR

Course Name: C111 (Design of Analog and Mixed Mode VLSI Circuits-18EVE21)

C111.1	Use efficient analytical tools for quantifying the behavior of basic circuits by inspection.
C111.2	Design high-performance, stable operational amplifiers with the tradeoffs between speed, precision and power dissipation.
C111.3	Design and study the behavior of phase-locked-loops for the applications.
C111.4	Identify the critical parameters that affect the analog and mixed-signal VLSI circuits 'performance
C111.5	Perform calculations in the digital or discrete time domain, more sophisticated data converters to translate the digital data to and from inherently analog world.

Course Name: C112 (Real Time Operating System-16EVE22)

C112.1	Develop programs for real time services, firmware and RTOS, using the fundamentals of Real Time Embedded System, real time service utilities, debugging methodologies and optimization techniques.
C112.2	Select the appropriate system resources (CPU, I/O, Memory, Cache, ECC Memory, and Microcontroller/FPGA/ASIC to improve the system performance.
C112.3	Apply priority based static and dynamic real time scheduling techniques for the given specifications.
C112.4	Analyze deadlock conditions, shared memory problem, critical section problem,
	missed deadlines, availability, reliability and QoS.
C112.5	Develop programs for multithreaded applications using suitable techniques and data structure

Course Name: C113(System Verilog-18EVE23)

C113.1	Write test benches for moderately complex digital circuits
C113.2	Use System Verilog language
C113.3	Appreciate functional coverage
C113.4	Apply constrained random tests benches using System Verilog
C113.5	Analyze a verification case and apply System Verilog to verify the design

Course Name: C114 (Advances in VLSI Design-18EVE241)

C114.1	Apply design automation for complex circuits using the different Implementation methodology like custom versus semi-custom, hardwired versus fixed, regular array versus ad-hoc.
C114.2	Use the approaches to minimize the impact of interconnect parasitic on performance, power dissipation and circuit reliability
C114.3	Impose the ordering of the switching events to meet the desired timing Constraints using synchronous, clocked approach.
C114.4	Infer the reliability of the memory

Course Name: C115 (LPVD-18EVE251)

C115.1	Identify the sources of power dissipation in CMOS circuits.
C115.2	Perform power analysis using simulation-based approaches and probabilistic analysis.
C115.3	Use optimization and trade-off techniques that involve power dissipation of digital circuits.
C115.4	Make the power design a reality by making power dimension an integral part of the design process

C115.5	Use practical low power design techniques and their analysis at various levels of design abstraction and analyses how these are being captured in the latest design automation environments.

Course Name: C116 (VLSI and ES Lab-2-18EVEL26)

C116.1	Learn the various issues in Mixed signal designs basically data converters.
C116.2	Acquire hands-on skills of using CAD tools in VLSI design.
C116.3	Appreciate the design process in VLSI through a mini-project on the design of a CMOS sub-system.
C116.4	Select a suitable task switching technique in a multithreaded application.
C116.5	Implement different techniques of message passing and Inter task Communication.
C116.6	Implement different data structures such as pipes, queues and buffers in multithreaded programming.

Course Name: C201 (CAD of Digital Systems-18EVE31)

C201.1	Solve graph theoretic problems.
C201.2	Evaluate the computational complexity of an algorithm
C201.3	Write algorithms for VLSI Automation
C201.4	Simulate and synthesize digital circuits using VLSI automation tools.

Course Name: C202 (Advances in Image Processing-18ECS321)

C202.1	Understand the representation of the digital image and its properties
C202.2	Apply pre-processing techniques required to enhance the image for its further analysis.
C202.3	Use segmentation techniques to select the region of interest in the image for analysis
C202.4	Represent the image based on its shape and edge information.
C202.5	Describe the objects present in the image based on its properties and Structure.
C202.6	Use morphological operations to simplify images, and quantify and Preserve the main shape characteristics of the objects.

Course Name: C203 (IOT-18ECS333)

C203.1	Understand the basic concepts IOT Architecture and devices employed.
C203.2	Analyze the sensor data generated and map it to IOT protocol stack for transport
C203.3	Apply communications knowledge to facilitate transport of IOT data over various available communications media.
C203.4	Design a use case for a typical application in real life ranging from sensing devices to analyzing the data available on a server to perform tasks on the device.

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M. Tech in Power Electronics

Vision of the Institute

To be a respected and most sought after engineering educational institution engaged in equipping individuals capable of building learning organizations in the new millennium.

Mission of the Institute

To develop competent students with good value systems and face challenges of the continuously changing world.

Vision of the Department

To meet the educational and research needs of the student community and staff through collaboration with other academic and technical institutions, industry and government agencies and make the students to face problems of the country and society as a whole.

Mission of the Department

M1 - To develop and train competent Electrical and Electronics Engineers with adequate practical skills.

M2 - To provide state-of-the-art resources that contribute to achieve excellence in teaching-learning, research and development activities.

M3 - To inculcate, ethics, leadership, moral values and social activities.

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Program Educational Objectives

PEO	Be able to apply the fundamental knowledge of mathematics, science, electrical and electronics engineering to analyze and solve the complex problem in electrical, electronics and allied interdisciplinary areas.
PEO	Possess good leadership skills, function ethically in multidisciplinary areas to develop sustainable solutions for global, environmental and social issues.
PEO	Be able to inculcate lifelong learning to maintain and enhance professional skills.

Program Specific Objectives

PSO 1: Apply fundamental knowledge to identify, formulate, design and investigate various problems of electrical and electronic circuits, power electronics, control systems and power systems.

PSO 2: Apply modern software tools for design, simulation and analysis of electrical systems to engage in life- long learning and to successfully adapt in multi-disciplinary environments.

PSO 3: Solve ethically and professionally various Electrical Engineering problems in societal and environmental context and communicate effectively by applying project management techniques to complex engineering problems.

Program Outcomes

1. Engineering knowledge: Apply the knowledge of mathematics, science, engineering fundamentals, and an engineering specialization to the solution of complex engineering problems.

2. Problem analysis: Identify, formulate, review research literature, and analyze complex engineering problems reaching substantiated conclusions using first principles of mathematics, natural sciences, and engineering sciences.

3. Design/development of solutions: Design solutions for complex engineering problems and design system components or processes that meet the specified needs with appropriate consideration for the public health and safety, and the cultural, societal, and environmental considerations.

4. Conduct investigations of complex problems: Use research-based knowledge and research methods including design of experiments, analysis and interpretation of data, and synthesis of the information to provide valid conclusions.

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12. Life-long learning: Recognize the need for, and have the preparation and ability to engage in independent and life-long learning in the broadest context of technological change.

Course Name: 18EEE11/ Mathematical Methods in Control

C111.1	Understand the fundamentals of vector space and bases in reference to transformations
C111.2	Solve system of linear equations using direct and iterative methods.
C111.3	Use the idea of Eigen values and Eigen vectors for the application of SVD
C111.4	Describe the basic notions of discrete and continuous probability distributions
C111.5	Find out responses of linear systems using statistical and probability tools

Course Name: 18EPE12/ Power Semiconductor Devices and Components

C112.1	Discuss power electronic concepts, electronic switches and semiconductor physics
C112.2	Explain representation of switches in P-spice and power computations.
C112.3	Explain the internal structure, the principle of operation, characteristics and base drive circuits of power semiconductor devices; power diodes, power BJT, power MOSFET
C112.4	Explain the internal structure, the principle of operation, characteristics and base drive circuits of power semiconductor devices; thyristors, power IGBT, power FET
C112.5	Design a heat sink to control the temperature rise of semiconductor devices
C112.6	Design magnetic components inductors and transformers used in the power electronic circuits

Course Name: 18EPE13 / Power Electronic Converters

C113.1	Use the knowledge of PWM techniques in controlling different power electronic converters
C113.2	Apply the knowledge of power electronics in design and analysis of DC –DC PWM converters
C113.3	Design and analyze DC –AC and AC – DC converters and control their operation using PWM techniques
C113.4	Design and analyze different resonant converters and their control circuits
C113.5	Design & Analyze of AC – AC converters
C113.6	Design & Analyze of multilevel converters.

Course Name: 18EPE14 / Modelling and Design of Controllers

C114.1	Describe the role of computer simulations in the analysis and design of power electronics systems
C114.2	Understand the functional modelling of static systems.
C114.3	Use sampling technique to determine a digital equivalent to a continuous time system
C114.4	Design digital controllers in discrete time and frequency domain
C114.5	Design optimal and robust controllers by different methods
C114.6	Explain essentials of discrete computation

Course Name: 18EPE15 / Modelling and Analysis of Electrical Machines

C115.1	Develop mathematical models for DC motors for transient state analysis
C115.2	Use reference frame theory to transform three phases to two phases
C115.3	Develop dynamic model for three phase induction motor in stator ad rotor reference frames
C115.4	Model synchronous machine using Park's transformation for the analysis of steady state operation
C115.5	Model synchronous machine to perform dynamic analysis under different conditions
C115.6	Develop mathematical model of single-phase transformers

Course Name: 18EPEL16 / Power Electronics Laboratory-1

C116.1	Analyze the static and dynamic characteristics of various semiconductor devices.
C116.2	Apply the knowledge of converters in assessing the performance of single phase and three phases fully controlled and semi controlled converters for RL load for continuous current modes.
C116.3	Apply the knowledge of converters in assessing the performance of single phase and three phases fully controlled and semi controlled converters for RL load for discontinuous current modes.
C116.4	Assess the performance of single-phase bridge inverter for RL load and control the voltage by pulse width modulation
C116.5	Apply the knowledge of power electronics in performance analysis of chopper converter
C116.6	Apply the knowledge of power electronics in performance analysis of synchronous buck converter

Course Name: 18RMI17 / Research Methodology and Ipr

C117.1	Discuss research methodology and the technique of defining a research problem
C117.2	Explain the functions of the literature review in research, carrying out a literature search, developing theoretical and conceptual frameworks and writing a review.
C117.3	Explain various research designs, sampling designs, measurement and scaling techniques and also different methods of data collections
C117.4	Explain several parametric tests of hypotheses, Chi-square test, art of interpretation and writing research reports
C117.5	Discuss various forms of the intellectual property, its relevance and business impact in the changing global business environment
C117.6	Discuss various forms of the intellectual property and leading International Instruments concerning IPR.

Course Name: 18EPE21 / Electric Drives

C121.1	Explain characteristics of DC motors, induction motors and synchronous motors
C121.2	Explain braking of electric motors.
C121.3	Classify electric drives
C121.4	Discuss dynamics conditions and stability considerations of Electric drive
C121.5	Suggest a drive for a specific application
C121.6	Explain using microprocessor in the control of an electric drive.

Course Name: 18EPE22 / Switched - Mode Power Supplies

C122.1	Explain a SMPS, its characteristics, new technologies, basic principles and control modes
C122.2	Suggest a suitable DC/DC converter for an SMPS.
C122.3	Explain the method of selecting key peripheral components of SMPS
C122.4	Design the power factor correction circuit of SMPS
C122.5	Explain selection of magnetic core and designing of high-frequency transformer
C122.6	Design protection and monitoring circuit for SMPS

Course Name: 18EPE23 / Power System Harmonics

C123.1	Explain the fundamentals that facilitate the understanding of the issues of harmonics
C123.2	Explain the causes for generation of harmonics
C123.3	Explain the effects of harmonics distortion on power system equipment and loads and suppression of harmonics in power systems
C123.4	Discuss standard limits of harmonic distortion and modeling of power system components for harmonic analysis study
C123.5	Model transmission lines and cables for harmonic analysis.
C123.6	Discuss implementation of harmonic studies

Course Name: 18EPE243 / Hybrid Electric Vehicles

C124.1	Explain the basics of electric and hybrid electric vehicles, their architecture, technologies and fundamentals
C124.2	Explain plug – in hybrid electric vehicle architecture, design and component sizing
C124.3	Explain the use of different power electronics devices in hybrid electric vehicles
C124.4	Suggest a suitable electric drive for a specific type of hybrid electric vehicle.
C124.5	Explain the use of different energy storage devices used for hybrid electric vehicles, their technologies and control
C124.6	Simulate electric hybrid vehicles by different techniques for the performance analysis

Course Name: 18EPE252 / Digital Power Electronics

C125.1	Explain traditional parameters computation, multiple quadrant operation and choppers
C125.2	Explain the disadvantages of analog power electronics and conversion technology, energy factor and sub-sequential parameters
C125.3	Explain basic mathematics of digital control systems and mathematical modelling of digitally controlled power electronic devices such as rectifiers, inverters and converters
C125.4	Describe mathematical modelling of AC/DC rectifiers, DC/AC inverters, DC/DC converters and AC/AC (AC/DC/AC) converters are working in the discrete-time state
C125.5	Discuss DC/AC pulse-width-modulation (PWM) inverters and AC /AC converters modelled as a first order-hold (FOH) element in digital control systems.
C125.6	To explain open loop and closed loop control of power electronic devices and energy factor application of AC and DC motor drives

Course Name: 18EPEL26/ Power Electronics Laboratory-2

C126.1	Conduct experiments on single phase fully controlled converter fed separately excited DC motor to assess the performance in continuous and discontinuous current modes
C126.2	Conduct experiments to assess the performance of Chopper fed DC drives for class A and class C commutation in continuous current mode
C126.3	Conduct experiments on three phase fully controlled converter fed separately excited DC motor to assess the performance in continuous and discontinuous current modes
C126.4	Simulate different converters for analyzing the waveform in continuous current modes
C126.5	Simulate different converters for analyzing the waveform in discontinuous current modes
C126.6	Simulate forward converter, fly back converter and resonant converter to study their performance

Course Name: 18EPE27/ Technical Seminar

C127.1	Attain, use and develop knowledge in the field of electrical and electronics engineering
C127.2	Identify, understand and discuss current, real-time issues
C127.3	Improve oral and written communication skills
C127.4	Explore an appreciation of the self in relation to its larger diverse social and academic contexts
C127.5	Apply principles of ethics and respect in interaction with others.

C127.6	Attain, use and develop knowledge in the field of other disciplines through independent learning and collaborative study

Course Name: 18EPE31/ HVDC Power Transmission

C231.1	Explain importance of DC power transmission
C231.2	Describe the basic components of a converter, the methods for compensating the reactive power demanded by the converter.
C231.3	Explain the methods for simulation of HVDC systems and its control.
C231.4	Describe filters for eliminating harmonics and the characteristics of the system impedance resulting from AC filter designs
C231.5	Explain the protection of HVDC system and other converter configurations used for the HVDC transmission
C231.6	Explain the recent trends for HVDC applications.

Course Name: 18EPE322/ EMC In Power Electronics

C232.1	Describe Electromagnetic interference and its classification and measurement of
	conducted high frequency disturbance
C232.2	Survey electromagnetic interference specific to power electronic equipment
C232.3	Explain the characteristics of circuit elements used for noise suppression
C232.4	Explain EMI suppression methods used in semiconductor and electromechanical devices.
C232.5	Explain design of EMI filter circuits and filtering methods
C232.6	Explain EMS reduction techniques for power electronic equipment

Course Name: 18EPE331/ Advanced Control Systems

C233.1	Evaluate Z transform of a continuous time signal
C233.2	Explain the process of reconstructing the analog signal from a digital signal
C233.3	Use state variable representation to design control law and observers for a system in both continuous and discrete time domains
C233.4	Solve optimal control problems
C233.5	Construct Lyapunov functions to evaluate the stability of a system
C233.6	Use describing function, phase plane methods and Lyapunov method to assess the stability of the nonlinear system

Course Name: 18EPE34/ Project Work Phase – I

C234.1	Present the project and be able to defend it
C234.2	Make links across different areas of knowledge and to generate, develop and evaluate ideas and information so as to apply these skills to the project task
C234.3	Habituated to critical thinking and use problem solving skills

C234.4	Communicate effectively and to present ideas clearly and coherently in both the written and oral forms
C234.5	Work in a team to achieve common goal.
C234.6	Learn on their own, reflect on their learning and take appropriate actions to improve it

Course Name: 18EPEI35/ Internship

C235.1	Gain practical experience within industry in which the internship is done
C235.2	Acquire knowledge of the industry in which the internship is done
C235.3	Develop a greater understanding about career options while more clearly defining personal career goals
C235.4	Develop and refine oral and written communication skills
C235.5	Identify areas for future knowledge and skill development
C235.6	Acquire the knowledge of administration, marketing, finance and economics

Course Name: 18EPE41/ Project Work Phase – II

C241.1	Present the project and be able to defend it
C241.2	Make links across different areas of knowledge and to generate, develop and evaluate ideas and information so as to apply these skills to the project task
C241.3	Habituated to critical thinking and use problem solving skills
C241.4	Communicate effectively and to present ideas clearly and coherently in both the
	written and oral forms
C241.5	Work in a team to achieve common goal.
C241.6	Learn on their own, reflect on their learning and take appropriate actions to improve it

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M. Tech in Computer Science & Engineering

Vision of the Institute

To be a respected and most sought after engineering educational institution engaged in equipping individuals capable of building learning organizations in the new millennium. To produce technocrats with creative technical knowledge and intellectual skills to sustain and excel in the highly demanding world with confidence.

Mission of the Institute

To develop competent students with good value systems and face challenges of the continuously changing world.

Vision of the Department

To produce technocrats with creative technical knowledge and intellectual skills to sustain and excel in the highly demanding world with confidence.

Mission of the Department

Mission 1. The department's aim is to develop the best computer science professionals who work creatively, communicate effectively & become technologically competent, and also to mould them into good citizens by inculcating sense of ethical values in them.

Mission 2. To Encourage the students to build self-help, Power of initiative, courage to change and create new things.

Mission 3. To inculcates the spirit of cooperation and capacity for organization with special emphasis on their self-reliance and sustainability to meet ever changing requirements of local and global industries.

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Program Educational Objectives

PEO To create graduates equipped with life-long learning skills and have a successful professional career in IT industry.

PEO To prepare graduates to pursue higher education and get inclined towards research & development in computer science engineering.

PEO To provide adequate training and opportunities, with exposure to emerging cutting-edge technologies and to work in teams on multidisciplinary projects with effective communication skills and leadership qualities.

Program Specific Objectives

PSO 1: To design efficient algorithms and develop effective code for real-time computations.

PSO 2: To apply software engineering principles in developing optimal software solutions.

Program Outcomes

1. Engineering knowledge: Apply the knowledge of mathematics, science, engineering fundamentals, and an engineering specialization to the solution of complex engineering problems.

2. Problem analysis: Identify, formulate, review research literature, and analyze complex engineering problems reaching substantiated conclusions using first principles of mathematics, natural sciences, and engineering sciences.

3. Design/development of solutions: Design solutions for complex engineering problems and design system components or processes that meet the specified needs with appropriate consideration for the public health and safety, and the cultural, societal, and environmental considerations.

4. Conduct investigations of complex problems: Use research-based knowledge and research methods including design of experiments, analysis and interpretation of data, and synthesis of the information to provide valid conclusions.

5. Modern tool usage: Create, select, and apply appropriate techniques, resources, and modern engineering and IT tools including prediction and modeling to complex engineering activities with an understanding of the limitations.

6. The engineer and society: Apply reasoning informed by the contextual knowledge to assess societal, health, safety, legal and cultural issues and the consequent responsibilities relevant to the professional engineering practice.

7. Environment and sustainability: Understand the impact of the professional engineering solutions in societal and environmental contexts, and demonstrate the knowledge of, and need for sustainable development.

8. Ethics: Apply ethical principles and commit to professional ethics and responsibilities and norms of the engineering practice.

9. Individual and team work: Function effectively as an individual, and as a member or leader in diverse teams, and in multidisciplinary settings.

10. Communication: Communicate effectively on complex engineering activities with the engineering community and with society at large, such as, being able to comprehend and write effective reports and design documentation, make effective presentations, and give and receive clear instructions.

11. Project management and finance: Demonstrate knowledge and understanding of the engineering and management principles and apply these to one's own work, as a member and leader in a team, to manage projects and in multidisciplinary environments.

12. Life-long learning: Recognize the need for, and have the preparation and ability to engage in independent and life-long learning in the broadest context of technological change.

Course Name: C101 (Basic Electronics-18SCS11)

C101.1	Understand the numerical methods to solve and find the roots of the equations.
C101.2	Utilize the statistical tools in multi variable distributions.
C101.3	Use probability formulations for new predictions with discrete and continuous RV's.
C101.4	To understand various graphs in different geometries related to edges.
C101.5	Understand vector spaces and related topics arising in magnification and rotation of images.

Course Name: C102 (Advances in Operating Systems -18SCS12)

C102.1	Demonstrate the Mutual exclusion, Deadlock detection and agreement protocols of Distributed operating system
C102.2	Learn the various resource management techniques for distributed systems
C102.3	Identify the different features of real time and mobile operating system
C102.4	Modify existing open-source kernels in terms of functionality or features used
C102.5	Demonstrate the Mutual exclusion, Deadlock detection and agreement protocols of Distributed operating system

Course Name: C103 (Advances in Data Base Management Systems-18SCS13)

C103.1	Select the appropriate high-performance database like parallel and distributed database
C103.2	Infer and represent the real-world data using object-oriented database
C103.3	Interpret rule set in the database to implement data warehousing of mining
C103.4	Discover and design database for recent applications database for better interoperability

Course Name: C104 (Internet of Things-18SCS14)

C104.1	Develop schemes for the applications of IOT in real time scenarios
C104.1	Manage the Internet resources
C104.3	Model the Internet of things to business
C104.4	Understand the practical knowledge through different case studies
C104.5	Understand data sets received through IoT devices and tools used for analysis

Course Name:C105(Advances in Computer Networks-18SCS151

C105.1	List and classify network services, protocols and architectures, explain why they are layered.

C105.2	Choose key Internet applications and their protocols, and apply to develop their own applications (e.g., Client Server applications, Web Services) using the sockets API.
C105.3	Explain develop effective communication mechanisms using techniques like
	connection establishment, queuing theory, recovery Etc.
C105.4	Explain various congestion control techniques.

Course Name: C201 (Managing Big Data -18SCS21)

C201.1	Describe big data and use cases from selected business domains
C201.2	Explain NoSQL big data management
C201.3	Install, configure, and run Hadoop and HDFS
C201.4	Perform map-reduce analytics using Hadoop
C201.5	Use Hadoop related tools such as HBase, Cassandra, Pig, and Hive for big data Analytics

Course Name: C202 (Advanced Algorithms-18SCS22)

C202.1	Design and apply iterative and recursive algorithms.
C202.2	Design and implement optimization algorithms in specific applications.
C202.3	Design appropriate shared objects and concurrent objects for applications

Course Name: C203 (Cloud Computing-18SCS23)

C203.1	Compare the strengths and limitations of cloud computing
C203.2	Identify the architecture, infrastructure and delivery models of cloud computing
C203.3	Apply suitable virtualization concept.
C203.4	Choose the appropriate cloud player
C203.5	Address the core issues of cloud computing such as security, privacy and interoperability
C203.6	Design Cloud Services
C203.7	Set a private cloud

Course Name: C204 (Advances in Storage Area Networks-18SCS241)

C204.1	Identify the need for performance evaluation and the metrics used for it
C204.2	Apply the techniques used for data maintenance.
C204.3	Realize strong virtualization concepts
C204.4	Develop techniques for evaluating policies for LUN masking, file systems

Course Name: C205 (Object Oriented Software Engingeering-18SCS251)

C205.1	Apply Object Oriented Software Engineering approach in every aspect of software project
C205.2	Analyze the requirements from various domains
C205.3	Adapt appropriate object-oriented design aspects in the development process
C205.4	Implement and test the software projects using object-oriented approach
C205.5	Learn the issues and concepts relating to maintenance of software projects
C205.6	Adapt the concepts and tools related to software configuration management

Course Name: C301 (Machine Learning Techniques-18SCS31)

C301.1	Choose the learning techniques with this basic knowledge.
C301.2	Apply effectively neural networks and genetic algorithms for appropriate applications.
C301.3	Apply Bayesian techniques and derive effectively learning rules.
C301.4	Choose and differentiate reinforcement and analytical learning techniques

Course Name: C302 (Information and Network Security-18SCS322)

C302.1	Analyze the vulnerabilities in any computing system and hence be able to design a security solution.
C302.2	Identify the security issues in the network and resolve it.
C302.3	Evaluate security mechanisms using rigorous approaches, including theoretical.

Course Name: C303 (Application and Web Security -18SCS331)

C303.1	Achieve Knowledge of web application's vulnerability and malicious attacks.
C303.2	Understand the basic web technologies used for web application development
C303.3	Understands the basic concepts of Mapping the application.
C303.4	Able to illustrate different attacking illustrations
C303.5	Basic concepts of Attacking Data Stores.

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M. Tech in SCN

Vision of the Institute

To be a respected and most sought after engineering educational institution engaged in equipping individuals capable of building learning organizations in the new millennium.

Mission of the Institute

To develop competent students with good value systems and face challenges of the continuously changing world.

Vision of the Department

To meet the educational, research & service needs of the region through collaboration with academic, technical institutions, businesses, government agencies & cultural organizations, thereby, providing a platform that encourages students & faculty to continue their intellectual & professional growth.

Mission of the Department

To develop the best Information Science Professionals, who work creatively, communicate effectively & become technologically competent and also to mould them into good citizens by inculcating sense ethical values in them.

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Program Educational Objectives

Be capable of understanding, analyzing and applying current & emerging technologies to design and develop solutions to IT/ITES/Software/Telecom related problems and acquire value and employment.

To have sound foundation in mathematical, scientific and Information science engineering fundamentals necessary to formulate, solve and analyze practical problems and to prepare students for further studies and research.

Function effectively as individuals and team members in the workplace, growing into highly technical or project management and leadership roles, in various organizations.

Create an awareness of the life-long learning process, to communicate effectively, learn necessary tools to successfully identify and adapt to ever changing technologies, byethical means and code of professional practice.

Program Specific Objectives

Provide effective and efficient real time solutions with the application of knowledge in IT, ITES,

Demonstrate the ability to work in a team, with professional ethics, good communication and documentation skills in designing, implementation and management of software products and services, at optimal cost.

Proven capability to exchange views/concepts, incubate ideas and to carry out learning with zeal, to be aware of the state of art technologies and their development.

Course Name: (Advances in Computer Networks/18SCN12)

C112.1	List and classify network services, protocols and architectures, explain why they are layered.
C112.2	Choose key Internet applications and their protocols, and apply to develop their own applications (e.g., Client Server applications, Web Services) using the sockets API.
C112.3	Explain develop effective communication mechanisms using techniques like connection establishment, queuing theory, recovery Etc.
C112.4	Explain various congestion control techniques.

Course Name: (Information and Network Security/18SCN13)

C113.1	Analyze the vulnerabilities in any computing system and hence be able to design a security solution.
C113.2	Identify the security issues in the network and resolve it.
C113.3	Evaluate security mechanisms using rigorous approaches, including theoretical.

Course Name: C114. (Internet of Things/18SCN14)

C114.1	Develop schemes for the applications of IOT in real time scenarios
C114.2	Manage the Internet resources
C114.3	Model the Internet of things to business
C114.4	Understand the practical knowledge through different case studies
C114.5	Understand data sets received through IoT devices and tools used for analysis

Course Name: (Wireless Networks and Mobile Computing/18SCN151)

C115.1	Explain state of art techniques in wireless communication.
C115.2	Discover CDMA, GSM. Mobile IP, WImax
C115.3	Demonstrate program for CLDC, MIDP let model and security concerns

Course Name:(Multi-Core Architecture and Programming/18SCN152)

C115.1	Identify the limitations of ILP and the need for multicore architectures
C115.2	Define fundamental concepts of parallel programming and its design issues
C115.3	Solve the issues related to multiprocessing and suggest solutions
C115.4	Make out the salient features of different multicore architectures and how they exploit parallelism
C115.5	Demonstrate the role of OpenMP and programming concept

Course Name: (Social Network Analysis/18SCN153)

C115.1	Define notation and terminology used in network science.

C115.2	Demonstrate, summarize and compare networks.
C115.3	Explain basic principles behind network analysis algorithms.
C115.4	Analyzing real world network.

Course Name: (Cloud Security/18SCN154)

C115.1	Demonstrate the growth of Cloud computing, architecture and different modules of implementation.
C115.2	Evaluate the different types of cloud solutions among IaaS, PaaS, SaaS.
C115.3	Access the security implementation flow, actions and responsibilities of stake holders.
C115.4	Generalize the Data Centre operations, encryption methods and deployment details.
C115.5	Provide recommendations for using and managing the customer's identity and choose the type of virtualization to be used.

Course Name: (Computer Networks and IOT Laboratory/18SCNL16)

C116.1	Apply key Internet applications and their protocols, and ability to develop their own applications (e.g., Client Server applications, Web Services) using the sockets API.
C116.2	Design and evaluate application layer protocol
C116.3	Analyze the vulnerabilities in any computing system and hence be able to design a security solution.
C116.4	Identify the security issues in the network and resolve it.
C116.5	Evaluate security mechanisms using rigorous approaches, including theoretical.

Course Name:(Multimedia Communications/18SCN21)

C121.1	Deploy the right multimedia communication models.
C121.2	Apply QoS to multimedia network applications with efficient routing techniques.
C121.3	Solve the security threats in the multimedia networks.
C121.4	Develop the real-time multimedia network applications

Course Name: (Network Programming/18SCN22)

C122.1	Develop applications that communicate with each other using TCP and SCTP.
C122.2	Identify the IPv4 and IPv6 compatibility.
C122.3	Evaluate socket programming APIs

Course Name: (Wireless Ad-Hoc Networks/18SCN23)

C123.1	Design their own wireless network
C123.2	Evaluate the existing network and improve its quality of service
C123.3	Choose appropriate protocol for various applications

C123.4	Examine security measures present at different level
C123.5	Analyze energy consumption and management

Course Name: (Advances in Storage Area Networks/18SCN241)

C124.1	Identify the need for performance evaluation and the metrics used for it
C124.2	Apply the techniques used for data maintenance.
C124.3	Realize strong virtualization concepts
C124.4	Develop techniques for evaluating policies for LUN masking, file systems

Course Name: (Switching & Statistical Multiplexing in Telecommunications/18SCN242)

C124.1	Explain basics of telecommunications and digital form
C124.2	Elaborate switching and multiplexing, telecommunication.
C124.3	Illustrate transmission control in telecommunication
C124.4	Design and develop switching, multiplexing and traffic control.

Course Name: (Ethernet Technology/18SCN243)

C124.1	Classify different types of Ethernet systems
C124.2	Contrast Ethernet Media systems
C124.3	Evaluate a complete Ethernet system

Course Name: (Mobile Application Development/18SCN244)

C124.1	Describe the requirements for mobile applications
C124.2	Explain the challenges in mobile application design and development
C124.3	Develop design for mobile applications for specific requirements
C124.4	Implement the design using Android SDK
C124.5	Implement the design using Objective C and iOS
C124.6	Deploy mobile applications in Android and iPone marketplace for distribution

Course Name: (Wireless Sensor Networks/18SCN251)

C125.1	Explain existing applications of wireless sensor actuator networks
C125.2	Apply in the context of wireless sensor networks and explain elements of distributed computing and network protocol design
C125.3	Contrast Various hardware, software platforms that exist for sensor networks
C125.4	Summarize various network level protocols for MAC, routing, time synchronization, aggregation, consensus and distributed tracking

Course Name: (Managing Big Data/18SCN252)

C125.1	Describe big data and use cases from selected business domains
C125.2	Explain NoSQL big data management

C125.3	Install, configure, and run Hadoop and HDFS
C125.4	Perform map-reduce analytics using Hadoop
C125.5	Use Hadoop related tools such as HBase, Cassandra, Pig, and Hive for big data Analytics

Course Name: (Network Management/18SCN253)

C125.1	Analyze the issues and challenges pertaining to management of emerging network technologies such as wired/wireless networks and high-speed internets.
C125.2	Apply network management standards to manage practical networks
C125.3	Formulate possible approaches for managing OSI network model.
C125.4	Use on SNMP for managing the network
C125.5	Use RMON for monitoring the behavior of the network
C125.6	Identify the various components of network and formulate the scheme for the managing them

Course Name: (Advances in Operating Systems/18SCN254)

C125.1	Demonstrate the Mutual exclusion, Deadlock detection and agreement protocols of Distributed operating system.
C125.2	Learn the various resource management techniques for distributed systems
C125.3	Identify the different features of real time and mobile operating system
C125.4	Modify existing open-source kernels in terms of functionality or features used

Course Name: (Cloud Computing/18SCN31)

C231.1	Compare the strengths and limitations of cloud computing
C231.2	Identify the architecture, infrastructure and delivery models of cloud computing
C231.3	Apply suitable virtualization concept.
C231.4	Choose the appropriate cloud player
C231.5	Address the core issues of cloud computing such as security, privacy and interoperability
C231.6	Design Cloud Services

Course Name: (Computer Systems Performance Analysis /18SCN321)

C232.1	Identify the need for performance evaluation and the metrics used for it
C232.2	Implement Little's law and other operational laws
C231.3	Apply the operational laws to open and closed systems
C232.4	Use discrete-time and continuous-time Markov chains to model real world systems
C232.5	Develop analytical techniques for evaluating scheduling policies

Course Name: (Network Routing Algorithms/18SCN322)

C232.1	Given the network and user requirements and the type of channel over which the network has to operate, the student would be in a position to apply his knowledge for identifying a suitable routing algorithm, implementing it and analyzing its performance.
C232.2	The student would also be able to design a new algorithm or modify an existing algorithm to satisfy the evolving demands in the network and by the user applications.

Course Name: (Information Security Policies in Industry/18SCN323)

C232.1	Explain the content, need, and responsibilities of information security policies.
C232.2	Explain the standards, guidelines, Procedures, and key roles of the organization.
C231.3	Able to write policy document for securing network connection and interfaces.
C232.4	Explain the threats to the stored data or data in transit and able to write policy document.
C232.5	Able to write, monitor, and review policy document.

Course Name: (Machine Learning Techniques/18SCN324)

C232.1	Choose the learning techniques with this basic knowledge.
C232.2	Apply effectively neural networks and genetic algorithms for appropriate applications.
C231.3	Apply Bayesian techniques and derive effectively learning rules.
C232.4	Choose and differentiate reinforcement and analytical learning techniques

Course Name: (Analysis of Computer Networks/18SCN331)

C233.1	List and classify network services, protocols and architectures, explain why they are layered.
C233.2	Implement key Internet applications and their protocols, and will apply to develop their own applications (e.g., Client Server applications, Web Services) using the sockets API.

Course Name: (Protocol Engineering/18SCN332)

C233.1	Describe the requirements for protocol engineering systems
C233.2	Explain the challenges in designing protocol engineering systems
C233.3	Implement the design using SDL

Course Name: (Web Engineering/18SCN333)

C233.1	Ability to Model the requirements of a web application.
C233.2	Contrast technology-aware Web Application.
C233.3	Ability to analyze the performances of web applications

Course Name: (Web Mining/18SCN334)

C233.1	Identify the application areas for web content mining, web structure mining and web usage mining.
C233.2	Design to retrieval the web data
C233.3	Develop schemes to crawl the web data, organize and index
C233.4	Cluster the documents for fast access
C233.5	Develop algorithms used by web mining applications.
C233.6	Select between different approaches and techniques of web mining

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M. Tech in Structural Engineering

Vision of the Institute

To be a respected and most sought after engineering educational institution engaged in equipping individuals capable of building learning organizations in the new millennium.

Mission of the Institute

To develop competent students with good value systems and face challenges of the continuously changing world.

Vision of the Department

To impart very high-quality education to the students to make them do innovative sustainable engineering relevant to industry and people at large.

Mission of the Department

Mission 1. To emphasize on basics of engineering as well as their applications relevant to the industry

Mission 2. To serve the society with due consideration of economy, ecology and ethical issues of nation.

Mission 3. To sensitize the students and faculty to take up research and consultancy to be on par with international standards.

Program Educational Objectives

Apply fundamental concepts of civil engineering in developing economically viable and sustainable sound solutions.

To work collaboratively on multidisciplinary problems

To achieve their professional aims keeping good ethics

Program Specific Objectives

PSO 1: Graduates will be able to apply technical skills and modern engineering tools for civilengineering day to day practice.

PSO 2: Graduates will be able to participate in critical thinking and problem solving of civiL engineering field that requires analytical and design requirements

PSO 3: Graduates will be able to participate in critical thinking and problem solving of civil engineering field that requires analytical and design requirements.

Program Outcomes

1. Engineering knowledge: Apply the knowledge of mathematics, science, engineering fundamentals, and an engineering specialization to the solution of complex engineering problems.

2. Problem analysis: Identify, formulate, review research literature, and analyze complex engineering problems reaching substantiated conclusions using first principles of mathematics, natural sciences, and engineering sciences.

3. Design/development of solutions: Design solutions for complex engineering problems and design system components or processes that meet the specified needs with appropriate consideration for the public health and safety, and the cultural, societal, and environmental considerations.

4. Conduct investigations of complex problems: Use research-based knowledge and research methods including design of experiments, analysis and interpretation of data, and synthesis of the information to provide valid conclusions.

5. Modern tool usage: Create, select, and apply appropriate techniques, resources, and modern engineering and IT tools including prediction and modeling to complex engineering activities with an understanding of the limitations.

6. The engineer and society: Apply reasoning informed by the contextual knowledge to assess societal, health, safety, legal and cultural issues and the consequent responsibilities relevant to the professional engineering practice.

7. Environment and sustainability: Understand the impact of the professional engineering solutions in societal and environmental contexts, and demonstrate the knowledge of, and need for sustainable development.

8. Ethics: Apply ethical principles and commit to professional ethics and responsibilities and norms of the engineering practice.

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11. Project management and finance: Demonstrate knowledge and understanding of the engineering and management principles and apply these to one's own work, as a member and leader in a team, to manage projects and in multidisciplinary environments.

12. Life-long learning: Recognize the need for, and have the preparation and ability to engage in independent and life-long learning in the broadest context of technological change.

Course Name: C101 Computational Structural Mechanics 18CSE11

C101.1	Formulate force displacement relation by flexibility and stiffness method
C101.2	Analyze the plane trusses, continuous beams and portal frames by transformation approach
C101.3	Analyze the structures by direct stiffness method

Course Name: C102 Advanced Design of RC Structures 18CSE12

C102.1	Achieve Knowledge of design and development of problem-solving skills
C102.2	Understand the principles of Structural Design.
C102.3	Design and develop analytical skills.
C102.4	Summarize the principles of Structural Design and detailing
C102.5	Understands the structural performance

Course Name: C103 Mechanics of Deformable Bodies 18CSE13

C103.1	Achieve Knowledge of design and development of problem-solving skills.
C103.2	Understand the principles of stress-strain behavior of continuum
C103.3	Design and develop analytical skills.
C103.4	Describe the continuum 3- di in 2 and mensions
C103.5	Understand the concepts of elasticity and plasticity

Course Name:C105 Structural Dynamics18CSE15

C105.1	Achieve Knowledge of design and development of problem-solving skills.
C105.2	Understand the principles of Structural Dynamics
C105.3	Design and develop analytical skills.
C105.4	Summarize the Solution techniques for dynamics of Multi-degree freedom systems
C105.5	Understand the concepts of damping in structures.

Course Name:C106 Research Methodology and IPR 18RMI17

C106.1	Discuss research methodology and the technique of defining a research problem
C106.2	Explain the functions of the literature review in research, carrying out a literature search, developing theoretical and conceptual frameworks and writing a review.
C106.3	Explain various research designs, sampling designs, measurement and scaling techniques and also different methods of data collections
C106.4	Explain several parametric tests of hypotheses, Chi-square test, art of interpretation and writing research reports

C106.5	Discuss various forms of the intellectual property, its relevance and business impact in the changing global business environment and leading International Instruments concerning IPR.

Course Name: C111 Advanced Design of Steel Structures 18CSE21

C111.1	Able to understand behavior of Light gauge steel members
C111.2	Able to understand design concepts of cold formed/unrestrained beams
C111.3	Able to understand Fire resistance concept required for present days
C111.4	Able to analyze beam column behavior

Course Name: C112finite Element Method of Analysis 18CSE22

C112.1	Explain the basic theory behind the finite element method.
C112.2	Formulate force-displacements relations for 2-D elements
C112.3	Use the finite element method to analyze real structures.
C112.4	Use a Finite Element based program for structural analysis

Course Name:C113earthquake Resistant Structures 18CSE23

C113.1	Achieve Knowledge of design and development of problem-solving skills. Understand the principles of engineering seismology
C113.2	Design and develop analytical skills.
C113.3	Summarize the Seismic evaluation and retrofitting of structures
C113.4	Understand the concepts of earthquake resistance of reinforced concrete buildings.

Course Name: C114 Analysis and Design of Plates and Shells 18CSE241

C114.1	Achieve Knowledge of design and development of problem-solving skills.
C114.2	Understand the principles of Analysis and Design
C114.3	Design and develop analytical skills.
C114.4	Summarize the performance of shells
C114.5	Understand the concepts of energy principle

Course Name: C114 Course Name Design of Tall Structures 18CSE254

C115.1	Achieve Knowledge of design and development of problem-solving skills.
C115.2	Understand the principles of Analysis and Design
C115.3	Design and develop analytical skills.
C115.4	Summarize the performance of shells
C115.5	Understand the concepts of energy principle

Course Name: C211 Design of Bridges 18CSE31

C211.1	Achieve Knowledge of design and development of problem-solving skills.
C211.2	Understand the principles of Analysis and Design
C211.3	Design and develop analytical skills.
C211.4	Summarize the performance of shells
C211.5	Understand the concepts of energy principle

Course Name: C212 Design of Masonry Structure 18CSE332

C212.1	Achieve Knowledge of design and development of problem-solving skills.
C212.2	Understand the principles of design and construction of masonry structures
C212.3	Design and develop analytical skills.
C212.4	Summarize the masonry Characteristics.
C212.5	Evaluate the strength and stability of the masonry structures

Course Name: C204 Reliability Analysis of Structures 18CSE324

C212.1	Understand the concepts of statistics for probabilistic analysis and importance
C212.2	of uncertainty (randomness) in structural analysis and design.
C212.3	Apply the theoretical principles of randomness of variables in structural
C212.4	engineering through density functions.
C212.5	Analyze components of structure to assess safety using concepts related to structural reliability by various methods.

Course Name: C213 18CSE31Design Of Bridges

C213.1	Describe historical growth, select ideal site and bridge, calculate values of design parameters of slab culvert at critical section as per IRC, design and detailing required for the execution of the project.
C213.2	Carry out analysis of box culvert as per IRC to obtain the values of design parameters and to design and detail the components following IS code procedure.
C213.3	Demonstrate the use of Pigeauds Method and Courbon's Method in the analysis of T beam bridge as per IRC, design to obtain the safe dimensions various components, optimum reinforcement required following IS code procedure
C213.4	Analysis a balanced cantilever bridge as per IRC and to obtain the safe values of design parameters and to design and detail the components as per IS code procedure
C213.5	Display the use of Courbon's Method in the analysis of PSC bridge as per IRC, design to obtain the safe value of prestressing force, obtain the dimensions of various components to keep the stresses within codal provisions following IS code procedure.

Course Name: C214 18CSE323 Stability of Structures

C214.1	Achieve Knowledge of design and development of problem-solving skills
C214.2	Understand the principles of strength and stability

C214.3	Design and develop analytical skills
C214.4	Appraise the Stability analysis by finite element approach.
C214.5	Understand the concepts of lateral buckling of beams

Course Name: C215 18CSE332 Design of Masonry Structures

C215.1	Achieve Knowledge of design and development of problem-solving skills.
C215.2	Understand the principles of design and construction of masonry
C215.3	Design and develop analytical skills.
C215.4	Summarize the masonry Characteristics.
C215.5	Evaluate the strength and stability of the masonry structures.

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M. Tech in Machine Design

Vision of the Institute

To be a respected and most sought after engineering educational institution engaged in equipping individuals capable of building learning organizations in the new millennium.

Mission of the Institute

To develop competent students with good value systems and face challenges of the continuously changing world.

Vision of the Department

To become a center of excellence providing state of the art engineering education in mechanical engineering and making individual to be capable of building nation in the new millennium.

Mission of the Department

Mission 1: To provide an excellent teaching and learning process for the students to meet the needs and standards of the current industries and higher learning process.

Mission 2: To promote research and development activity in the recent emerging trends of the mechanical engineering department.

Mission 3: To provide the students with good communication skill, lifelong learning, team spirit and leadership qualities to face the current society.

Program Outcomes

1. Engineering knowledge: Apply the knowledge of mathematics, science, engineering fundamentals, and an engineering specialization to the solution of complex engineering problems.

2. Problem analysis: Identify, formulate, review research literature, and analyze complex engineering problems reaching substantiated conclusions using first principles of mathematics, natural sciences, and engineering sciences.

3. Design/development of solutions: Design solutions for complex engineering problems and design system components or processes that meet the specified needs with appropriate consideration for the public health and safety, and the cultural, societal, and environmental considerations.

4. Conduct investigations of complex problems: Use research-based knowledge and research methods including design of experiments, analysis and interpretation of data, and synthesis of the information to provide valid conclusions.

5. Modern tool usage: Create, select, and apply appropriate techniques, resources, and modern engineering and IT tools including prediction and modeling to complex engineering activities with an understanding of the limitations.

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in independent and life-long learning in the broadest context of technological change.

Course Name: C101 (Mathematical Method in Engg-18MDE11) (2019-20)

C101.1	To understand the course are to enhance the knowledge of various methods in finding the roots of an algebraic
C101.2	To understand Transcendental or simultaneous system of equations
C101.3	To solve Numerical Integration: Newton –Cotes and Guass Quadrature Integration formulae, Integration of Equations, Romberg integration
C101.4	To solve Direct methods, Cramer's Rule, Gauss Elimination Method, Gauss-Jordan Elimination Method
C101.5	To evaluate integrals numerically and differentiation of complex functions with a greater Accuracy. These concepts occur frequently in their subjects like finite element method
C101.6	To Analysis for direct methods, Iteration Methods.

Course Name: C102 (Advanced Theory of vibrations-18MDE12)

C102.1	To teach students how to use the theoretical principles of vibration, and vibration analysis techniques, for the practical solution of vibration problems
C102.2	To understand the concepts of Vibration Measurement and applications, Modal analysis & Condition Monitoring
C102.3	To understand the concepts of Transient Vibration of single Degree-of freedom systems and Random vibrations
C102.4	To understand the concepts of Non-Linear Vibrations
C102.5	To understand the concepts of Continuous Systems
C102.6	To understand the importance of vibrations in mechanical design of machine parts subject to vibrations.

Course Name: C103 (Continuum Mechanics-18MDE13)

C103.1	To understand the analysis of stress
C103.2	To study the deformation and strain
C103.3	To understand the generalized Hooke's law
C103.4	Formulation of Two-Dimensional Electrostatic problems
C103.5	To understand the Basic equations of Viscoelasticity
C103.6	Continuum Mechanics background essential to mathematically model physical problems in Solid Mechanics

Course Name: C104 (Dynamics and Mechanism Design-18MDE14)

C104.1	To provide a theoretical and practical foundation for analysis and design of articulated mechanical systems for desired applications
C104.2	Develop skills to analyze the displacement, velocity, and acceleration of mechanisms
C104.3	Improve understanding of the synthesis of mechanisms for given tasks
C104.4	To include dynamics considerations in the design of mechanisms
	For engineering applications.

Course Name: C105 (Fracture Mechanics -18MDE15)

C105.1	Develop basic fundamental understanding of the effects of crack like defects on the performance of aerospace, civil and mechanical Engineering structures
C105.2	Learn to select appropriate materials for engineering structures to insure damage tolerance.
C105.3	Learn to employ modern numerical methods to determine critical crack sizes and fatigue crack propagation rates in engineering structures.
C105.4	To understand the concepts of Dynamics and crack arrest
C105.5	Provides a methodology for prediction, prevention and control of fracture in materials, components and structures.
C105.6	Gain an appreciation of the status of academic research in field of fracture mechanics

Course Name: C106 (Research Methodology and IPR-18RMI17)

C106.1	understand some basic concepts of research and its methodologies
C106.2	identify appropriate research topics
C106.3	select and define appropriate research problem and parameters
C106.4	prepare a project proposal (to undertake a project)
C106.5	organize and conduct research (advanced project) in a more appropriate manner

Course Name: C212 (Finite Element Methods -18MDE21)

C212.1	Knowledgeable about the FEM as a numerical method for the solution of solid mechanics, structural mechanics and thermal problems
C212.2	To present Finite element formulation using variational and weighted residual approaches
C212.3	To present Finite elements for the analysis of bars & trusses, beams & frames.
C212.4	To present Finite elements for the analysis of plane stress & plane strain problems and 3-D solids.
C212.5	To present Finite elements for the analysis of thermal and dynamics problems

C212.6	Developing skills required to use a commercial FEA software

Course Name: C213 (Tribology and Bearing Design -18MDE23)

C213.1	Focuses regarding hydrodynamic, hydrostatic lubrication and various bearings, with their design and applications
C213.2	To understand the concepts of Reynolds's 2D equation
C213.3	To understand the concepts of EHL Contacts
C213.4	To understand the concepts of Antifriction bearings
C213.5	To understand the concepts of Magnetic Bearings
C213.6	To develop skills to design and selection of bearings on various tribological factors to be considered in moving and rotating parts.

Course Name: C213 (Rotor Dynamics-18MDE243)

C214.1	To understand the rotor dynamics phenomena with the help of simple rotor models and subsequently the modern analysis methods for real life rotor systems.
C214.2	To understand modeling of bearings, shafts and rotor stages (compressors, turbines including blades) to predict instability like whirling including gyroscopic and Corialis effect.
C214.3	Provides the student understanding of modeling rotating machine elements theoretically.
C214.4	Upon completion of this course, students will have gained an understanding of the design, application
C214.5	Upon completion of this course, students will have gained an understanding of the reliability evaluation of bearings in rotating machinery applications.

Course Name: C215 (Automobile System Design- 18MEA252)

C215.1	To understand of the stages involved in automobile system design.
C215.2	To expose industrial practices in design of various systems of an automobile.
C215.3	To study importance and features of different systems like axle, differential, brakes, Steering, suspension, and balancing etc.
C215.4	To study working of various Automobile Systems.
C215.5	To know some modern trends in Automotive Vehicles.

Course Name: C215 (Design for manufacture and Assembly- 18MDE31)

C311.1	To understand various general design rules for manufacturability and criteria for material selection
C312.2	To study various machining process and tolerance aspects in machining.
C313.3	To know the design considerations for casting, forging and welding process.

C314.4	To study the general design guidelines for manual assembly and development of DFA Methodology.
C315.5	Select proper materials and manufacturing processes for designing products/components by applying the relevant principles for ease and economic 36 production.

Course Name: C311 (Experimental Mechanics-18CAE321)

C311.1	To introduce the concepts of dynamic measurements and analysis of experimental data.
C312.2	To expose them to the techniques of Data Acquisition, Signal conditioning and processing.
C313.3	To introduce students to different aspects of measuring deformation, strains, and stresses for developing a mechanistic understanding of both the material and the structure behavior.
C314.4	To familiarize the student with state-of-the-art experimental techniques employing strain gauges, photoelasticity, Mo reinters of ergometry, brittle coating, Moiré fringes and holography.
C315.5	Apply the principles and techniques of holographic interferometry.

Course Name: C312 (Composite Materials Technology-18MDE332)

C311.1	To impart a basic understanding of micro-mechanics of layered composites, analysis and design of composite structures and failure analysis of laminated panels.
C312.2	To understand the principles, matrix and reinforcement material options, advantages and disadvantages of different manufacturing techniques of composites.
C313.3	To comprehend recent developments in composites, including metal, ceramic and polymer matrix composites.
C314.4	To know the use of composites in engineering applications.
C315.5	Analyze the performance of composites in engineering applications.

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M. Tech in Thermal Power Engineering

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C101.5	To evaluate integrals numerically and differentiation of complex functions with a greater Accuracy. These concepts occur frequently in their subjects like finite element method
C101.6	To Analysis for direct methods, Iteration Methods.

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C102.2	To present Finite element formulation using variational and weighted residual approaches
C102.3	To present Finite elements for the analysis of bars & trusses, beams & frames.
C102.4	To present Finite elements for the analysis of plane stress & plane strain problems and 3-D solids.
C102.5	To present Finite elements for the analysis of thermal and dynamics problems
C102.6	Developing skills required to use a commercial FEA software

Course Name: C103 (Advanced Fluid Mechanics-18MTP13)

C103.1	Explain the basic concepts fluid flow and their governing equations
C103.2	Understand the concepts in the analysis of fluid flow problems in laminar and Turbulent flows
C103.3	Formulate and solve one dimensional incompressible and compressible fluid flow problems
C103.4	Distinguish normal and oblique shocks and their governing equations.
C103.5	Identify relevant instruments and methods for flow measurements

Course Name: C104 (Thermodynamics &Combustion Engineering-18MTP14)

C104.1	Understand the concepts of combustion phenomena in energy conversion devices.

C104.2	Apply the knowledge of adiabatic flame temperature in the design of combustion devices.
C104.3	Identify the phenomenon of flame stabilization in laminar flames.
C104.4	Identify the phenomenon of flame stabilization in turbulent flames.
C104.5	Analyze the pollution formation mechanisms in combustion of solid, liquid and
	gaseous fuels.

Course Name: C105 (Energy Conservation and Management-18MTP15)

C105.1	Understand the various conservation techniques
C105.2	Explain various Energy Efficiency Improvement technique
C105.3	Employ the principles of thermal engineering and energy management to improve the performance of thermal systems.
C105.4	Assess energy projects on the basis of economic and financial criteria.
C105.5	Describe methods of energy production for improved utilization

Course Name: C107 (Thermal Engineering measurement - Lab 1-18RMI17)

C106.1	Perform experiments to determine the coefficient of discharge of flow measuring devices.
C106.2	Conduct experiments on hydraulic turbines and pumps to draw characteristics.
C106.3	Test basic performance parameters of hydraulic turbines and pumps and execute the knowledge in real life situations.
C106.4	Identify exhaust emission, factors affecting them and report the remedies.
C106.5	Determine the energy flow pattern through the hydraulic machines and I C Engine
C106.6	Exhibit his competency towards preventive maintenance of IC engines.

Course Name: C107 (Research Methodology and IPR-18RMI17)

C107.1	understand some basic concepts of research and its methodologies
C107.2	identify appropriate research topics
C107.3	select and define appropriate research problem and parameters
C107.4	prepare a project proposal (to undertake a project)
C107.5	organize and conduct research (advanced project) in a more appropriate manner

Course Name: C212 (Advanced Heat Transfer- 18MTP21)

C212.1	Summarize both the physics and the mathematical treatment of the advanced topics pertaining to the modes of heat transfer.
C212.2	Use principles of heat transfer to develop mathematical models for uniform and non-uniform fins.

C212.3	Employ mathematical functions and heat conduction charts in tackling two-dimensional and three-dimensional heat conduction problems.
C212.4	Identify free and forced convection problems involving complex geometries with proper boundary conditions.
C212.5	Use the concepts of radiation heat transfer for enclosure analysis.

Course Name: C213 (Steam &Gas Turbines- 18MTP22)

C213.1	Summarize the working principles of Gas and steam turbines nozzle and diffusers.
C213.2	Use the principles of thermodynamics to determine the performance of steam and gas turbines.
C213.3	Distinguish and demonstrate the working principle and performance of impulse and reaction turbines
C213.4	Explain the concepts of axial flow and centrifugal compressors
C213.5	Differentiate axial flow and radial flow gas turbines for their analysis.

Course Name: C213 (Alternate Fuels for 1C Engines- 18MTP243)

C214.1	Explain about the availability and usage of conventional fuels for IC engines.
C214.2	Identify possible alternative fuels for IC engines.
C214.3	Demonstrate the use of alternative fuels for different types of engines
C214.4	Assess the environmental impact standards
C214.5	Performance using alternate fuels.

Course Name: C215 (Theory of 1C Engines- 18MTP251)

C215.1	Distinguish different Fuel-air and actual cycles.
C215.2	Demonstrate the different types of injection and carburetor systems
C215.3	Formulate the flow and combustion phenomenon for modeling
C215.4	Identify the various types of emissions, noise and their control systems
C215.5	Recommend the suitable alternative fuel for IC Engine.

Course Name: C215 (Simulation Laboratory Projects on Thermal Engineering - Lab 2-18MTPL26

C311.1	Explain the basic principles and concepts underlying in modeling techniques
C312.2	Explain the basic principles and concepts underlying in simulation techniques
C313.3	Optimize the design of thermal systems.
C314.4	Develop representational modes of real processes and systems.
C315.5	Generate suitable modeling techniques to compute the performance.

Course Name: C311 (Design of heat Transfer Equipment's for thermal power Plant -18CAE321)

C311.1	Understand the physics and the mathematical treatment of typical heat exchangers.

C312.2	Employ LMTD and Effectiveness methods in the design of heat exchangers and analyze the importance of LMTD approach over AMTD approach.
C313.3	Examine the performance of double-pipe counter flow (hair-pin) heat exchangers.
C314.4	Design and analyze the shell and tube heat exchanger.
C315.5	Understand the fundamental, physical and mathematical aspects of boiling and condensation.
C316.6	Classify cooling towers and explain their technical features.

Course Name: C312 (Convective Heat and Mass Transfer- 18MTP321

C311.1	Understand the fundamental and advanced principles of forced and natural convection heat transfer processes.
C312.2	Formulate and solve convective heat transfer problems
C313.3	Relate the principles of convective heat transfer to estimate the heat dissipation from devices.
C314.4	Estimate the energy requirements for operating a flow system with heat transfer.
C315.5	Relate to the current challenges in the field of convective heat transfer.

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2020-21
Department of Automobile Engineering

Vision of the Institute

To be a respected and most sought after engineering educational institutions engaged in equipping individuals capable of building learning organizations in the new millennium.

Mission of the Institute

To develop competent students with good value systems and face challenges of the continuously changing world.

Vision of the Department

To establish the department as a renowned center of excellence in the area of scientific education, research with industrial guidance and exploration of the latest advances in the rapidly changing field of Automobile Engineering.

Mission of the Department

Mission 1. The Department will serve its students, industry and society by fulfilling the mission of learning, and engagement through the creation, dissemination and application of engineering methods.

Mission 2. Encourage students to continuously challenge the existing methods in Automobile Engineering with an intention to align the students towards research.

Mission 3. Impart knowledge on practical aspects and professional standards relevant to the practice of Automobile Engineering in the many aspects of modern life where it plays a vital role.

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Program Educational Objectives

PEO	Graduates shall display technical knowledge in basic Mechanical and Automobile Engineering subject areas enabling them to find career opportunities in relevant government agencies, reputed private firms.
PEO 2.	Graduates shall gain practical knowledge in the working of Automobile Systems, capable of working on indigenous projects, ventures related to automotive discipline.
PEO 3.	Graduates shall be well versed with the academic learning material of the course syllabus and ready to take up further learning through higher education and scientific research.
	Graduates shall be well equipped with the requirements of the current industries to obtain job opportunities in Mechanical and Automotive sectors in the design, Manufacturing, Analysis domains.

Program Specific Objectives

PSO1. Graduate will demonstrate the knowledge to design, develop, implement, and use same into various domains to identify cause and hence provide solutions in the automotive field.

PSO2. Graduate to work in interdisciplinary environment to design systems with the future emission norms and safety standards in automobile sector.

PSO3. Graduate will be able to pursue of lifelong learning and professional development to face the challenging and emerging needs of our society.

Course Name: (Engineering Mathematics III-8MAT31)

CO-1	Know the use of periodic signals and Fourier series to analyze circuits and system communications.
CO-2	Explain the general linear system theory for continuous-time signals and digital signal processing using the Fourier Transform and z-transform.
CO-3	Employ appropriate numerical methods to solve algebraic and transcendental equations
CO-4	Apply Green's Theorem, Divergence Theorem and Stokes' theorem in various applications in the field of electro-magnetic and gravitational fields and fluid flow problems.
CO-5	Determine the extremals of functionals and solve the simple problems of the calculus of variations.

Course Name: (Engineering Thermodynamics-18AU32)

CO-1	Explain different types of material crystal structures and arrangement of atoms.
CO-2	Describe various mechanical properties of materials.
CO-3	Describe about different types of fractures and their importance in engineering. applications.
CO-4	Draw and Interpret TTT curves and Iron carbon diagram
CO-5	Identify various ferrous metals and nonferrous metals and alloys based on composition and properties
CO-6	Describe about different types of composite materials and their production and application in engineering field

Course Name: (Material Science And Metrology-18AU33)

CO-1	Define and explain fundamental thermodynamic laws and concepts, work, various types of works and heat and its applications, entropy and its relations, Zeroth, First & Second law of thermodynamics and its applications.
CO-2	Explain various thermodynamic relations, constants of gas and basics of ideal gas & its mixtures.
CO-3	Calculate load and IP, BP and other performance characteristics of I.C. engines.
CO-4	Explain the selection of air conditioning system; evaluate thermal performance of refrigeration cycles.
CO-5	Calculate efficiency and MEP of various gas power & vapor power cycles.
CO-6	Explain the principles of gas turbine & jet propulsion system and their fuels

Course Name: (Mechanics of Materials-18AU34)

CO-1	Explain the concepts of stress, strain; material properties.
CO-2	Explain the behavior of materials under different loading conditions
CO-3	Calculate SF and BM and draw the SF and BM diagrams types of beams carrying different types of loads.
CO-4	Explain the concepts of torque and calculate the diameter of hollow and solid shafts subjected to twisting moment.
CO-5	Stresses & angle of twist induced into the shaft due to twisting.
CO-6	Calculate Critical load for different types of columns using Euler's, Rankine's equations & limitations of these equations and explain the applications.

Course Name: (MMM-18AU35)

CO-1	Explain the significance of mechanical measurements and components of a generalized measurement system.
CO-2	Classify and explain principles of various types of transducers, modifying devices and terminating devices.
CO-3	Explain the working principle of instruments used for measurement of Force, Torque, Pressure, Temperature, Strain and Vibration
CO-4	Classify the comparators and explain their working principles.
CO-5	Explain the objectives of metrology and explain various standards of length such as line and end standards
CO-6	Explain the usage of instruments used for the measurement of screw thread and gear parameters.

Course Name: (Manufacturing Process-I-18AU36)

CO-1	Define various terminologies used in casting process.
CO-2	Explain basic concepts used in construction of various moulds.
CO-3	Analyze the working of various moldings machines.
CO-4	Select the appropriate moulding machine and moulding process depending on the type of raw material required to produce the desired product
CO-5	Select the appropriate joining process depending on the type of joint required to produce the desired product.
CO-6	Select the Non-Destructive Testing method for application

Course: Dynamics of Machines-17AU52

CO-1	Calculate static forces at various points in different types of mechanism
CO-2	Calculate fluctuation of energy in flywheel and dimensions of flywheel

CO-3	Balance rotating masses and of reciprocating masses in internal combustion engine, V engine, radial engine and to solve analytically and graphically to balance the systems
CO-4	Describe gyroscopic couple and to understand effect of gyroscopic couple
CO-5	Calculate gyroscopic effect on stability of vehicles, ship, aircraft etc.
CO-6	Analyze effect of profile of cam on motion of followers

Course Name: Design of Machine Elements 1-17AU53

CO-1	To know the Standards in Design, Selection of materials as per CODES & STANDARDS
CO-2	Analyze the various modes of failure of machine components under different static load conditions and use appropriate theories of failures
CO-3	To understand the Impact stresses for machine components, Fatigue stress analysis stress concentration
CO-4	To evaluate dimensions of shafts and other simple machine components
CO-5	Able to understand design of joints like welded and riveted joints
CO-6	Terminologies and Design of threaded joints and power screws

Course Name: Automotive Fuels & Combustion-17AU54

CO-1	Introduce understanding about available energy sources for ICE
CO-2	Distinguish between properties of difference fuels
CO-3	Determine the A/F ratio for complete combustion
CO-4	Explain and differentiate between multi fuel and dual fuel engines
CO-5	Design SI& CI engine combustion chambers
CO-6	Explain stages of combustion in S.I. & C.I. engines

Course Name: (CAD/CAM)17AU551

CO-1	Use the Solid Edge software for drawing and solid modeling.
CO-2	Sketch the solutions of the sections of solids, determine the inclination of the cutting plane when true shape of section of an object is given.
CO-3	Sketch and draw the orthographic views of simple machine parts (top view, front view, side view) using first angle projection. • Sketch and draw the sectional views of simple machine parts.
CO-4	Sketch and draw ISO metric threads, Square, ACME & BSW forms of threads using conventional representation.
CO-5	Distinguish between temporary and permanent joints and sketch and draw the different types of keys. • Sketch and draw two views of different types of riveted joints

C0-6	Create solid models of different parts and assemble them and draw their sectional views using Solid Edge software. • Prepare assembly drawings along with their bill of material.

Course Name: (AE & ES)-15AU71

CO-1	Explain the construction of battery used in automotive vehicles.
CO-2	Describe the construction and working of cranking motor, D. C. generator, alternator, ignition systems along with trouble shooting.
CO-3	Discuss the faults arising in automotive wiring and lighting system.
CO-4	Explain various chassis electrical systems.
CO-5	Describe transducers and sensors.
CO-6	Explain various aspects of electrical and Hybrid vehicles.

Course Name: (Automotive Engine Component Design & AS-15AU72

CO-1	Calculate major dimensions of engine components like cylinder, piston, connecting rod, crankshaft, valve and valve operating mechanisms.
CO-2	Analyze working of two stroke engines.
CO-3	Select suitable scavenging process for two stroke engines.
CO-4	Select suitable lubricant and lubrication system for given engine
CO-5	Calculate amount coolant required and select suitable cooling system for given engine.
CO-6	Explain need for supercharger and modifications required in engine for supercharging.

Course Name: (Finite Element Modelling & Analysis) -15AU73

CO-1	The question paper will have ten questions
CO-2	Each full question consists of 16 marks
CO-3	There will be 2full questions (with a maximum of four sub questions) from each module.
CO-4	Each full question will have sub questions covering all the topics under a module.
CO-5	The students will have to answer 5 full questions, selecting one full question from each module.

Course Name: (Earth Moving Equipment & Tractors) -15AU741

CO-1	Gain the knowledge about various basic operations and applications of earth moving equipment.
CO-2	Acquire the knowledge of under carriage, hydraulics, steering of tractors.
CO-3	Get the complete information about the earth moving equipment
CO-4	Select suitable machine depending on type of land, haul distance, climate, etc.

Course Name: (Two & Three Wheeled Vehicle)-15AU754

CO-1	Describe construction and working of different type of internal combustion engines for two and three wheeled vehicles.
CO-2	Laydown wiring diagram for two-wheeler and three wheeled vehicles.
CO-3	Explain types of clutches, transmission and final drives used for two and three wheeled vehicles.
CO-4	Describe types of frames, brakes and tires used for two and three wheeled vehicles.
CO-5	Laydown maintenance schedule for two and three wheeled vehicles.

Course Name: (CP & SM)-18MAT41

CO-1	Solve first and second order ordinary differential equation arising in flow problems using single step and multistep numerical methods.
CO-2	Illustrate problems of potential theory, quantum mechanics and heat conduction by employing notions and properties of Bessel's functions and Legendre's polynomials.
CO-3	Explain the concepts of analytic functions, residues, poles of complex potentials and describe conformal and Bilinear transformation arising in field theory and signal processing.
CO-4	Develop probability distribution of discrete, continuous random variables and joint probability distribution occurring in digital signal processing, information theory and design engineering.
CO-5	. Demonstrate testing of hypothesis of sampling distributions and illustrate examples of Markov chains related to discrete parameter stochastic process.

Course Name: (Fluid Mechanics) 18AU42

CO-1	Define fluid properties and distinguish between types of fluids. • Describe Pascal's law, Hydrostatic law & their application to solve engineering static fluid problems.
CO-2	Explain the concepts of Buoyancy and stability of floating objects. • Explain the types of flows, application of continuity equations.
CO-3	Explain the forces acting when fluid is under motion & application of Bernoulli's equation for solving flow problems
CO-4	Estimate the various types of losses in pipes.
CO-5	Analyze various forces acting on submerged bodies in engineering flow problems.

Course Name: (Kinematics of Machine) 18AU43

CO-1	Define and explain the terms such as Link, Kinematic chain, Kinematic pair, types of pairs, degree freedom, Mechanism, Machine Mobility.
CO-2	Sketch and explain various types of mechanisms, and their inversions.
CO-3	Draw Velocity and Acceleration of simple mechanisms using Instantaneous center method, Analytical and Graphical methods.

CO-4	Explain the Gear terminology, Law of gearing, gear tooth systems
CO-5	Determine the velocity ratio of different types of gear trains using tabular and algebraic methods
CO-6	To draw cam profile and calculate the velocity and acceleration of cams at any given instant.

Course Name: (Automotive Engines) :18AU44

CO-1	Explain the constructional details of SI and CI engines and classify engines.
CO-2	Explain the construction and working of carburetors and fuel injection pumps.
CO-3	Explain the combustion process in SI and CI engines.
CO-4	Suggest an efficient cooling system for IC engines.
CO-5	Select a proper lubricant to be used in an automobile used in various environmental conditions.

Course Name: (Computer Aided Machine Drawing) 18AU46

CO-1	Use the Solid Edge software for drawing and solid modeling.
CO-2	Sketch the solutions of the sections of solids, determine the inclination of the cutting plane when true shape of section of an object is given.
CO-3	Sketch and draw the orthographic views of simple machine parts (top view, front view, side view) using first angle projection. • Sketch and draw the sectional views of simple machine parts.
CO-4	Sketch and draw ISO metric threads, Square, ACME & BSW forms of threads using conventional representation.
CO-5	Distinguish between temporary and permanent joints and sketch and draw the different types of keys. • Sketch and draw two views of different types of riveted joints
C0-6	Create solid models of different parts and assemble them and draw their sectional views using Solid Edge software. • Prepare assembly drawings along with their bill of material.

Course Name: (Manufacturing Process-II) 18AU45

CO-1	Define various terminologies used in production technology.
CO-2	Explain basic concepts used in construction of various machine tools.
CO-3	Analyze the various mechanisms underlying the working of various machine tools.
CO-4	Select the appropriate machining process depending on the properties of the raw material required to produce the desired product.
CO-5	Select non-traditional machining process for given application.

Course Name: Automotive Chasis & Suspension):17AU61

CO-1	Explain different chassis layouts and frames and solve for stability and weight distribution and suitability cross sections for frames.
CO-2	Describe various Front Axles, factors of wheel alignment Steering Systems and Calculate dimensions of Front Axle.
CO-3	Describe various types of Propeller Shaft, Differential and Rear axles and can find dimensions of these components.
CO-4	Select type of brake required to given application and will be able to calculate basic dimension of brakes.
CO-5	Describe, About Various Types of Suspensions, Wheels, and Tires
Co-6	Calculate dimensions of different suspensions.

Course Name: (Heat and Mass Transfer) 17AU62

CO-1	Demonstrate fundamental principles and laws of conduction, convection, and radiation modes of heat transfer.
CO-2	Analyze one dimensional steady state heat transfer. Analyze one dimensional one-dimensional unsteady state heat transfer
CO-3	Analyze one dimensional forced convection heat transfer problems.
CO-4	Analyze one dimensional application like flow over flat plate etc.
CO-5	Introduce basic principle of heat exchanger analysis and thermal design.
Co-6	Apply laws of radiation heat transfer to solve engineering problems.

Course Name: (Design of Machine Elements-II) 17AU63

CO-1	Design the curved beams using the equations of stress.
CO-2	Design helical spring and leaf spring using the equations of stress and deflection.
CO-3	Design the spur gears and helical gears using different parameters and check the gears for dynamic and wear load.
CO-4	Design sliding contact and rolling contact bearings to find coefficient of friction, heat generated, heat dissipated and average life of bearings.
CO-5	Design the various types of bevel gears and worm gears for dynamic and wear load using various parameters.
Co-6	Analyze and design given machine components and present their designs in the form of a Report.

Course Name: (Automotive Transmission) :17AU64

CO-1	Explain the Constructional, design and working principles of different types of clutches.
CO-2	Explain the constructional and working principle of different types of fluid flywheel, torque converter and one-way clutches.
CO-3	Explain the constructional and working principle of different types of gear box.
CO-4	Determine the gear ratio, speed of vehicle and number of teeth on driving and driven gears.
CO-5	Explain the necessity and advantages of automatic transmission.
Co-6	Explain the constructional and principle of operation of different types of automatic transmissions and hydraulic control.

Course Name: (Composite Materials) 17AU653

CO-1	Describe basic concepts of composite materials and application of composite materials in various engineering fields.
CO-2	Describe various FRP processing.
CO-3	Describe selection, requirements for production and application of MMCs.
CO-4	Describe concepts of nano materials, nano technology and use of nano materials.
CO-5	Use various techniques used for MMCs production.
Co-6	Analyze micro mechanical properties of lamina using various approaches.

Course Name: (Vehicle Body Engineering & Safety15AU81

CO-1	Classify the vehicles and define basic terms.
CO-2	Select appropriate body material. 3. Calculate various aerodynamic forces and moments acting on vehicle.
CO-3	Calculate load distribution in vehicle body.
CO-4	Explain the ergonomics, stability the vehicle.
CO-5	Identify the various safety aspects in each vehicle.
Co-6	Identify various sources of noise and methods of noise separation

Course Name: (Mechanical Vibration:15AU82

CO-1	Classify different types of vibration / damping associated with systems and vibration measuring instruments.
CO-2	Calculate natural frequency, damping, logarithmic decrement, and other parameters of single degree of freedom un-damped / damped free vibrating systems
CO-3	Compute the response of single degree of freedom damped vibrating systems to different excitation forces.

CO-4	Determine the natural frequencies and the modes of two degree of freedom free vibrating systems
CO-5	Compare the natural frequencies / modes of multi-degree of freedom free vibrating systems using numerical methods

Semester: (Total Quality Management15AU831

CO-1	Explain basic concepts of TQM.
CO-2	Describe leadership qualities, different factors of customer satisfaction and benefits of involvement of employee in quality management
CO-3	Describe various techniques for continuous process improvement and to understands its benefits
CO-4	Apply various tools and techniques in industries to achieve the higher productivity
CO-5	Describe importance of HR dept. recruitment process, importance of training of employees
Co-6	Understand use of various graphical representation of process behavior in TQM

CHILDREN'S EDUCATION SOCIETY (Regd.)
THE OXFORD COLLEGE OF ENGINEERING
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DEPARTMENT OF BIOTECHNOLOGY

Vision of the Department

Aspiring to be recognized as a premier source of outstanding graduates, who in turn will help their enterprise attain and sustain industrial and societal competitiveness.

Mission of the Department

To create and disseminate knowledge by being accountable for developing and motivating our pupils to attain academic excellence and industrial competency. With our focus on teaching, learning & research, we engage in helping our students to face challenges in the field of Biotechnology

Detailed Mission

M1	To embrace and disseminate fundamental and applied knowledge of Biotechnology Engineering to attain academic excellence and industrial competency
M2	To empower the students for enhanced performance through continuous learning and research capabilities in multidisciplinary domains
M3	To create awareness about professional conduct and socio-ethical implications of potentials of biotechnology
M4	To equip the students to interrelate biotechnological solutions for present day challenges

Program Specific Objectives

1: Graduates will gain and apply knowledge of Science, Biotechnology and Engineering concepts in order to design and perform the experiments followed by validating the data to solve complex problems in the multidisciplinary research fields of Biotechnology.

2: Graduates will be able to analyze, appraise and develop technologies to address the Biotechnology Engineering problems while keeping in mind safety & ethical factors to safeguard the environment and society at large.

Program Educational Objectives

1. To endow students with basics of mathematics, life sciences and engineering necessary to analyze and solve scientific problems.
2. To provide students with the necessary instructions and relevant practical experience combined with exposure to and adequate training to face basic challenges in Biotechnology.
3. To inculcate scientific temperament in students to pursue and engage in research projects related to health, food, and environment.
4. To prepare students with efficient communication skills, team spirit and leadership qualities and awareness of professional conduct and mould them into responsible and competent engineers.
5. To empower students to work in scientific environment with ethical values and social responsibilities.

Course Name: C201 (Biostatistics-18BT31)

C201.1	Study and design various statistical problems
C201.2	Foundation to tackle live problems in various spheres of bioscience and bioengineering.
C201.3	Demonstrate strong basics in statistics and numerical analysis

Course Name: C202 (Microbiology-18BT32)

C202.1	Describe the structure and function of typical prokaryotic and eukaryotic cell structure like bacteria, algae, yeast & molds, protozoa, viruses, etc.
C202.2	Ability to isolate, grow, identify the microorganisms.
C202.3	Study of equipment's like LAF, hot air oven, autoclave microscope etc. and their role in sterilization and understanding the mechanism of chemical based sterilization
C202.4	Learning to disinfect the microbes and to work in sterile environment.
C202.5	Define the role of microorganisms towards environmental protection, industrial applications, and infectious diseases their diagnosis and control of the spread of the disease.
C202.6	Out-line industrial fermentation processes leading to the production of antibiotics, organic acids, enzymes, vitamins, and therapeutic products.

Course Name: C203 (Unit Operations-18BT33)

C203.1	State and describe the nature and properties of the fluids
C203.2	Classify fluid systems and understand its behavior and derive equations governing fluid flow
C203.3	Study the different flow measuring instruments and demonstrate applications of Bernoulli's theorem in venturi meter, orifice meter and pumps.
C203.4	Illustrate the working of size reduction, sedimentation, and mixing equipment's.
C203.5	Understand the working of mass transfer operations and distinguish them
C203.6	Design and operate the heat exchange equipment

Course Name: C204 (Introduction to Biomolecules-18BT34)

C204.1	present the foundational principles of macromolecular structure and function
C204.2	understand the principle of high energy molecules and Photosynthesis

C204.3	Understand about biological membrane and transport mechanism across the cell membrane and analyses its regulation

Course Name: C205 (Cell Biology and Genetics-18BT35)

C205.1	Able to summarize and recollect the concepts of cell biology and understand the cell organelles and functions
C205.2	To Exploit and analyze the knowledge of cell division and importance of cell cycle regulation and cell locomotion
C205.3	explain the concepts of hematology and Growth factors
C205.4	understand the structure of genetic material, classical experiments, and Mendelian laws of Inheritance
C205.5	Illustrate the gene interactions, linkage, mapping, and the structure of chromosome.
C205.6	To interpret the knowledge of population genetics in brief &apply the fundamental aspects of genetics in biotechnology

Course Name: C206 (PYTHON programming -18BT36)

C206.1	Develop algorithmic solutions to simple computational problems
C206.2	Read, write, execute by hand simple Python programs.
C206.3	Structure simple Python programs for solving problems.
C206.4	Decompose a Python program into functions.

Course Name: C207 (Microbiology Laboratory-18BTL37)

C207.1	To use different laboratory equipment and instruments such as Microscope, Laminar Air Flow Station, Autoclave, oven, incubators
C207.2	Prepare the media and use for the cultivation of the microorganisms.
C207.3	Perform laboratory experiments for the isolation, identification, and characterization of microorganisms
C207.4	Carry-out experiments for the enumeration, staining and control.
C207.5	Understanding the biochemical characterization of microbes to establish taxonomic classification.
C207.6	Ability to interpret the growth pattern and mechanism and correlation w.r.t industrial microbiology

Course Name: C208 (Unit Operations Laboratory-18BTL38)

C208.1	Arrive at required results based on experimental observations recorded systematically.
C208.2	Study and illustrate the working of different flow measuring instruments
C208.3	Understand and estimate the shape and size of irregular particles by sieve analysis
C208.4	Demonstrate the experimental procedure for mass transfer operation though distillation and diffusion studies.
C208.5	Study heat transfer operation in double pipe heat exchanger and compare flow patterns of double pipe heat exchanger
C208.6	Understand operation of centrifugal and reciprocating pumps by varying flow rates

Course Name: C209 (Stoichiometry -18BT41)

C209.1	Discuss the significance of material and energy balance for bioprocess technology.
C209.2	Solve problems related to material and energy balance to give solutions for bioprocess development.
C209.3	Develop the flowsheet for general processes operating in bioprocess industry.
C209.4	Apply the stoichiometry of microbial growth and product formation involved in bioprocess technology

Course Name: C210 (Molecular Biology -18BT42)

C210.1	Explain replication, transcription and translation processes with underlying differences in prokaryotic and eukaryotic systems
C210.2	Recognize and explain the role of enzymes and factors involved in replication, transcription, and translation
C210.3	Describe the regulation of gene expression in prokaryotes and eukaryotes and interpret its importance
C210.4	Elaborate importance of genetic recombination with special reference to bacterial system
C210.5	Categorize DNA damage occurring in living system and outline repair mechanisms
C210.6	Apply the knowledge of molecular biology in biotechnological applications

Course Name: C211 (Immunotechnology-18BT43)

C211.1	Classify the immune system and summarize their functions
C211.2	Outline the molecular and cellular mechanisms involved in the development of the immune response

C211.3	Explain the regulatory mechanism involved in development of immune response
C211.4	Describe the cause, challenges and treatment for Immune System Pathologies
C211.5	Describe the cause, challenges and treatment for Immune System Dysfunctions
C211.6	Apply the major immunological laboratory techniques and their application to both clinical analysis and experimental research

Course Name: C212 (Cell Culture Techniques-18BT44)

C212.1	Ability to understand the importance of equipment's a, their sterilization and usage aspects
C212.2	Able to Differentiate between the various sources of cells to be used in cell culture techniques
C212.3	Ability to Correlate between different biological samples and understand the importance of different media in tissue culture
C212.4	Ability to Comprehend the applications of plant tissue culture and their utilization.
C212.5	Ability to Comprehend the applications of animal and microbial cell culture in industry, healthcare, and environment.
C212.6	Appraise the role of biotechnology in plant, animal, and microbial sciences for sustainable eco-system & human welfare

Course Name: C213 (Biochemical Thermodynamics-18BT45)

C213.1	State & describe the concepts of system, surrounding, process, laws of thermodynamics & entropy
C213.2	Explain the PVT behavior of pure fluids and derive equations of state for real gases
C213.3	Distinguish between various equations of state & their applications and analyze the thermodynamic diagrams
C213.4	Determine the importance of partial molar properties, activity co-efficient of solution & the concepts of phase equilibrium.
C213.5	Summarize vapor liquid equilibrium data for ideal solutions
C213.6	Illustrate the phase rule for reacting systems and effect of temperature, pressure on equilibrium constants

Course Name: C214 (Clinical Biochemistry-18BT46)

C214.1	Able to discuss the biochemistry and pathophysiology associated with various disorders of cellular metabolism and inborn errors of metabolism.
C214.2	Able to describe the structure and function of metabolic pathways for carbohydrates, amino acids and lipids and their corresponding clinical conditions.
C214.3	Able to analyze the medical problems associated with abnormal lipoprotein and enzyme levels and therapeutic agents used to treat such disorders.
C214.4	Able to assess the clinical manifestations of renal, hepatic, pancreatic, gastric, and intestinal functions.
C214.5	Able to understand and outline the significance of hormonal systems and their corresponding disturbances.
C214.6	Able to evaluate the biochemical and clinical aspects of hematology including measurement of coagulation and thrombosis.

Course Name: C215 (Biochemistry Laboratory-18BTL47)

C215.1	Able to understand and use many of the techniques and tools of biochemistry
C215.2	Able to explain the basic concepts of pH, buffers, and colorimeter
C215.3	Able to comprehend fundamental principles of biochemical research and conduct qualitative and quantitative analysis of biological samples for constituents like glucose, urea, phosphate, iron & cholesterol
C215.4	Able to evaluate the properties of important biomolecules like carbohydrates, amino acids, proteins & lipids
C215.5	Able to implement experimental protocols, and adapt them to plan and carry out simple clinical investigations to identify biomolecules based on their color reactions
C215.6	Able to develop basic laboratory skills and use apparatus to obtain reproducible data from biochemical experiments and analyze, interpret, and report the results of clinical investigations.

Course Name: C216 (ImmunoTechnology Laboratory-18BTL48)

C216.1	Learn and demonstrate the various Immunodiagnostic techniques like agglutination, precipitation, immunoelectrophoretic, qualitative analysis, ELISA, separation of Lymphocytes and Immunoblot
C216.2	Independently carry out research experiments in immunology and cell biology.

Course Name: C301 (Bio-Kinetics AND Bio-Reaction-17BT51)

C301.1	Understand the different importance of kinetic and thermodynamic considerations for the choice of feed temperature in reactor systems.
C301.2	Explain the different steps in reaction mechanisms on catalytic surfaces and identify the rate determining step
C301.3	Comprehend the fundamentals of Microbial growth kinetics and its stoichiometry
C301.4	Analyze the kinetic study of enzymes and its regulation
C301.5	Develop suitable environment for microbial growth by analyzing various parameters.

Course Name: C302 (Genetic Engineering & Applications-17BT52)

C302.1	Able to explain the basic concepts of gene cloning and of applications recombinant DNA technology
C302.2	Able to categorize vectors, enzymes, and nucleic acid purification strategies important for transgenic technology, gene manipulation concepts and transgene methods.
C302.3	Able to outline and assess specific techniques like PCR, hybridization & construction of libraries used in genetic engineering
C302.4	Able to appraise the different gene/DNA transfer techniques to produce transgenic organisms
C302.5	Able to comprehend various methods of producing transgenic plants and animals and engineering microbes to produce useful products like enzymes and antibiotics
C302.6	Able to formulate specific applications of genetic engineering for the welfare of mankind & society.

Course Name: C303 (Immunotechnology-17BT53)

C303.1	Classify the immune system and summarize their functions
C303.2	Outline the molecular and cellular mechanisms involved in the development of the immune response
C303.3	Explain the regulatory mechanism involved in development of immune response
C303.4	Describe the cause, challenges, and treatment for Immune System Pathologies
C303.5	Describe the cause, challenges, and treatment for Immune System Dysfunctions

C303.6	Apply the major immunological laboratory techniques and their application to both clinical analysis and experimental research

Course Name: C304 (Bioinformatics -17BT54)

C304.1	Students will use basic biological concepts, grounded in foundational theories, to interpret relationships among living things and to analyze and solve biological problems.
C304.2	To know the relevant online resources, databases, and software tools
C304.3	To understand the underlying concepts of Bioinformatics in disease understanding
C304.4	To be able to design for engineering proteins and genetic engineering.
C304.5	Analyze biological data using modeling, predictive and drug design methods
C304.6	The students will be familiar with tools and techniques of bioinformatics and they can apply these techniques to Health care and pharmacy industry.

Course Name: C305 (Animal Biotechnology-17BT553)

C305.1	Understand, classify & distinguish the various parameters and concepts involved in animal cell culture and media formulation.
C305.2	Execute the experimental aspects by utilizing high end equipment's
C305.3	Interpret knowledge of the recent advances in animal breeding
C305.4	Explain basic principles & techniques in genetic engineering, gene transfer technologies for animal cell lines
C305.5	Explain the contribution 'functional genomics' is making & is likely to make in animal biotechnology now & in the future
C305.6	Appraise the role of biotechnology in animal sciences for sustainable eco-system & human welfare

Course Name: C306 (Biotechnology for Sustainable Environment-17BT563

C306.1	Apply reasoning to identify the components of environmental eco systems and effect of pollutant on environment
C306.2	Characterize the various parameters for treatment of water, wastewater, and solid waste from their sources to provide valid conclusions.
C306.3	Understand the impact of recovery, recycle of the useful resources from the wastes by adopting advanced techniques to demonstrate the need for sustainable development.

C306.4	Identify and demonstrate the knowledge to use suitable equipment for abatement and control of air & noise pollution

Course Name: C307 (Genetic Engineering & ImmunoTechnology Laboratory-17BTL57)

C307.1	Categorize the blood group and analyze the sample for diagnosis of typhoid.
C307.2	Measure the concentration of antigen or antibody present in the sample by selecting the appropriate immunochemical technique and infer the results
C307.3	Choose a suitable experimental method to isolate, quantify & measure the concentration of DNA & RNA
C307.4	Demonstrate the use of PCR and prepare amplified DNA using thermal cycler
C307.5	Perform gene transformation using the appropriate method
C307.6	Analyze and identify the DNA & protein by suitable technique

Course Name: C308 (Bioinformatics Lab -17BTL57)

C308.1	The students will be gaining expertise on practical data analytics, Data mining, machine learning.
C308.2	Utilize the biological information from public databases for given problem in biotechnology, medicine, or biology.
C308.3	To gain foundational knowledge about molecular evolution, protein structure and gene expression using computational tools.
C308.4	Ability to write computer programs in various programming techniques to analyze bioinformatics data
C308.5	To apply the tools to address important problems of biotechnology and to verify the capability in handling a research project.
C308.6	The students will be able to visualize data and will apply this knowledge towards analysis of data related to graphical interfaces in the fields of systems biology, functional genomics, and biomedicine

Course Name: C309 (Bio-Business and Entrepreneurship -17BT61

C309.1	To understand analyze and explore entrepreneurship opportunity in biotechnology
C309.2	To Analyze societal problems and derive biotech based scientific solutions.
C309.3	To accelerate innovation and conservation of IPR
C309.4	To Explore funding opportunity for innovations and startups.

C309.5	To Exploit business opportunity through expired patent, technology learning and licensing.
C309.6	To illustrate scientific problem into a project proposal.

Course Name: C310 (Bioprocess Control and Automation -17BT62

C310.1	Able to describe the Instrumentation of flow, pressure, temperature.
C310.2	Able to determine the transient response and to derive the transfer functions of first order systems and first order systems in series and to solve problems of response of first order systems for different types of input.
C310.3	Able to determine the transient response and to derive the transfer functions of second order systems.
C310.4	To Understand the parameters to be measured and controlled in the bioreactor.
C310.5	Able to apply the design aspects for block diagrams and use the concept of stability for solving the problems.
C310.6	Able to analyze online data and understand the dynamics and control of bioreactors.

Course Name: C311 (Enzyme Technology & Biotransformation-17BT63)

C311.1	Classify and identify the enzymes based on the biochemical reaction catalyzed by them
C311.2	Compare enzymes and catalyst, and explain the mechanism of enzyme catalysis
C311.3	Recognize & Interpret the importance of enzymes in medicine
C311.4	Explain the methods involved in study of enzyme kinetics, standardization, and optimization of enzyme catalyzed reactions
C311.5	Compare immobilized enzymes over conventional enzymes, apply the knowledge of immobilized enzymes in bioprocess industry
C311.6	Summarize the applications of enzymes in medicine and industry

Course Name: C312 (Bioprocess Equipment Design & CAED -17BT64)

C312.1	To define the notations and terminology for welding and pipe joints.
C312.2	To draw various values and joints.
C312.3	To calculate the no of tubes, diameter, and different parameter of double pipe heat exchanger.
C312.4	To calculate the dimensions of shell and tube heat exchangers.

C312.5	To apply the design aspects by solving the problems.
C312.6	To evaluate the no of plates & height of packing in distillation column and to design the fermenter.

Course Name: C313 (Cell Culture Techniques-17BT653)

C313.1	Ability to understand the importance of equipment's a, their sterilization and usage aspects
C313.2	Able to Differentiate between the various sources of cells to be used in cell culture techniques
C313.3	Ability to Correlate between different biological samples and understand the importance of different media in tissue culture
C313.4	Ability to Comprehend the applications of plant tissue culture and their utilization.
C313.5	Ability to Comprehend the applications of animal and microbial cell culture in industry, healthcare, and environment.
C313.6	Appraise the role of biotechnology in plant, animal, and microbial sciences for sustainable eco-system & human welfare

Course Name: C314 (Nano Biotechnology-17BT662)

C314.1	Able to understand and describe nanobiotechnology and its applications
C314.2	Able to discuss nanoparticle types and synthesis method
C314.3	Able to describe the importance and various classification of nanolithography process
C314.4	Able to describe various characterization techniques for nanoparticles
C314.5	Understand the principle and application of nano diagnostics
C314.6	Able to understand and differentiate between bio nanotechnology and nanobiotechnology

Course Name: C315 (Bioprocess Control & Automation Laboratory-17BTL67)

C315.1	To understand the characteristics of transducers of temperature, pressure & flow
C315.2	To understand determine the oxygen demand required for biological degradation of pollutant
C315.3	To analyze the response of first order systems for step and impulse input
C315.4	To interpret the response of first order systems.
C315.5	Describe the principles of controllers
C315.6	To explain the concept of control of DO & agitation

Course Name: C316 **(Biokinetics and Enzyme Technology Laboratory -17BTL68)**

C316.1	Able to apply principles of protein chemistry and enzymology for analysis and study of enzymes as biocatalysts
C316.2	Able to investigate various methods available for isolation, purification, and characterization of enzymes
C316.3	Able to apply the principles and methods of immobilization of enzymes useful in a diverse range of industries
C316.4	Able to assess biokinetics parameters using different reactors
C316.5	Able to implement experimental protocols, and adapt them to plan and carry out investigations to relate experimental data with fundamental theories of enzyme kinetics
C316.6	Able to use basic laboratory skills and apparatus to obtain reproducible data from biochemical experiments and analyze, interpret, and report the results.

Course Name: C401 (Fermentation Technology -15BT71)

C401.1	To Describe the factors affecting secondary metabolite production and its industrial importance.
C401.2	To Describe the basic requirements of downstream processing for biochemical product recovery.
C401.3	To Identify and summarize the effect of change in unit's operations and its impact on the process.
C401.4	To Illustrate how emerging technologies would benefit the biochemical product recovery and show the likely benefits it would have over the traditional operations.

C401.5	To Analyzing both analytical and process validation issues that are critical to successful manufacturing
C401.6	To Outline the processes involving large-scale, high-purity protein production.

Course Name: C402 (Genomics & Proteomics -15BT72)

C402.1	The students will be able to apply DNA/genome sequencing techniques to various genome projects.
C402.2	The students will be able to analyze genomes of various organisms and genome annotation importance.
C402.3	The students will be able to correlate the relationship between genome, transcriptome, proteome, and metabolome.
C402.4	To engineer proteins for therapeutic and clinical applications.
C402.5	The students will be able to apply the knowledge of the major web-resources and the notion about how the methods are applied in real-life scientific research.
C402.6	The students will be able to understand how to perform simple analysis of this data and remember examples of how the research tools are applied in published investigations.

Course Name: C403 (Plant Biotechnology -15BT73)

C403.1	To apply tissue culture techniques for the large-scale production of various plantlets with economically useful traits
C403.2	Analyze the developments of crop production by using plant breeding and hybridization techniques.
C403.3	Apply genetically engineered concepts to induce biotic and abiotic stresses in plants
C403.4	Develop & create genetically modified plants with genes from microbial and animal origin that have diagnostic application
C403.5	Utilize the technique for the development and production of pharmaceutically important molecules as edible drugs
C403.6	Utilize and implement knowledge of mass production of plants to meet the societal demand for food

Course Name: C404 (Lab to Industrial Scaling -15BT743)

C404.1	Analyze the various parameters for bioreactor design.

C404.2	Identify appropriate qualitative and quantitative analysis methods depending upon the chemical nature of analyze.
C404.3	Enhance product output by selection of appropriate method of enrichment operation
C404.4	Enhance product quality by appropriate method of purification operation
C404.5	Analyze industrial problems in fermentation process and solving.
C404.6	Designing Bioreactors using computer programming skills

Course Name: C405 (Molecular Diagnostics -15BT753)

C405.1	Outline the basic concepts of health diagnostics.
C405.2	Explain the role & importance DNA-based and PCR-based diagnostic methods.
C405.3	Describe the diagnosis of disorders such as haemoglobinopathies, mucopolysaccharidoses, lipidoses, amyloidosis using biochemical & cell-based assays.
C405.4	Identify the different immunodiagnostics & imaging diagnostic techniques.
C405.5	Explain the different ways of product & assay development methods.
C405.6	Describe the application of biosensors in diagnostics.

Course Name: C406 (Fermentation Technology Laboratory -15BTL76)

C406.1	Analyze and select appropriate unit operations for isolation and purification of bio molecules.
C406.2	Evaluate the bio-product using appropriate qualitative and quantitative analysis methods depending upon the chemical nature of analyte.
C406.3	Analyze, compare, and select a technique for concentrating biological products like extraction, drying, filtration, precipitation, membrane separation.
C406.4	Acquire the basic principles and techniques of chromatography to purify the biological products.
C406.5	Describe the basic principles of fermentation preparation and the requirements of downstream processing for biochemical product recovery.
C406.6	Analyze the kinetics and estimation of product produced using fermenter

Course Name: C407 (Plant Biotechnology Laboratory -15BTL77)

C407.1	To explain the basic concepts of plant biotechnology in plant tissue culture
C407.2	To describe the various components of plant tissue culture media, like minerals, growth factors, hormones, and their significance

C407.3	To relate the various steps taken to establish and optimize media for purposes
C407.4	Explain and perform some of the more advanced techniques, e.g., embryo culture and protoplast isolation and regeneration
C407.5	To establish and maintain plants in tissue culture and micro propagation, including morphogenesis
C407.6	To adapt and apply plant tissue culture techniques to research problems in plant biology

Course Name: C408 (Clinical & Pharmaceutical Biotechnology -15BT81)

C408.1	To Explain the significance of pharmaco-kinetic models
C408.2	To Explain the significance of pharmaco-dynamic principles
C408.3	To understand various dosage forms and formulation
C408.4	To Understand the specific techniques used in biotherapy & clinical Biotechnology
C408.5	Comprehend specific applications of pharmaceutical & clinical Biotechnology
C408.6	Able to implement experimental protocols, and adopt to plan and carry out pre-clinical& clinical investigations

Course Name: C409 (Regulatory Affairs in Biotech Industry -15BT82)

C409.1	To educate students about regulatory rules governing biotech industry
C409.2	To create awareness about guidelines that specify parameters of the safety and quality standards in the biotech industry
C409.3	Outline the importance of the quality and compliance in the biotech industry
C409.4	Comprehend the various regulatory guidelines and rules as well as the organizations governing the same.
C409.5	To learn the documentation process pertaining to quality management, QA, quality policy and marketing.
C409.6	To understand the importance of quality auditing, process designing, validating master plans & commissioning

Course Name: C410 (Metabolic Engineering -15BT832)

C410.1	To empower the students with the knowledge on metabolic engineering.
C410.2	To understand the basic concepts about enzymology

C410.3	Outline and understand the basics followed in primary and secondary metabolites biosynthesis.
C410.4	Understand the importance of bioconversions of substances into products.
C410.5	Understand the concepts involved in regulation of enzyme production
C410.6	Understand the technique involved in strain improvement with interest to develop it for industrial fermentation use

Course Name: C411 (Project Work -15BT85)

C411.1	Identify a topic in relevant areas of Biotechnology
C411.2	Illustrate literature review to identify gaps and define objectives & scope of the work.
C411.3	Formulate the problem to meet the objectives of the proposed work
C411.4	Develop a prototypes/models, fabrication, experimental set-up/software systems necessary to meet the objectives
C411.5	Develop the work with a concern for society, environment, and ethics
C411.6	Analyze and discuss the results to draw valid conclusions.

Course Name: C412 (Seminar -15BT86)

C412.1	Enables to update with present technologies and trends in real world
C412.2	Enables to improve ability of data collection and presentation
C412.3	Enables to overcome stage fear and improve communication skills
C412.4	Enables to face spontaneous queries
C412.5	Prepare and write the report as per recommended format.
C412.6	Help to develop vocabulary & demonstrate efforts put in comprehensive analysis & interpretation of data

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Department of Chemistry

Vision of the Institute

To be a respected and most sought after engineering educational institution engaged in equipping individuals capable of building learning organizations in the new millennium.

Mission of the Institute

To develop competent students with good value systems and face challenges of the continuously changing world.

Vision of the Department

Our vision is to give our students an in-depth exposure to the latest developments in Chemistry made by reputed scientists and experts in this field. To equip individuals capable of earning in the new millennium.

Mission of the Department

Our mission is to provide a contemporary foundation for addressing problems in Chemistry. Also, to develop competent engineers with good values and to equip them to face the challenges of the continuously changing world.

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Program Educational Objectives

PEO 1. Mater the basic knowledge of Engineering Chemistry for building technical Competence in industries, research, and development.

PEO 2. To develop knowledge in the fields of use of free energy in chemical Equilibrium, electrochemistry and energy storage systems, corrosion, and metal finishing.

PEO 3. To understand the importance of the energy systems, environmental pollution, waste management, water chemistry, Instrumental methods of analysis and nano-materials.

Program Specific Objectives

PSO 1: Understand the principles of electrochemistry & battery technology.

PSO 2: Apply the knowledge of Corrosion and metal finishing in solving environmental issues.

PSO 3: Utilize the knowledge of fuels and solar energy for various Engineering applications.

PSO 4: Utilize the knowledge of water technology for various engineering applications as well as in daily life.

PSO 5: Develop solutions for problems associated with Nano technology.

Course Name: 18CHE12/22 (Engineering Chemistry) -18CHE12/22

CO_1	Understanding the concept of free energy in equilibrium, rationalize bulk properties and processes using thermodynamic considerations.
CO_2	Apply the k knowledge of corrosion and electrochemical energy systems to modify surface properties of metals, to develop resistance to corrosion, wear, tear, impact etc. by electroplating and electroless plating.
CO_3	Understanding the difference between electrochemical cell, concentration cell, batteries, and fuel cell, and know its applications for the industrialization of country. Water chemistry and problems and types of water and various ways to make it
CO_4	Applying the knowledge of environmental pollution and waste management in controlling pollution.
CO_5	Understanding the different techniques of instrumental analysis.
CO6	To know the fundamental principles of Nanomaterials for building technical competence in industries and research.

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Department of Civil Engineering

Vision of the Institute

To be a respected and most sought after engineering educational institution engaged in equipping individuals capable of building learning organizations in the new millennium.

Vision of the Institute

To develop competent students with good value systems and face challenges of the continuously changing world.

Vision of the Institute

To impart very high-quality education to the students to make them do innovative sustainable engineering relevant to industry and people at large.

Mission of the Department

Mission 1. To emphasize on basics of engineering as well as their applications relevant to the industry.

Mission 2. To serve the society with due consideration of economy, ecology and ethical issues of nation.

Mission 3. To sensitize the students and faculty to take up research and consultancy to be on par with international standards.

Program Educational Objectives

PEO 1.	Apply fundamental concepts of civil engineering in developing economically viable and sustainable sound solutions.
PEO 2.	To work collaboratively on multidisciplinary problems.
PEO 3.	To achieve their professional aims keeping good ethics.

Program Specific Objectives

PSO 1: To apply technical skills and modern engineering tools for civil engineering day to day practice.

PSO 2: To participate in critical thinking and problem solving of civil engineering field that needs analytical and design requirements.

PSO 3: To pursue lifelong learning and professional development to face the challenging and emerging needs of our society.

Course Name: 232.1 (Strength of Materials-18CV32)

C232.1	To understand the basic material properties of structural materials such as steel, aluminum, wood and their combinations under axial tension and compression.
C232.2	To learn methods of stress analysis after determining the internal forces under axial tension and compression, bending, shear and torsion.
C232.3	To evaluate the behavior and strength of structural elements under the action of compound stresses and thus understand failure criteria.
C232.4	To understand the methods of analyses of design of structural frames such as pin jointed trusses and portal frames both determinate and indeterminate.
C232.5	To understand the basic concept of instability analyses of structural elements such as columns and struts.
C232.6	To understand the basic concepts of torsion developed in circular shaft.

Course Name: 233.1 (FLUIDS MECHANICS-18CV32)

C233.1	Possess a sound knowledge of fundamental properties of fluids and fluid continuum
C233.2	Compute and solve problems on hydrostatics, including practical applications
C233.3	Apply principles of mathematics to represent kinematic concepts related to fluid flow
C233.4	Apply fundamental laws of fluid mechanics and the Bernoulli's principle for practical applications
C233.5	Compute the discharge through pipes and over notches and weirs

Course Name: 234.1 (BASIC SURVEYING -18CV34)

C234.1	Possess a sound knowledge of fundamental principles Geodetics[L1] [PO1]
C234.2	Measurement of vertical and horizontal plane, linear and angular dimensions to arrive at solutions to basic surveying problems.
C234.3	Capture geodetic data to process and perform analysis for survey problems
C234.4	Analyze the obtained spatial data and compute areas and volumes. Represent 3D data on plane figures as contours

Course Name: 235.1 (ENGINEERING GEOLOGY -18CV35)

C235.1	Students will be able to apply the knowledge of geology and its role in Civil Engineering
C235.2	Students will effectively utilize earth's materials such as mineral, rocks and water in civil engineering practices.
C235.3	Analyze the natural disasters and their mitigation.
C235.4	Assess various structural features and geological tools in ground water. exploration, Natural resource estimation and solving civil engineering problems

C235.5	Apply and asses use of building materials in construction and asses their properties

Course Name: 236.1 (Building Materials and Construction-18CV36)

C236.1	Select suitable materials for buildings and adopt suitable construction techniques.
C236.2	Adopt suitable repair and maintenance work to enhance durability of buildings.

Course Name: C242 (Analysis of Determinate Structures (18CV42

C242.1	To evaluate the forces in determinate trusses by method of joints and sections.
C242.2	To evaluate the deflection of cantilever, simply supported and overhanging beams by different methods
C242.3	To understand the energy principles and energy theorems and their applications to determine the deflections of trusses and bent frames.
C242.4	To determine the stress resultants in arches and cables.
C242.5	To understand the concept of influence lines and construct the ILD diagram for the moving loads.
C242.6	To know the comparison between moment area and conjugate beam method.

Course Name: C243(applied hydraulics 18CV43)

C243.1	Apply dimensional analysis to develop mathematical modeling and compute the parametric values in prototype by analyzing the corresponding model parameters
C213.2	Design the open channels of various cross sections including economical channel sections
C213.3	Apply Energy concepts to flow in open channel sections, Calculate Energy dissipation,
C213.4	Compute water surface profiles at different conditions
C213.5	Design turbines for the given data, and to know their operation characteristics under different operating conditions
C213.6	The working principles of the hydraulic machines for the given data and analyzing the performance of Turbines for various design data.

Course Name:C244 (concrete technology18CV44)

C244.1	Relate material characteristics and their influence on microstructure of concrete.
C244.2	Distinguish concrete behavior based on its fresh and hardened properties
C244.3	Illustrate proportioning of different types of concrete mixes for required fresh and hardened properties using professional codes.
C244.4	Adopt suitable concreting methods to place the concrete based on requirement.

C244.5	Select a suitable type of concrete based on specific application.
C244.6	Describe the physical & mechanical properties of aggregates

Course Name: C245 (Applied geotechnical Engineering 18CV45)

C245.1	Will acquire an understanding of the procedures to determine index properties of any type of soil, classify the soil based on its index properties
C245.2	Will be able to determine compaction characteristics of soil and apply that knowledge to assess field compaction procedures
C245.3	Will be able to determine permeability property of soils and acquires conceptual knowledge about stresses due to seepage and effective stress; Also acquire ability to estimate seepage losses across hydraulic structure
C245.4	Will be able to estimate shear strength parameters of different types of soils using the data of different shear tests and comprehend Mohr-Coulomb failure theory.
C245.5	Ability to solve practical problems related to estimation of consolidation settlemen deposits also time required for the same.
C245.6	To implement the knowledge attained in solving civil engineering problems of making roads, townships etc.

Course Name: C246 (Advanced Surveying 18CV46)

C246.1	Apply the knowledge of geometric principles to arrive at surveying problems
C246.2	Use modern instruments to obtain geo-spatial data and analyze the same to appropriate engineering problems.
C246.3	Capture geodetic data to process and perform analysis for survey problems with the use of electronic instruments;
C246.4	Design and implement the different types of curves for deviating type of alignments.
C246.5	To apply basic principles in analyzing position of celestial bodies
C246.6	To implement the knowledge attained in solving civil engineering problems of making roads, townships etc.
C245.1	Will acquire an understanding of the procedures to determine index properties of any type of soil, classify the soil based on its index properties
C245.2	Will be able to determine compaction characteristics of soil and apply that knowledge to assess field compaction procedures
C245.3	Will be able to determine permeability property of soils and acquires conceptual knowledge about stresses due to seepage and effective stress; Also acquire ability to estimate seepage losses across hydraulic structure
C245.4	Will be able to estimate shear strength parameters of different types of soils using the data of different shear tests and comprehend Mohr-Coulomb failure theory.
C245.5	Ability to solve practical problems related to estimation of consolidation settlemen deposits also time required for the same.

C245.6	To implement the knowledge attained in solving civil engineering problems of making roads, townships etc.

Course Name: C351 (Design of RC Structural Elements) 17CV52)

C252.1	Determine the moment in indeterminate beams and frames having variable moment of inertia and subsidence using slope defection method
C252.2	Determine the moment in indeterminate beams and frames of no sway and sway using moment distribution method.
C252.3	Construct the bending moment diagram for beams and frames by Kani's method.
C252.4	Construct the bending moment diagram for beams and frames using flexibility method
C252.5	Analyze the beams and indeterminate frames by system stiffness method

Course Name: C253: Applied Geotechnical Engineering -(17CV53)

C253.1	To evaluate the forces in determinate trusses by method of joints and sections.
C253.2	To evaluate the deflection of cantilever, simply supported and overhanging beams by different methods
C253.3	To understand the energy principles and energy theorems and their applications to determine the deflections of trusses and bent frames.
C253.4	To determine the stress resultants in arches and cables.
C253.5	To understand the concept of influence lines and construct the ILD diagram for the moving loads.

Course Name: C254 Computer Aided Building Planning and Drawing (17CV54)

C254.1	Ability to plan and execute geotechnical site investigation program for different civil engineering projects
C254.2	Understanding of stress distribution and resulting settlement beneath the loaded footings on sand and clayey soils
C254.3	Ability to estimate factor of safety against failure of slopes and to compute lateral pressure distribution behind earth retaining structures
C254.4	Ability to determine bearing capacity of soil and achieve proficiency in proportioning shallow isolated and combined footings for uniform bearing pressure
C254.5	Capable of estimating load carrying capacity of single and group of piles

Course Name: C355(Air pollution and Control (17CV551)

C355.1	Identify the major sources of air pollution and understand their effects on health and environment.

C355.2	Evaluate the dispersion of air pollutants in the atmosphere and to develop air quality models.
C355.3	Ascertain and evaluate sampling techniques for atmospheric and stack pollutants.
C355.4	Choose and design control techniques for particulate and gaseous emissions.

Course Name: C356(Traffic Engineering-(17CV561)

C356.1	Understand the human factors and vehicular factors in traffic engineering design.
C356.2	Conduct different types of traffic surveys and analysis of collected data using statistical concepts.
C356.3	Use an appropriate traffic flow theory and to comprehend the capacity & signalized intersection analysis.
C356.4	Understand the basic knowledge of Intelligent Transportation System.

Course Name: C361 (Construction Management & Entrepreneurship 17CV61)

C361.1	Understand the construction management process.
C361.2	Understand and solve variety of issues that are encountered by every professional in discharging professional duties.
C361.3	Fulfil the professional obligations effectively with global outlook
C361.4	Create a construction project and safety plan
C361.5	Apply construction management skills as a member of a multi-disciplinary team.
C361.6	To make them understand the concept of project management for planning and execution.

Course Name: C262 (Design of Steel Structural Elements 17CV62)

C362.1	Possess knowledge of Steel Structures Advantages and Disadvantages of Steel structures, steel code provisions.
C362.2	Possess knowledge of Plastic behavior of structural steel.
C362.3	Understand the Concept of Bolted and Welded connections,
C362.4	Understand the Concept of Design of compression members, built-up columns and columns splices.
C362.5	Understand the Concept of Design of tension members, simple slab base and gusseted base.
C362.6	Understand the Concept of Design of laterally supported and un-supported steel beams.

Course Name:C263 (Highway Engineering 17CV63)

C363.1	Acquire knowledge of different modes of transportation systems, history, development of highways and the organizations associated with research and development of the same in INDIA.
C363.2	Acquire the capability of proposing a new alignment or re-alignment of existing roads, conduct necessary field investigation for generation of required data.
C363.3	Evaluate the engineering properties of the materials and suggest the suitability of the same for pavement construction.
C363.4	Design road geometrics, structural components of pavement
C363.5	Design of highway drainage structural elements
C363.6	Evaluate the highway economics by few select methods and also will have a basic knowledge of various highway financing concepts.

Course Name: C264 (Water Supply and Treatment Engineering 17CV64)

C364.1	Estimate average and peak water demand for a community.
C364.2	Evaluate available sources of water, quantitatively and qualitatively and make appropriate choice for a community.
C364.3	Evaluate water quality and environmental significance of various parameters and plan suitable treatment system.
C364.4	Design a comprehensive water treatment and distribution system to purify and distribute water to the required quality standards.
C364.5	Study drinking water quality standards and to illustrate qualitative analysis of water
C364.6	Design physical, chemical and biological treatment methods to ensure safe and potable water Supply. Revise

Course Name:C265 (Solid Waste Management 17CV651)

C365.1	Analyze existing solid waste management system and to identify their drawbacks
C365.2	Evaluate different elements of solid waste management system.
C365.3	Suggest suitable scientific methods for solid waste management elements.
C365.4	Design suitable processing system and evaluate disposal sites.
C365.5	Analyze different processing technologies and to study conversion of municipal solid waste to compost or biogas.
C365.6	Evaluate landfill site and to study the sanitary landfill reactions.

Course Name:C261 (Water Resources Management 17CV661)

C3661.1	Assess the potential of groundwater and surface water resources.
C3661.2	Address the issues related to planning and management of water resources.
C3661.3	Know how to implement IWRM in different regions.

C3661.4	Understand the legal issues of water policy.
C3661.5	Select the method for water harvesting based on the area.
C3661.6	Understand the importance of water and manage the water resources effectively.

Course Name: C471 (MIWW-(15CV71)

C471.1	Acquires capability to design sewer and Sewerage treatment plant.
C471.2	Evaluate degree of treatment and type of treatment for disposal, reuse and recycle.
C471.3	Identify waste streams and design the industrial wastewater treatment plant.
C471.4	Manage sewage and industrial effluent issues.

Course Name: C472 Design of RCC and Steel Structures 15CV72)

C472.1	Understand the importance of hydrology and its components.
C472.2	Measure precipitation and analyze the data and analyze the losses in precipitation.
C472.3	Estimate runoff and develop unit hydrographs.
C472.4	Find the benefits and ill-effects of irrigation.
C472.5	Find the quantity of irrigation water and frequency of irrigation for various crops. loads.
C472.6	Find the canal capacity, design the canal and compute the reservoir capacity.

Course Name: C473 Hydrology and Irrigation Engineering (15CV73)

C473.1	Understand the importance of hydrology and its components.
C473.2	Measure precipitation and analyze the data and analyze the losses in precipitation.
C473.3	Estimate runoff and develop unit hydrographs.
C473.4	Find the benefits and ill-effects of irrigation.
C473.5	Find the quantity of irrigation water and frequency of irrigation for various crops. loads.
C473.6	Find the canal capacity, design the canal, and compute the reservoir capacity.

Course Name 474 Ground Water & Hydraulics (15CV74)

C474.1	find the characteristics of aquifers.
C474.2	estimate the quantity of ground water by various methods.
C474.3	locate the zones of ground water resources.
C474.4	select particular type of well and augment the ground water storage.

Course Name:475 (Urban Transportation and Planning-15CV755)

C475.1	Design, conduct and administer surveys to provide the data required for transportation planning.
C475.2	Supervise the process of data collection about travel behavior and analyze the data for use in transport planning.
C475.3	Develop and calibrate modal split, trip generation rates for specific types of land use developments.
C475.4	Adopt the steps that are necessary to complete a long-term transportation plan.

course Name:C481(Quantity Surveying and Contracts Management 15CV81)

C481.1	. Prepare detailed and abstract estimates for roads and building.
C481.2	Prepare valuation reports of buildings
C481.3	Interpret Contract documents of domestic and international construction works
C481.4	Estimate the quantities of work, develop the bill of quantities, and arrive at the Cost of civil engineering Project
C481.5	Understand and apply the concept of Valuation for Properties
C481.6	Understand, Apply and Create the Tender and Contract document

Course Name:C482 Design of Pre-Stressed Concrete Elements 15CV82)

C482.1	Understand the requirement of PSC members for present scenario
C482.2	Analyze the stresses encountered in PSC element during transfer and at working

C482.3	Understand the effectiveness of the design of PSC after studying losses
C482.4	Capable of analyzing the PSC element and finding its efficiency.
C482.5	Design PSC beam for different requirements
C482.6	learn Design of Pre-Stressed Concrete Element

Course Name: C483 (Pavement Design 15CV833)

C483.1	Gain knowledge about the process of collecting data required for design, factors affecting pavement design, and maintenance of pavement.
C483.2	Systematically generate and compile required data for design of pavement (Highway & Airfield).
C483.3	Analyse stress, strain and deflection by bossiness's, bur mister's and Vestergaard's theory.
C483.4	Design rigid pavement and flexible pavement conforming to IRC58-2002 and IRC37-2001.
C483.5	Understand the requirements of various types of joints in pavements, which are provided to take care of climatic variations.
C483.6	Evaluate the performance of the pavement and develops maintenance statement based on site specific requirements.

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Department of Computer Science Engineering

Vision of the Institute

To be a respected and most sought after engineering educational institution engaged in equipping individuals capable of building learning organizations in the new millennium. To produce technocrats with creative technical knowledge and intellectual skills to sustain and excel in the highly demanding world with confidence.

Mission of the Institute

To develop competent students with good value systems and face challenges of the continuously changing world.

Vision of the Department

To produce technocrats with creative technical knowledge and intellectual skills to sustain and excel in the highly demanding world with confidence.

Mission of the Department

Mission 1. The department's aim is to develop the best computer science professionals who work creatively, communicate effectively & become technologically competent, and to mould them into good citizens by inculcating sense of ethical values in them.

Mission 2. To Encourage the students to build self-help, Power of initiative, courage to change and create new things.

Mission 3. To inculcates the spirit of cooperation and capacity for organization with special emphasis on their self-reliance and sustainability to meet ever changing requirements of local and global industries.

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Program Educational Objectives

PEO To create graduates equipped with life-long learning skills and have a successful professional career in IT industry.

PEO To prepare graduates to pursue higher education and get inclined towards research & development in computer science engineering.

PEO To provide adequate training and opportunities, with exposure to emerging cutting-edge technologies and to work in teams on multidisciplinary projects with effective communication skills and leadership qualities.

Program Specific Objectives

PSO 1: To design efficient algorithms and develop effective code for real-time computations.

PSO 2: To apply software engineering principles in developing optimal software solutions.

Course Name:C231 (Transform Calculus, Fourier Series and Numerical Technique -18MAT31)

C231.1	Solving differential/ integral equation arising in network analysis, control systems and other fields of engineering by Laplace transform and inverse Laplace transform
C231.2	Employ Fourier series to study the behavior of periodic functions and their applications in system communications, digital signal processing and field theory.
C231.3	Analyze the concept of Fourier transform and Z-transform to illustrate discrete/continuous function arising in wave and heat propagation, signals, and systems.
C231.4	To solve the first and second order ordinary differential equations arising in engineering problems make use of single step and multistep numerical methods.

Course Name:C232 (Data Structures and Applications -18CS32)

C232.1	Use different types of data structures, algorithms, and their operations.
C232.2	Apply searching, sorting operation on files.
C232.3	Analyze the usage of stack, Queue, List, Trees and Graphs in problem solving.
C232.4	Use the hash function, concepts of collision and its resolution methods.

Course Name:C233 (Data Structure in C -18CS33)

C233.1	Comprehend/Perceive the working principles of fundamental building blocks of analog and Digital Systems.
C233.2	Develop truth tables, switching equations, state tables and diagrams for given clocked. sequential circuits.
C233.3	Apply the knowledge of principles of Digital System Design in designing combinational. and Synchronous/Asynchronous sequential logic circuits.
C233.4	Apply the knowledge of semiconductor devices and circuits to determine circuit parameters and mathematical expressions for the same.

Course Name:C234 (Unix And Shell Programming -18CS34)

C234.1	Apply the basic concepts of sub system of a computer and machine instructions.
C234.2	Apply different algorithms used to perform arithmetic and logic operations.
C234.3	Analyze the importance of pipelining and processing unit.
C234.4	Analyze how to measure and improve the memory performance.

Course Name:C235 (Discrete Mathematical structures -18CS35)

C235.1	Apply software engineering technologies and ethics in professional responsibility.
C235.2	Apply software engineering practice over the entire software system life cycle.

C235.3	Analyze process activities for different software process models and system models.
C235.4	Analyze the techniques, skills, and modern engineering tools necessary for engineering practice.

Course Name:C236 (Discrete Mathematical structures -18CS36)

C236.1	Examine the correctness of an argument using propositional and predicate logic and truth tables. Construct proofs using direct proof, proof by contradiction,
C236.2	Apply the Knowledge to solve problems using counting techniques and combinatorics and application of different mathematical proofs techniques in proving theorems.
C236.3	Solve the problems using recurrence relations and generating functions. Also analyze the concept of discrete probability recursion.
C236.4	Use the knowledge of graphs theory and contrast the various types of graphs, trees and their applications.

Course Name:C241 (Engineering Mathematics-IV-17CS41)

C241.1	Understand the basic concept of complex variables, distribution, and special functions to solve mathematical problems.
C241.2	Apply the knowledge of numerical methods, sampling distribution to solve complex engineering problems.
C241.3	Analyze the probability distribution, sampling distribution and complex Variable through analytic function, Cauchy-Riemann equations, residues, Bilinear transformation for signal processing.
C241.4	Evaluate first and second order ordinary differential equations through single and multi-step method problems.

Course Name:C242 (Object Oriented Concepts-17CS42)

C242.1	Understand and Apply Object Oriented Programming concepts of C++ and java.
C242.2	Apply Object oriented concepts of C++ and java to solve simple problems.
C242.3	Analyze event driven simple GUI programs using java applets and swings.

Course Name:C243 (Design and Analysis Of Algorithms-17CS43)

C243.1	Understand the analysis framework and computational solution to well-known problems with suitable data structure.
C243.2	Apply appropriate design strategies for problem solving.
C243.3	Analyze the performance of different algorithms.
C243.4	Design an efficient algorithm using appropriate design strategies for problem solving.

Course Name:C244 (Microprocessor and Microcontroller-17CS44)

C244.1	Understand the architecture and ARM processor and apply instruction set to process data.
C244.2	Apply suitable addressing modes, instructions, and interrupt functions for data processing.
C244.3	Analyze memory and Input Output interfacing for data transferring.
C244.4	Design memory address decoders and assembly language program for simple applications.

Course Name:C245 (Software Engineering -17CS45)

C245.1	Understand the software engineering technologies and apply in software development.
C245.2	Apply software engineering practice over the entire software system life cycle.
C245.3	Analyze process activities for different software process models and system models.
C245.4	Evaluate high-level and low-level design of an application from the identified software requirements.

Course Name:C246 (Data Communication-17CS46)

C246.1	Understand and apply the basic concepts of Data Communication and technologies
C246.2	Apply the appropriate methods and protocol suites to address the different data communication issues
C246.3	Analyze the significance of data network components
C246.4	Evaluate the functionalities of various layer protocols and network devices

Course Name:C351 (Management, Entrepreneurship for It Industry-17CS51)

C351.1	Understand the basic concepts of management functions, projects, ERP and outline their importance in entrepreneurship.
C351.2	Analyze the business opportunities, appropriate leadership styles, motivation theories, communications, coordination and controlling methods.
C351.3	Evaluate the importance of SSIs in economic development and its institutional support provided by government of India.
C351.4	Estimate the importance of IPRs and cyber-law to protect infringement of secret document.

Course Name:C352 (Computer Networks-17CS5)

C352.1	Understand the fundamentals of application layer, transport layer, network layers and apply the various protocols for data communication.
C352.2	Apply mobile, multimedia networking and network management mechanisms for data transfer.
C352.3	Analyze the difference between various routers address classes, Routing Algorithms, and compute shortest paths.
C352.4	Evaluate the suitability of data transfer protocols for transport layer services.

Course Name:C353 (Database Management System-17CS53)

C353.1	Apply the physical structure of the database to handle data, to define a problem at the view level.
C353.2	Apply the basics knowledge of relation algebra and SQL to construct queries.
C353.3	Analyze the concepts of Normalization and Transaction Management to structure the database.
C353.4	Examine Functional Dependencies, concurrency control, recovery, and security in formulating a familiar database for real world problem.

Course Name:C354 (Automata Theory and Computability-17CS54)

C354.1	Understand and apply the fundamental concepts of Automata theory and Computability.
C354.2	Apply analytical principle and fundamentals for different language classes.
C354.3	Analyze models of computation like Deterministic, Non-deterministic and software models for a given problem.
C354.4	Analyze the problem under study through formal reasoning and reduction techniques

Course Name:C355 (Object Oriented Modeling and Design-17CS55)

C355.1	Understand and apply the concepts of Object Oriented (OO) models and Design Pattern.
C355.2	Analyze the application Domain and Prepare models from different viewpoints.
C355.3	Design and draw class diagram, sequence diagrams and interaction diagrams for any software systems.
C355.4	Choose and apply design pattern for software applications

Course Name:C356 (.Net Framework for Application Devt-17CS56)

C356.1	Understanding visual studio .NET platform, syntax, and semantics of c# and applying framework tools efficiently.
C356.2	Analyze the object-oriented programming concepts in c# programming language.

C356.3	Design custom interfaces for windows form applications by using controls.
C356.4	Develop window form applications using c# programming language to resolve a given problems.

Course Name:C361 (Cryptography, Network security and Cyber law-**17CS61)**

C361.1	Understand the fundamentals of cryptography, network security, cyber laws and apply the cryptographic techniques for various ciphers.
C361.2	Apply principal concepts to solve a given problem under study.
C361.3	Investigate malwares, file infectors to check for viruses and bugs to eliminate the same.
C361.4	Evaluate the performance of different cryptographic techniques.

Course Name:C362 (File Structures-**17CS62)**

C362.1	Identify the appropriate concept of file structure design and secondary storage devices.
C362.2	Apply appropriate designs for storage and data manipulation with object-oriented programming.
C362.3	Analyze sorting, indexing, and hashing technique for data handling.
C362.4	Identify the appropriate concept of file structure design and secondary storage devices.

Course Name:C363 (Software Testing-17CS63)

C363.1	Understand the concepts of testing and apply to derive different test cases
C363.2	Apply the different testing techniques
C363.3	Analyze the appropriate testing techniques in classifying the problems
C363.4	Create appropriate document for the software artifact

Course Name:C364 (Operating Systems-17CS64)

C364.1	Understand fundamentals of operating systems and applying algorithms to solve given problems.
C364.2	Analyze process scheduling and process synchronization
C364.3	Apply suitable techniques for management of different resources.
C364.4	Compare various operating system platforms through case studies.

Course Name:C365 (Data Mining and Data Warehouse-17CS65)

C365.1	Understand the applicability of fundamental concepts of data warehouse and data mining
C365.2	Apply classification and clustering algorithms for various problems

C365.3	Analyze the suitability of association rules for a given data pattern

Course Name:C366 (Python Application Programming-17CS66)

C366.1	Understand and apply the fundamentals of python programming language.
C366.2	Apply procedure and object-oriented concepts of python to solve simple problems.
C366.3	Analyze python program for Network Programming, Web services and Database applications.
C366.4	Understand and apply the fundamentals of python programming language.

Course Name:C371 (Web Technology and Its Applications-17CS71)

C371.1	Understand and apply the syntax, semantics of HTML and CSS.
C371.2	Apply basics to create forms and tables.
C371.3	Analyze JavaScript frameworks jQuery, Backbone MVC, AJAX and web services.
C371.4	Evaluate dynamic web pages using JavaScript and PHP.

Course Name:C372 (Software Architecture and Design Pattern-17CS72)

C372.1	Understand the range of design patterns and applying appropriate patterns to solve the given problem.
C372.2	Analyze various components of object-oriented system and patterns.
C372.3	Apply design principles in the design of object-oriented systems and distributed systems.
C372.4	Design and model object-oriented systems using different types of pattern.

Course Name:C373 (Machine Learning-17CS73)

C373.1	Understand the applicability of fundamental concepts, algorithms, and associated procedures of machine learning.
C373.2	Apply the basic concepts of mathematics and machine learning to understand Supervised, unsupervised and reinforcement learning algorithms.
C373.3	Analyze the usage of neural networks, Bayes classifier and k nearest neighbor for given problem under study to infer its efficacy.
C373.4	Evaluate the statistics to infer the correctness of the written machine learning algorithm for a given application.

Course Name:C374 (Unix System Programming-17CS74)

C374.1	Understand UNIX, ANSI, POSIX standards and apply file APIs to process files.
C374.2	Apply process concepts to demonstrate inter-process communications.
C374.3	Analyze Signal and Daemon processes for process controlling.

Course Name:C375 (Storage Area Networks -17CS75)

C375.1	Understand the fundamentals and applications of Storage area Network including storage architectures and storage networking techniques.
C375.2	Apply different techniques to provide business continuity capabilities and disaster recovery.
C375.3	Identify key challenges in virtualization and cloud computing.
C375.4	Analyze the suitable RAID technology for different application environments.

Course Name:C381 (Internet of Things Technology-17CS81)

C381.1	Apply the fundamental concepts of IOT architectural models, IOT network protocols and hardware and software tools
C382.2	Apply suitable IOT protocols for given network under study.
C383.3	Analyze the data Analytics in IOT to infer the security issue related to the IOT network.
C384.4	Evaluate the correctness of the chosen hardware and software tools to be used in constructing IOT model.

Course Name:C382 (Object System Simulation and Modeling-17CS82)

C382.1	Understand the basic concepts of warehousing, mining and apply Hadoop Distributed File System commands to manage data.
C382.2	Apply algorithms of warehousing, mining, and Hadoop Distributed File System for data analysis.
C382.3	Analyze Regression, Clustering, Artificial Neural Networks and Decision tree techniques for decision making.
C382.4	Evaluate different techniques of Mining, Association and Mapreduce framework.

Course Name:C383 (Big Data Analytics-17CS83)

C383.1	Describe the role of important elements of discrete event simulation and apply modeling paradigm.
C383.2	Apply functional modeling methods for statistical system activities to conceptualize real world situations.
C383.3	Analyze the modeled simulation results to resolve critical issues in a real-world environment
C383.4	Evaluate the simulation models using verification and validation methods

Course Name:C384 (Internship / Professional Practise-17CS84)

C384.1	Understand the key concerns, practices, Standard operating procedures protocols and new concepts of the company/ industry in which they have worked.

C384.2	Apply hands on experience, communication, interpersonal and other critical skills to integrate theory and practice in multidisciplinary area.
C384.3	Manage time, Analyze the skills which are transferable to new contexts and identify which appropriate engineering technology could be used to solve given problem.
C384.4	Understand the key concerns, practices, Standard operating procedures protocols and new concepts of the company/ industry in which they have worked.

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Department of Electronics and Communication

EngineeringVision of the Institute

To be a respected and most sought after engineering educational institution engaged in equipping individuals capable of building learning organizations in the new millennium.

Mission of the Institute

To develop competent students with good value systems and face challenges of the continuously changing world.

Vision of the Department

To impart technical education par excellence and prepare leaders to serve the industries and society.

Mission of the Department

Mission 1. To Provide the world with a highly committed and quality conscious engineering workforce.

Mission 2. To Encourage the students to build self-help, Power of initiative, courage to change and create new things.

Mission 3. To inculcate the spirit of cooperation and capacity for organization with special emphasis on their self-reliance and sustainability to meet ever changing requirements of local and global industries.

Program Educational Objectives

PEO 1.	Graduates apply their knowledge of mathematics and science to identify, analyze and solve problems in the field of Electronics & communication to develop sophisticated communication systems.
PEO 2.	Graduates to design and build up interdisciplinary systems by solving core engineering problems in communication systems which are technically sound, economically feasible and socially acceptable.
	Graduates exhibit desire for life-long learning which directs them to obtain thorough knowledge in their chosen fields and motivate them for higher studies/research.

Program Specific Objectives

PSO 1: An ability to understand the basic core courses of Electronics & Communication Engineering and to relate them to various areas of application like Communication Systems, control system, Signal processing, VLSI and Embedded systems.

PSO 2: Should have capability to apply modern tools to analyze and solve complex designs with optimal solutions for various real-world applications.

PSO 3: Excellent adaptability to changing work environment with good leadership qualities and zeal for social and environmental well-being.

Course Name: C104 (Basic Electronics-18ELN14/24)

C104.1	Describe the operation of diodes, BJT, FET and operational amplifiers
C104.2	Design and explain the construction of rectifiers, regulators, amplifiers, and oscillators
C104.3	Describe general operating principles of SCRs and its application
C104.4	Explain the working and design of fixed voltage IC regulator using 7805 and a stable oscillator using Timer IC555.
C104.5	Explain the different number systems and their conversions and construct simple combinational and sequential logic circuits using flip-flops.
C104.6	Describe the basic principle of operation of communication systems and mobile phone.

Course Name: C202 (Network Theory-18EC32)

C202.1	Determine currents and voltages using source transformation/ source shifting/ mesh/ nodal analysis and reduce given network using star-delta transformation/source transformation/ source shifting
C202.2	Solve network problems by applying Superposition/ Reciprocity/ Thevenin 's/ Norton 's/ Maximum Power Transfer/ Millman 's Network Theorems and electrical laws to reduce circuit complexities and to arrive at feasible solutions.
C202.3	Calculate current and voltages for the given circuit under transient conditions. Apply Laplace transform to solve the given network.
C202.4	Solve the given network using specified two port network parameter like Z or Y or T or h
C202.5	Understand the concept of resonance
C202.6	Determine the parameters that characterize series / parallel resonant circuit.

Course Name:C203(Electronic Devices -18EC33)

C203.1	Understand the principles of semiconductor Physics
C203.2	Understand the principles and characteristics of different types of semiconductor devices
C203.3	Understand the fabrication process of semiconductor devices
C203.4	Utilize the mathematical models of semiconductor junctions and MOS transistors for circuits and systems.
C203.5	Identify the mathematical models of MOS transistors for circuits and systems.
C203.6	Analyze the circuits and develop mathematical model of MOS transistors.

Course Name: C204 (Digital System Design-18EC34)

C204.1	Explain the concept of combinational and sequential logic circuits.

C204.2	Analyze and Design the combinational logic circuits.
C204.3	Describe and characterize flip-flops and its applications.
C204.4	Design the sequential circuits using SR, JK, D, T flip-flops.
C204.5	Design the sequential circuits using Mealy & Moore machines.
C204.6	Design applications of Combinational & Sequential Circuits.

Course Name:C205 (Computer Organization and Architecture-18EC35)

C205.1	Explain the basic organization of a computer system.
C205.2	Describe the addressing modes, instruction formats and program control statements.
C205.3	Explain different ways of accessing an input / output device including interrupts.
C205.4	Illustrate the organization of different types of semiconductor and other secondary storage memories.
C205.5	Illustrate simple processor organization based on hardwired control.
C205.6	Illustrate simple processor organization based on micro programmed control.

Course Name: C206 (Power Electronics and Instrumentation-18EC36)

C206.1	Build and test circuits using power electronic devices.
C206.2	Analyze and design-controlled rectifier, DC to DC converters, DC to AC inverters and SMPS.
C206.3	Analyze the instrument characteristics and errors.
C206.4	Describe the principle of operation and Develop circuits for multirange Ammeters, Voltmeters and Bridges to measure passive component values and frequency.
C206.5	Explain the principle, design and analyze the transducers for measuring physical Parameters.
C206.6	Design bridge circuits using instrumentation transducers.

Course Name: C212 (Analog Circuits -18EC42)

C212.1	Understand the characteristics of BJTs and FETs.
C212.2	Design and analyze BJT and FET amplifier circuits.
C212.3	Design sinusoidal and non-sinusoidal oscillators.
C212.4	Understand the functioning of linear ICs.
C212.5	Design of Linear IC based circuits.
C212.6	Develop amplifier circuits using BJT and FET.

Course Name: C213 (Control Systems -18EC43)

C213.1	Develop the mathematical model of mechanical and electrical systems.

C213.2	Develop transfer function for a given control system using block diagram reduction techniques and signal flow graph method.
C213.3	Determine the time domain specification s for first and second order systems.
C213.4	Determine the stability of a system in the time domain using Routh-Hurwitz criterion.
C213.5	Determine the stability of a system in the time domain using Root-Locus technique.
C213.6	Determine the s stability of a system in the frequency domain using Nyquist and bode plots.

Course Name: C215 (Signals and Systems -18EC45)

C215.1	Analyze the different types of signals and systems.
C215.2	Determine the linearity, causality, time-invariance, and stability properties of continuous and discrete time systems.
C215.3	Evaluate the convolution sum and integral
C215.4	Represent continuous systems in time and frequency domain using different transforms
C215.5	Represent discrete systems in time and frequency domain using different transforms
C215.6	Analyze discrete Fourier time signals and systems using Z-Transforms.

Course Name: C216 (Microcontroller -18EC46)

C216.1	Explain the difference between Microprocessors & Microcontrollers, Architecture of 8051 Microcontroller, Interfacing of 8051 to external memory and Instruction set of 8051.
C216.2	Write 8051 Assembly level programs using 8051 instruction set.
C216.3	Explain the Interrupt system, operation of Timers/Counters and Serial port of 8051.
C216.4	Write 8051 Assembly language programs to generate square wave on 8051 I/O port pin using interrupt and C Programme to send & receive serial data using 8051 serial port.
C216.5	Interface simple switches, simple LEDs, ADC 0804, LCD and Stepper Motor to 8051 using 8051 I/O ports.

Course Name:C301 (Management & Entrepreneurship-17ES51)

C301.1	Understand the fundamental concepts of Management and Entrepreneurship
C301.2	Select a best Entrepreneurship model for the required domain of establishment
C301.3	Describe the functions of Managers, Entrepreneurs, and their social responsibilities
C301.4	Compare various types of Entrepreneurs
C301.5	Analyze the various roles of Entrepreneurs and Various small-scale businesses.
C301.6	Analyze the Institutional support by various state and central government agencies

Course: C302(Digital Signal Processing -17EC52)

C302.1	Determine response of LTI systems using time domain and DFT techniques.
C302.2	Compute DFT of real and complex discrete time signals.
C302.3	Computation of DFT using FFT algorithms
C302.4	Computation of DFT using linear filtering approach.
C302.5	Solve problems on digital filter design and realize using digital computations.
C302.6	Analyze the various DSP processors and its floating-point processors

Course Name: C303(Verilog HDL-17EC53)

C303.1	Write Verilog programs in gate, dataflow (RTL), behavioral and switch modeling levels of Abstraction.
C303.2	Write simple programs in VHDL in different styles.
C303.3	Design and verify the functionality of digital circuit/system using test benches.
C303.4	Identify the suitable Abstraction level for a particular digital design.
C303.5	Write the programs more effectively using Verilog tasks and directives.
C303.6	Perform timing and delay Simulation.

Course Name:C304(Information Theory & Coding -17EC54)

C304.1	Explain concept of Dependent & Independent Source, measure of information, Entropy, Rate of Information and Order of a source
C304.2	Represent the information using Shannon Encoding, Shannon Fano, Prefix and Huffman Encoding Algorithms
C304.3	Model the continuous and discrete communication channels using input, output and joint probabilities
C304.4	Determine a codeword comprising of the check bits computed using Linear Block codes, cyclic codes & convolutional codes
C304.5	Design the encoding and decoding circuits for Linear Block codes, cyclic codes, convolutional codes.
C304.6	Design the encoding and decoding circuits BCH and Golay codes.

Course Name:C305 (Operating System- 17EC553)

C305.1	Explain the goals, structure, operation and types of operating systems.
C305.2	Apply scheduling techniques to find performance factors.
C305.3	Explain organization of file systems and IOCS.
C305.4	Describe message passing, deadlock detection and prevention methods
C305.5	Apply suitable techniques for contiguous and non-contiguous memory allocation

Course Name: C306 (Object Oriented Programming Using C++-17EC562)

C306.1	Explain the basics of Object-Oriented Programming concepts
C306.2	Apply the object initialization and destroy concept using constructors and destructors.
C306.3	Apply the concept of polymorphism to implement compile time polymorphism in programs by using overloading methods and operators.
C306.4	Use the concept of inheritance to reduce the length of code and evaluate the usefulness
C306.5	Apply the concept of run time polymorphism by using virtual functions, overriding functions and abstract class in programs.
C306.6	Use I/O operations and file streams in programs

Course Name:C311 (Digital Communication-17EC61)

C311.1	Associate and apply the concepts of Bandpass sampling to well specified signals and channels.
C311.2	Analyze and compute performance parameters and transfer rates for low pass and bandpass symbol under ideal and corrupted non-band limited channels.
C311.3	Describe low pass and bandpass symbol under ideal and corrupted non-band limited channels.
C311.4	Test and validate symbol processing at the receiver under ideal and corrupted bandlimited channels.
C311.5	Test and validate performance parameters at the receiver under ideal and corrupted bandlimited channels.
C311.6	Demonstrate by simulation and emulation that bandpass signals subjected to corrupted and distorted symbols in a bandlimited channel, can be demodulated and estimated at receiver to meet specified performance criteria.

Course Name: C312 (ARM Microcontroller & Embedded Systems-17EC62)

C312.1	Describe the architectural features and instructions of 32-bit microcontroller ARM Cortex M3.
C312.2	Apply the knowledge gained for Programming ARM Cortex M3 for different applications.
C312.3	Understand the basic hardware components and their selection method based on the characteristics and attributes of an embedded system.
C312.4	Develop the hardware co-design and firmware design approaches.
C312.5	Explain the need of real time operating system for embedded system applications.
C313.6	Develop the software co-design and firmware design approaches.

Course Name:C313(VLSI Design-17EC63)

C313.1	Demonstrate understanding of MOS transistor theory, CMOS fabrication flow and technology scaling.
C313.2	Draw the basic gates using the stick and layout diagrams with the knowledge of physical design aspects
C313.3	Interpret Memory elements along with timing considerations
C313.4	Demonstrate knowledge of FPGA based system design
C313.5	Interpret testing and testability issues in VLSI Design
C313.6	Analyze CMOS subsystems and architectural issues with the design constraints.

Course Name: C314 (Computer Communication Networks - 17EC64

C314.1	Identify the protocols and services of Data link layer.
C314.2	Identify the protocols and functions associated with the transport layer services.
C314.3	Describe the layering architecture of computer networks and distinguish between the OSI reference model and TCP/IP protocol suite.
C314.4	Distinguish the basic network configurations and standards associated with each network
C314.5	Analyze and design a network model using Dijkstra's algorithm.
C314.6	Construct a network model and determine the routing of packets using different routing algorithms.

Course Name:C315(Digital Switching Systems-17EC654)

C315.1	Describe the electromechanical switching systems and its comparison with the digital switching.
C315.2	Determine the telecommunication traffic and its measurements.
C315.3	Define the technologies associated with the data switching operations.
C315.4	Describe the software aspects of switching systems and its maintenance.

Course Name:C316(Digital System Design using Verilog-17EC663)

C316.1	Construct the combinational circuits, using discrete gates and programmable logic devices.
C316.2	Describe Verilog model for sequential circuits and test pattern generation.
C316.3	Design a semiconductor memory for specific chip design.
C316.4	Design embedded systems using small microcontrollers, larger CPUs/DSPs, or hard or soft processor cores. ·
C316.5	Synthesize different types of processors that are used in embedded system.

C316.6	Synthesize different types of I/O controllers that are used in embedded system

Course Name:C401(Microwave and Antennas - 15EC71)

C401.1	Describe the use and advantages of microwave transmission.
C401.2	Analyze various parameters related to microwave transmission lines and waveguides
C401.3	Identify microwave devices for several applications.
C401.4	Analyze various antenna parameters necessary for building an RF system.
C401.5	Recommend various antenna configurations according to the applications
C401.6	Design/Simulate an antenna configuration according to the applications.

Course Name:C402(Digital Image Processing- 15EC72)

C402.1	Understand image formation and the role human visual system plays in perception of gray and color image data.
C402.2	Apply image processing techniques in both the spatial and frequency (Fourier) domains.
C402.3	Design image analysis techniques in the form of image segmentation
C402.4	Evaluate the various Methodologies for segmentation.
C402.5	Describe Image Enhancement techniques.
C402.6	Conduct independent study and analysis of Image Enhancement techniques.

Course Name:C403(Power Electronics- 15EC73)

C403.1	Describe the characteristics of different power devices and identify the various applications associated with it
C403.2	Illustrate the working of power circuit as DC-DC converter
C403.3	Illustrate the operation of inverter circuit and static switches.
C403.4	Determine the output response of a thyristor circuit with various triggering options
C403.5	Determine the response of controlled rectifier with resistive and inductive loads.
C403.6	Analyze the various types of inverters and develop SMPS.

Course Name:C404(Multimedia Communication - 15EC741)

C404.1	Understand basics of different multimedia networks and applications.
C404.2	Understand different compression techniques to compress audio and video.
C404.3	Describe multimedia Communication across Networks.

C404.4	Analyze different media types to represent them in digital form.
C404.5	Compress different types of text and images using different compression techniques and analyses DMS.

Course Name:C405(Satellite Communication - 15EC755

C405.1	Describe the satellite orbits and its trajectories with the definitions of parameters associated with it.
C405.2	Describe the electronic hardware systems associated with the satellite subsystem and earth station.
C405.3	Describe the various applications of satellite with the focus on national satellite system.
C405.4	Analyze the applications on national satellite system.
C405.5	Describe multiple access techniques.
C405.6	Compute the satellite link parameters under various propagation conditions with the illustration of multiple access techniques.

Course Name:C411(Wireless Cellular and LTE 4G Broadband -15EC81

C411.1	Understand the system architecture and the functional standard specified in LTE 4G.
C411.2	Analyze the role of LTE radio interface protocols and EPS Data convergence protocols to set up, reconfigure and release data and voice from users.
C411.3	Demonstrate the UTRAN and EPS handling processes from set up to release including mobility management for a variety of data call scenarios.
C411.4	Describe Resource management, packet data processing.
C411.5	Test the Performance of resource management and packet data processing and transport algorithms.
C411.6	Evaluate the Performance of resource management and packet data processing and transport algorithms.

Course Name:C412(Fiber Optics & Networks- 15EC82)

C412.1	Classification and working of optical fiber with different modes of signal propagation.
C412.2	Describe the transmission characteristics and losses in optical fiber communication.
C412.3	Describe the construction and working principle of optical connectors, multiplexers and amplifiers.
C412.4	Describe the constructional features and the characteristics of optical sources and detectors.
C412.5	Illustrate the networking aspects of optical fiber.

C412.6	Describe various standards associated with networking.

Course Name:C413(Radar Engineering- 15EC833)

C413.1	Understand the radar fundamentals and radar signals
C413.2	Explain the working principle of pulse Doppler radars, their applications and limitations
C413.3	Describe Radar applications and limitations.
C413.4	Analyze radar transmitters and receivers.
C413.5	Describe the working of various radar transmitters and receivers.
C413.6	Analyze the range parameters of pulse radar system which affect the system performance

CHILDREN'S EDUCATION SOCIETY (Regd.)
THE OXFORD COLLEGE OF ENGINEERING
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Department of Electrical and Electronics

EngineeringVision of the Institute

To be a respected and most sought after engineering educational institution engaged in equipping individuals capable of building learning organizations in the new millennium.

Mission of the Institute

To develop competent students with good value systems and face challenges of the continuously changing world.

Vision of the Department

To meet the educational and research needs of the student community and staff through collaboration with other academic and technical institutions, industry and government agencies and make the students to face problems of the country and society.

Mission of the Department

M1 - To develop and train competent Electrical and Electronics Engineers with adequate practical skills.

M2 - To provide state-of-the-art resources that contribute to achieve excellence in teaching-learning, research, and development activities.

M3 - To inculcate, ethics, leadership, moral values, and social activities.

Program Educational Objectives

PEO	Be able to apply the fundamental knowledge of mathematics, science, electrical and electronics engineering to analyze and solve the complex problem in electrical, electronics and allied interdisciplinary areas.
PEO 2.	Possess good leadership skills, function ethically in multidisciplinary areas to develop sustainable solutions for global, environmental, and social issues.
	Be able to inculcate lifelong learning to maintain and enhance professional skills.

Program Specific Objectives

PSO 1: Apply fundamental knowledge to identify, formulate, design, and investigate various problems of electrical and electronic circuits, power electronics, control systems and power systems.

PSO 2: Apply modern software tools for design, simulation, and analysis of electrical systems to engage in life- long learning and to successfully adapt in multi-disciplinary environments.

PSO 3: Solve ethically and professionally various Electrical Engineering problems in societal and environmental context and communicate effectively by applying project management techniques to complex engineering problems.

Course Name:18EE32/Electric Circuit Analysis

C232.1	Understand the basic concepts, basic laws, reduce the complexity of the network using source transformation and source shifting, network reduction using star/delta transformations and understand the analysis of dc and ac networks
C232.2	Discuss the resonance in series and parallel circuits
C232.3	Solve complex electric circuits using superposition, Thevenin's and Norton's theorems
C232.4	Solve complex electric circuits using Reciprocity, Millman's and Maximum power transfer theorems
C232.5	Synthesize typical waveforms using Laplace transforms
C232.6	Evaluate the performance of two port networks and transient analysis

Course Name:18EE33–Transformers and Generators

C233.1	Understand the construction and operation of 1-phase, 3-Phase transformers and Autotransformer.
C233.2	Analyze the performance of transformers by polarity test, Sumner's Test, phase conversion, 3-phase connection, and parallel operation.
C233.3	Understand the construction and working of AC and DC Generators.
C233.4	Analyze the performance of the AC Generators on infinite bus and parallel operation.
C233.5	Determine the regulation of AC Generator by Slip test, EMF, MMF, and ZPF Methods.
C233.6	Performance of Synchronous Generators, Power angle characteristics.

Course Name: Analog Electronic Circuits / 18EE34

C234.1	Utilize the characteristics of transistor for different applications.
C234.2	Design and analyze biasing circuits for transistor.
C234.3	Observe the effect of negative feedback, different types of negative feedback topologies.
C234.4	Design and analyze and test transistor circuitry as amplifiers and oscillators.
C234.5	Design and working of different oscillators using BJT's.
C234.6	Develop the ability to understand the design and working of FET amplifiers.

Course Name:18EE35– Digital System Design

C235.1	Develop simplified switching equation using Karnaugh Maps
C235.2	Develop simplified switching equation using Quine McClusky techniques and Design of Adder circuits
C235.3	Design Multiplexer, Encoder, Decoder, Subtractors and Comparator as digital combinational control circuits.
C235.4	Design flip flops, counters, shift registers as sequential control circuits
C235.5	Design of Counters

C235.6	Develop Mealy/Moore Models and state diagrams for the given clocked sequential circuits and Explain the functioning of Read only and Read/Write Memories, Programmable ROM, EPROM and Flash memory

Course Name:18EE36 - Electrical &Electronics Measurements

C236.1	Measure resistance, inductance and capacitance using bridges and determine earth resistance.
C236.2	Construction and operation of single-phase and three phase Electrodynamometer P. Meter, Weston frequency meter and Phase sequence indicator
C236.3	Explain the working of various meters used for measurement of Power, Energy & understand the adjustments, calibration & errors in energy meters.
C236.4	Understand methods of extending the range of instruments & instrument transformers
C236.5	Explain the working of different electronic instruments
C236.6	Explain the working of different display and recording devices

Course Name:18EEL37–Electrical Machines Lab

C238.1	Evaluate the performance of transformers from the test data obtained. •
C238.2	Connect and operate two single phase transformers of different KVA rating in parallel.
C238.3	Connect single phase transformers for three phase operation and phase conversion.
C238.4	Compute the voltage regulation of synchronous generator using the test data obtained in the laboratory.
C238.5	Evaluate the performance of synchronous generators from the test data and assess the performance of synchronous generator connected to infinite bus.
C238.6	Evaluate the performance of transformers from the test data obtained. •

Course Name:18EEL38–Electrical Machines Lab

C238.1	Evaluate the performance of transformers from the test data obtained. •
C238.2	Connect and operate two single phase transformers of different KVA rating in parallel.
C238.3	Connect single phase transformers for three phase operation and phase conversion.
C238.4	Compute the voltage regulation of synchronous generator using the test data obtained in the laboratory.
C238.5	Evaluate the performance of synchronous generators from the test data and assess the performance of synchronous generator connected to infinite bus.
C238.6	Evaluate the performance of transformers from the test data obtained. •

Course Name:18EE42 – Power Generation and Economics

C242.1	Describe the working of hydroelectric, power plants and state functions of major equipment of the power plants.

C242.2	Describe the working of steam power plants and state functions of major equipment of the power plants
C242.3	Describe the working of Diesel, Gas Turbine, power plants and state functions of major equipment of the power plants
C242.4	Describe the working of nuclear power plants and state functions of major equipment of the power plants.
C242.5	Classify various substations and explain the functions of major equipment's in substations. • Explain the types of grounding and its importance.
C242.6	Infer the economic aspects of power system operation and its effects. • Explain the importance of power factor improvement.

Course Name: Transmission and Distribution / 18EE43

C243.1	Understand the concepts of various methods of generation of power.
C243.2	Parameters associated with transmission line.
C243.3	Design and analyze the overhead transmission line for different configuration.
C243.4	Calculate the parameters of transmission line for different configuration.
C243.5	Understand the use of underground cable.
C243.6	Evaluate different types of distributors.

Course Name: Electric Motors / 18EE44

C244.1	Explain the constructional features of motors and drive for specific applications.
C244.2	Analysis the performance characteristic of DC motors.
C244.3	Explain the constructional features of 3-phase and single-phase induction motors.
C244.4	Control the speed of induction motor by suitable method
C244.5	Explain the operation of synchronous motor and special motors.
C244.6	Control the speed of motor by suitable method.

Course Name: Field theory / 18EE45

C245.1	To study different coordinate systems for understanding the concept of gradient, divergence, and curl of a vector.
C245.2	To study, apply coulomb's law and gauss laws for electric field produced by different charge configuration.
C245.3	To evaluate the energy and potential due to a system of charges.
C245.4	To study the behavior of electric field across a boundary between a conductor and dielectric and between two different dielectrics.
C245.5	To study the magnetic fields and magnetic materials.
C245.6	To study the time varying fields and propagation of wave of different media.

Course Name: Opamp / 18EE46

C246.1	Explain the representation, characteristics and equivalent circuit and application.
C246.2	Designing of first, second order filters, voltage regulators using OPAMP.
C246.3	Use of OPAMP in signal generation, comparator, and converter circuits.
C246.4	Use of OPAMP in signal processing, A/D and D /A converter circuits.
C246.5	Discussion of PLL, its components and performance factors.
C246.6	Discussion of 555 timers an its application in signal generation.

Course Name: Electrical Machines Lab – 2 / 18EEL47

C247.1	Test dc machines to determine their characteristics
C247.2	Control the speed of dc motor
C247.3	Pre-determine the performance characteristics of dc machines by conducting suitable tests.
C247.4	Perform load test on single phase and three phase induction motor to assess its performance
C247.5	Conduct test on induction motor to pre-determine the performance characteristics
C247.6	Conduct test on synchronous motor to draw the performance curves.

Course Name: Opamp & LIC Laboratory / 18EEL48

C247.1	To conduct experiment to determine the characteristic parameters of OP-Amp
C247.2	To design test the OP-Amp as Amplifier, adder, subtractor, differentiator and integrator
C247.3	To design test the OP-Amp as oscillators and filters.
C247.4	Design and study of Linear ICs as multivibrator power supplies.
C247.5	Use of OPAMP in signal generation, comparator, and converter circuits.
C247.6	Use of OPAMP in signal processing, A/D and D /A converter circuits.

Course Name:17EE51 - Management & Entrepreneurship

C351.1	Explain the field of management, task of the manager, planning and the need of proper staff, recruitment, and selection process.
C351.2	Discuss work allocation, the structure of organization, the modes of communication and importance of managerial control in business.
C351.3	To explain need of coordination between the manager and staff in exercising the authority and delegating duties.
C351.4	To explain the social responsibility of business and leadership concepts of entrepreneurship and the role and importance.
C351.5	Show an understanding of the role and importance of Small-Scale Industries, business plan and its presentation.

C351.6	Discuss the concepts of project management, capitol building process, project feasibility study, project appraisal and project financing.

Course Name: - Microcontroller

C352.1	To explain the internal or organization and working of computers, microcontrollers and embedded processors also to compare and contrast the various members of the 8051 family.
C352.2	To explain in detail the execution of 8051 assembly language instructions and data types and to explain loop, conditional and unconditional jump and call, handling and manipulation of I / O instructions.
C352.3	To explain develop 8051C programs for time delay, I/O operations, I/O bit manipulation, logic, arithmetic operations, and data conversions.
C352.4	To explain develop 8051C serial port programming.
C352.5	To explain in detail the interfacing of various devices with 8051 C processor.
C352.6	To explain about various interrupt routines

Course Name:17EE53–Power Electronics

C353.1	- To explain application area of power electronics, types of power electronic circuits and switches their characteristics and specifications.
C353.2	To explain types of power diodes, their characteristics, and the effects of power diodes on RL circuits.
C353.3	To explain the techniques for design, operation, and analysis of single-phase diode rectifier circuits
C353.4	To explain steady state, switching characteristics and gate control requirements of different power transistors and their limitations.
C353.5	To discuss different types of Thyristors, their operation, gate characteristics and gate control requirements
C353.6	To explain designing, analysis techniques and characteristics of thyristor-controlled rectifiers.

Course Name:17EE54 – Signals and Systems

C354.1	Basics of signals and system, Classification of signals and system
C354.2	To explain in detail the basic operations on signals and properties of system
C354.3	To explain the use convolution in both continuous and discrete domain for the analysis of systems given the impulse response of a system. Provide block diagram representation of LTI system.
C354.4	To explain use Z-transform and properties of Z-transform for the analysis of discrete time systems
C354.5	To explain in detail the continuous time Fourier transform representation to study signals and linear time invariant systems

C354.6	To explain to apply Discrete time Fourier transform representation to study signals and linear time invariant systems

Course Name:17EE553 – Electrical Estimation & Costing

C355.1	Explain the purpose of estimation and costing.
C355.2	Discuss AE act and IE rules.
C355.3	Discuss energy distribution in a building, wiring, cable, fuses, lightning, points, circuits, sub circuits.
C355.4	Discuss types of service mains and estimation of service mains and power circuits.
C355.5	Discuss estimation of overhead transmission and distribution system and its components.
C355.6	Discuss main components of substation, preparation of single line diagram and ear thing of a substation.

Course Name:17EE563 – Renewable Energy Sources

C356.1	Discuss energy scarcity, solution, availability of renewable energy.
C356.2	Explain about sun, earth relationship, types of solar collectors.
C356.3	Discuss solar cell components, characteristics, application, and configuration.
C356.4	Discuss hydrogen, wind energy production, site selection, storage.
C356.5	Discuss biomass, biogas composition types, production, advantages, and disadvantages.
C356.6	Discuss availability, generation, devices for tidal, sea wave and wave and ocean thermal energy.

Course Name:17EEL57 – Microcontroller Lab

C357.1	Write Assembly language Program for arithmetic and data transfer Instructions
C357.2	Write Assembly language Program for Logical and Branching Instructions
C357.3	Write Assembly/ C language Program for Counters
C357.4	Write Assembly / C language Program for generating Delays
C357.5	Interface External control and Display devices
C357.6	To work in a team and present report

Course Name:17EEL58 – Power Electronics Lab

C358.1	To conduct experiments on semiconductor devices to obtain their static characteristics.
C358.2	To study different methods of triggering the SCR
C358.3	To study the performance of single phase controlled full wave rectifier and AC voltage controller with R and RL loads
C358.4	To control the speed of a dc motor, universal motor, and stepper motors

C358.5	To study single phase full bridge inverter connected to resistive load.
C358.6	To study protection circuit

Course Name: Control Systems / 17EE61

C361.1	Discuss the effect of feedback and types of control systems, evaluate the transfer function.
C361.2	Evaluate the stability of linear time invariant systems.
C361.3	Apply block diagram manipulation and signal flow graph.
C361.4	Demonstrate the model of control system using mathematical modeling.
C361.5	Determine the transient and steady state time response.
C361.6	Investigate the performance of the given system in time and frequency domain-based design of controller or compensator configuration.

Course Name: Power System Analysis / 17EE62

C362.1	Show understanding of per unit system, its advantages and computation.
C362.2	Perform short circuit analysis on a synchronous machine and simple power system to select a circuit breaker for the system.
C362.3	Evaluate symmetrical components of voltages and currents in un-balanced three phase circuits.
C362.4	Explain the concept of sequence impedance and sequence networks of power system components and power system.
C362.5	Analyse three phase synchronous machine and simple power systems for different unsymmetrical faults using symmetrical components.
C362.6	Discuss the dynamics of synchronous machine, stability, and types of stability.

Course Name: Digital Signal Processing / 17EE63

C363.1	Compute the DFT of various signals using its properties.
C363.2	Use the DFT to compute the linear and circular convolution and linear filters of long sequence.
C363.3	Apply fat and efficient algorithm for computing DFT and IDFT.
C363.4	Design of IIR Butterworth digital filters using impulse invariant/BT.
C363.5	Design of IIR digital filter using Impulse invariant/Bilinear transformation.
C363.6	Design of FIR filters using wind functions and frequency sampling method and realization of IIR and FIR filters

Course Name: Electrical Machine Design / 17EE64

C364.1	To know the properties of electrical and magnetic materials.
C364.2	To design the machines as in modern trend.
C364.3	Selection of loading for various machines

C364.4	To discuss the main dimensions of machines.
C364.5	To discuss design of AC and DC machines.
C364.6	To know the short circuit ration and performance.

Course Name: Computer Aided Electrical Drawing / 17EE651

C365.1	Discuss the terminology and types of DC and AC armature windings.
C365.2	Develop armature winding diagram for AC and DC machines.
C365.3	Develop layout of substation using standard symbols.
C365.4	Draw sectional views of transformer using design data.
C365.5	Draw sectional views of assembled DC machine or its parts.
C365.6	Draw sectional views of assembled alternator or its parts.

Course Name:17EE654 – Solar and Wind Energy

C362.1	Explain the importance of energy in human life, relationship among economy and environment with energy use and increasing role of renewable energy.
C362.2	Explain the concept of energy storage and the principles of energy storage devices.
C362.3	To discuss solar radiation on horizontal and tilted surface, its characteristics, measurement, and analysis of radiation data.
C362.4	Describe the process of harnessing solar energy and its applications in heating and cooling.
C362.5	Discuss fabrication, operation of solar cell, electrical characteristics, sizing and design of solar PV systems and their applications.
C362.6	Explain basic Principles of Wind Energy Conversion, collection of wind data, energy estimation and site selection. Discuss the performance of Wind-machines, energy storage, applications of Wind Energy and environmental aspects.

Course Name: Sensors and Transducers / 17EE662

C366.1	Discuss need of transducers, classification, advantages, disadvantages, working.
C366.2	Discuss recent trends in sensor technologies of their selection.
C366.3	Discuss basics of signal codes equipment.
C366.4	Discuss configuration of DAS and data conversion.
C366.5	Show knowledge of data transmission &telemetry.
C366.6	Express measurement of non-electrical quantities.

Course Name: Control Systems Lab / 17EEL67

C367.1	Use software package or discrete components in assessing the time and frequency domain reposes of a given second order system
C367.2	Design and analyze Lead, Lag and Lag – Lead compensators for given specifications
C367.3	Determine the performance characteristics of ac and dc servomotors and synchro-transmitter receiver pair used in control systems

C367.4	Simulate the DC position and feedback control system to study the effect of P, PI, PD and PID controller and Lead compensator on the step response of the system
C367.5	Write a script files to plot root locus, bode plot, Nyquist plots to study the stability of the system using a software package
C367.6	Work with a small team to carryout experiments and prepare reports that present lab work

Course Name: Digital Signal Processing Lab / 17EEL68

C368.1	Give physical interpretation of sampling theorem in time and frequency domains.
C368.2	Evaluate the impulse response of a system
C368.3	Perform convolution of given sequences to evaluate the response of a system.
C368.4	Compute DFT and IDFT of a given sequence using the basic definition and/or fast methods
C368.5	Provide a solution for a given difference equation
C368.6	Design and implement IIR and FIR filters

Course Name:15EE71 - Power System Analysis-2

C471.1	Formulate network matrices and models for solving load flow problems
C471.2	Perform steady state power flow analysis of power systems using numerical iterative techniques
C471.3	Suggest a method to control voltage profile
C471.4	Show knowledge of optimal operation of generators on a bus bar, optimal unit commitment; discuss optimal scheduling for hydrothermal system, power system security and reliability
C471.5	Analyze short circuit faults in power system networks using bus impedance matrix
C471.6	Perform numerical solution of swing equation for multi – machine stability

Course Name:15EE72 - Power System Protection

C472.1	To discuss performance of protective relays, components of protection scheme and relay terminology and to explain relay construction and operating principles.
C472.2	To explain Overcurrent protection using electromagnetic and static relays and Overcurrent protective schemes
C472.3	To discuss types of electromagnetic and static distance relays, effect of arc resistance, power swings, line length and source impedance on performance of distance relays
C472.4	To discuss pilot protection, wire pilot relaying and carrier pilot relaying. And also, to discuss construction, operating principles and performance of various differential relays for differential protection
C472.5	To discuss protection of generators, motors, Transformer and Bus Zone Protection.
C472.6	To explain the principle of circuit interruption and different types of circuit breakers and to describe the construction and operating principle of different types of fuses and to give the definitions of different terminologies related to a fuse

Course Name:15EE73 – HIGH VOLTAGE ENGG

C473.1	Explain the Conduction and Breakdown phenomenon in gases, liquid dielectrics
C473.2	Explain the Conduction and Breakdown phenomenon in gases, solid dielectrics.
C473.3	To discuss the generation of high Voltages and currents.
C473.4	To discuss the measurement techniques for high voltages and currents.
C473.5	To discuss over voltage phenomenon and Insulation coordination in Electric power system.
C473.6	To discuss testing of materials and Electric apparatus and high voltage testing of Electric apparatus.

Course Name:15EE742 – Utilization of Electrical Energy

C4742.1	Able to discuss electric heating, air-conditioning and electric welding.
C4742.2	To explain laws of electrolysis, extraction and refining of metals and electro deposition, terminology of illumination, laws of illumination, construction and working of electric lamps.
C4742.3	Able to Design interior and exterior lighting systems- illumination levels for factory lighting- flood lighting-street lighting.
C4742.4	To discuss systems of electric traction, speed time curves and mechanics of train movement.
C4742.5	Able to Explain the motors used for electric traction and their control and discuss braking of electric motors, traction systems and power supply and other traction systems

C4742.6	Able to explain the working of electric and hybrid electric vehicles

Course Name:15EE752 – Testing and Commissioning of Power System Apparatus

C4752.1	Describe the process to plan, control and implement commissioning of electrical equipment's.
C4752.2	Differentiate the performance specifications of transformer and induction motor
C4752.3	Demonstrate the routine tests for synchronous machine, induction motor, transformer & switchgears.
C4752.4	Describe corrective and preventive maintenance of electrical equipment's
C4752.5	Explain the operation of an electrical equipment's such as isolators & circuit breakers
C4752.6	Explain the operation of an electrical equipment's such as induction motor and synchronous machines.

Course Name:15EEL76-Power System Simulation Lab

C476.1	Develop a program in MATLAB to assess the performance of medium and long transmission lines.
C476.2	Develop a program in MATLAB to obtain the power angle characteristics of salient and non-salient pole alternator and assess the transient stability under three phase faults at different locations in a of radial power systems.
C476.3	Develop programs in MATLAB to formulate bus admittance and bus impedance matrices of interconnected power systems.
C476.4	Use Mi-Power package to solve power flow problem for simple power systems.
C476.5	Use Mi-Power package to study unsymmetrical faults at different locations in radial power systems
C476.6	Use of Mi-Power package to study optimal generation scheduling problems for thermal power plants

Course Name: 15EEL77-High Voltage &Relay Lab

C477.1	Experimentally verify the characteristics of over current, over voltage, under voltage and negative sequence relays both electromagnetic and static type
C477.2	Experimentally verify the characteristics of microprocessor based over current, over voltage, under voltage relays and distance relay. Show knowledge of protecting
C477.3	Analyze the spark over characteristics for both uniform and non-uniform configurations using High AC and DC voltages.
C477.4	Measure high AC and DC voltages and breakdown strength of transformer oil.
C477.5	Draw electric field and measure the capacitance of different electrode configuration models.

C477.6	Show knowledge of generating standard lightning impulse voltage to determine efficiency, energy of impulse generator and 50% probability flashover voltage for air insulation.

Course Name:15EEP78-Project Work – Phase 1

C478.1	Demonstrate a sound technical knowledge of their selected project topic
C478.2	Undertake problem identification, formulation, and solution.
C478.3	Design engineering solutions to complex problems utilizing a systems approach.
C478.4	Communicate with engineers and the community at large in written an oral form.
C478.5	Demonstrate the knowledge &skills of a professional engineer.
C478.6	Demonstrate the attitudes of a professional engineer.

Course Name: Power System Operation and control / 15EE81

C481.1	Describe various levels of controls in power systems, the vulnerability of the system, components, architecture, and configuration of SCADA and Solve unit commitment problems
C481.2	Explain issues of hydrothermal scheduling and solutions to hydrothermal problems
C481.3	Explain basic generator control loops, functions of Automatic generation control, speed governors
C481.4	Develop and analyze mathematical models of Automatic Load Frequency Control
C481.5	Explain automatic generation control, voltage and reactive power control in an interconnected power system.
C481.6	Explain reliability, security, contingency analysis, state estimation and related issues of power systems.

Course Name: Industrial Drives / 15EE82

C482.1	Explain the advantages and choice of electric drive.
C482.2	Explain dynamics and different modes of operation of electric drives.
C482.3	Analyze the performance of induction motor drives under different conditions.
C482.4	Control induction motor, synchronous motor, and stepper motor drives.
C482.5	Suggest a motor for a drive and control of dc motor using controlled rectifiers
C482.6	Suggest a suitable electrical drive for specific application in the industry

Course Name: Smart Grid / 15EE831

C4831.1	Discuss the progress made by different stakeholders in the design and development of smart grid and Explain measurement techniques using Phasor Measurement Units and smart meters
C4831.2	Discuss tools for the analysis of smart grid and design, operation, and performance

C4831.3	Discuss classical optimization techniques and computational methods for smart grid design, planning and operation.
C4831.4	Explain predictive grid management and control technology for enhancing the smart grid performance
C4831.5	Discuss the computational techniques, communication, measurement, and monitoring technology tools essential to the design of the smart grid.
C4831.6	Explain methods to promote smart grid awareness and making the existing transmission system smarter by investing in new technology

Course Name: Internship / 15EE84

C484.1	Gain practical experience within industry in which the internship is done
C484.2	Apply knowledge and skills learned to classroom work
C484.3	Develop a greater understanding about career options while more clearly defining personal career goals
C484.4	Develop and refine oral and written communication skills.
C484.5	Expand intellectual capacity, credibility, judgment, intuition.
C484.6	Acquire the knowledge of administration, marketing, finance, and economics

Subject Name/ Subject Code: Project Work/ 15EEP85

C485.1	Present the project and be able to defend it
C485.2	Make links across different areas of knowledge and to generate, develop and evaluate ideas and information to apply these skills to the project task
C485.3	Habituated to critical thinking and use problem solving skills
C485.4	Communicate effectively and to present ideas clearly and coherently in both the written and oral forms
C485.5	Work in a team to achieve common goal.
C485.6	Learn on their own, reflect on their learning and take appropriate actions to improve it

Course Name: Seminar/ 15EES86

C486.1	Attain, use, and develop knowledge in the field of electrical and electronics engineering and other disciplines through independent learning and collaborative study
C486.2	Identify, understand, and discuss current, real-time issues
C486.3	Improve oral and written communication skills
C486.4	Explore an appreciation of the self in relation to its larger diverse social and academic contexts.
C486.5	Apply principles of ethics and respect in interaction with others
C486.6	Work in a team to achieve common goal.

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Department of Information Technology

Vision of the Institute

To be a respected and most sought after engineering educational institution engaged in equipping individuals capable of building learning organizations in the new millennium.

Mission of the Institute

To develop competent students with good value systems and face challenges of the continuously changing world.

Vision of the Department

To meet the educational, research & service needs of the region through collaboration with academic, technical institutions, businesses, government agencies & cultural organizations, thereby, providing a platform that encourages students & faculty to continue their intellectual & professional growth.

Mission of the Department

To develop the best Information Science Professionals, who work creatively, communicate effectively & become technologically competent and to mould them into good citizens by inculcating sense ethical values in them.

Program Educational Objectives

PEO 1.	Be capable of understanding, analyzing, and applying current & emerging technologies to design and develop solutions to IT/ITES/Software/Telecom related problems and acquire value and employment.
PEO 2.	To have sound foundation in mathematical, scientific and Information science engineering fundamentals necessary to formulate, solve and analyze practical problems and to prepare students for further studies and research.
PEO 3.	Function effectively as individuals and team members in the workplace, growing into highly technical or project management and leadership roles, in various organizations. Create an awareness of the life-long learning process, to communicate effectively, learn necessary tools to successfully identify and adapt to ever changing technologies, by ethical means and code of professional practice.

Program Specific Objectives

PSO 1.	Provide effective and efficient real time solutions with the application of knowledge in IT, ITES, Networking and Software domains.
PSO 2.	Demonstrate the ability to work in a team, with professional ethics, good communication and documentation skills in designing, implementation and management of software products and services, at optimal cost. Proven capability to exchange views/concepts, incubate ideas and to carry out lifelong learning with zeal, to be aware of the state of art technologies and their development.

Course Name: C202 Data Structures and Applications 18CS32

C202.1	Use different types of data structures, operations, and algorithms
C202.2	Apply searching and sorting operations on files
C202.3	Use stack, Queue, Lists, Trees and Graphs in problem-solving
C202.4	Implement all data structures in a high-level language for problem-solving.

Course Name: C203 Analog and Digital Electronics 18CS33

C203.1	Design and analyze application of analog circuits using photo devices, timer IC, power supply and regulator IC and-amp.
C203.2	Explain the basic principles of A/D and D/A conversion circuits and develop the same.
C203.3	Simplify digital circuits using Karnaugh Map, and Quine-McClusky Methods
C203.4	Explain Gates and flip flops and make us in designing different data processing circuits, registers and counters and compare the types.
C203.5	Develop simple HDL programs

Course Name: C234 Computer Organization 18CS34

C234.1	Explain the basic organization of a computer system.
C234.2	Demonstrate functioning of different sub systems, such as processor, Input/output, and memory.
C234.3	Illustrate hardwired control and micro programmed control, pipelining, embedded and other computing systems.
C234.4	Design and analyses simple arithmetic and logical units.

Course Name:C205 Software Engineering 18CS35

C205.1	Design a software system, component, or process to meet desired needs within realistic constraints.
C205.2	Assess professional and ethical responsibility
C205.3	Function on multi-disciplinary teams
C205.4	Use the techniques, skills, and modern engineering tools necessary for engineering practice
C205.5	Analyze, design, implement, verify, validate, implement, apply, and maintain software systems or parts of software systems

Course Name:C206 Discrete Mathematical Structures 18CS36

C206.1	Use propositional and predicate logic in knowledge representation and truth verification.

C206.2	Demonstrate the application of discrete structures in different fields of computer science.
C206.3	Solve problems using recurrence relations and generating functions.
C206.4	Application of different mathematical proofs techniques in proving theorems in the courses.
C206.5	Compare graphs, trees, and their applications.

Course Name: C212 Design and Analysis of Algorithms 18CS42

C212.1	Describe computational solution to well-known problems like searching, sorting etc.
C212.2	Estimate the computational complexity of different algorithms.
C212.3	Devise an algorithm using appropriate design strategies for problem-solving.

Course Name: C213 Operating Systems 18CS43

C213.1	Demonstrate need for OS and different types of OS
C213.2	Apply suitable techniques for management of different resources
C213.3	Use processor, memory, storage, and file system commands
C213.4	Realize the different concepts of OS in platform of usage through case studies

Course Name:C214 Microcontroller and Embedded System 18CS44

C214.1	Describe the architectural features and instructions of ARM microcontroller
C214.2	Apply the knowledge gained for Programming ARM for different applications.
C214.3	Interface external devices and I/O with ARM microcontroller.
C214.4	Interpret the basic hardware components and their selection method based on the characteristics and attributes of an embedded system.
C214.5	Develop the hardware /software co-design and firmware design approaches.
C214.6	Demonstrate the need of real time operating system for embedded system applications

Course Name: C215 Object Oriented Concepts 18CS45

C215.1	Explain the object-oriented concepts and JAVA.
C215.2	Develop computer programs to solve real world problems in Java.
C215.3	Develop simple GUI interfaces for a computer program to interact with users, and to understand the event-based GUI handling principles using swings.

Course Name: C216 Data Communication 18CS46

C216.1	Explain the various components of data communication.
C216.2	Explain the fundamentals of digital communication and switching.
C216.3	Compare and contrast data link layer protocols.

C216.4	Summarize IEEE 802.xxstandards

Course Name:C301 (Management & Entrepreneurship-17CS51**)**

C301.1	Define management, organization, entrepreneur, planning, staffing, ERP and outline their importance in entrepreneurship
C301.2	Utilize the resources available effectively through ERP
C301.3	Make use of IPRs and institutional support in entrepreneurship

Course Name: C302 Computer Networks

C302.1	Explain principles of application layer protocols
C302.2	Outline transport layer services and infer UDP and TCP protocols
C302.3	Classify routers, IP and Routing Algorithms in network layer
C302.4	Explain the Wireless and Mobile Networks covering IEEE 802.11 Standard

Course Name:C303 Database Management System 18CS51

C303.1	Define management, organization, entrepreneur, planning, staffing, ERP and outline their importance in entrepreneurship
C303.2	Utilize the resources available effectively through ERP
C303.3	Make use of IPRs and institutional support in entrepreneurship

Course Name:C304 Automata Theory and Computability17cs54

C304.1	Explain how to translate between different models of Computation (e.g., Deterministic and Non-deterministic and Software models).
C304.2	Interpret Grammars and Automata (recognizers) for different language classes and become knowledgeable about restricted models of Computation (Regular, Context Free) and their relative powers.
C304.3	Develop skills in formal reasoning and reduction of a problem to a formal model, with an emphasis on semantic precision and conciseness.
C304.4	Classify a problem with respect to different models of Computation

Course Name:C305 Object Oriented Modeling and Design17cs551

C305.1	Describe the concepts of object-oriented and basic class modelling.
C305.2	Draw class diagrams, sequence diagrams and interaction diagrams to solve problems.
C305.3	Choose and apply a befitting design pattern for the given problem.

Course Name: C306 Advanced Java and J2ee17CS553

C306.1	Interpret the need for advanced Java concepts like enumerations and collections in developing modular and efficient programs
C306.2	Build client-server applications and TCP/IP socket programs

C306.3	Illustrate database access and details for managing information using the JDBC API
C306.4	Describe how servlets fit into Java-based web application architecture
C306.5	Develop reusable software components using Java Beans

Course Name:C311 Programming in Java17CS561

C311.1	Explain the object-oriented concepts and JAVA.
C311.2	Develop computer programs to solve real world problems in Java.
C311.3	Develop simple GUI interfaces for a computer program to interact with users

Course Name: Dot Net Framework for Application Development 17CS564

C312.1	Build applications on Visual Studio .NET platform by understanding the syntax and semantics of C#
C312.2	Demonstrate Object Oriented Programming concepts in C# programming language
C312.3	Design custom interfaces for applications and leverage the available built-in interfaces in building complex applications.
C312.4	Illustrate the use of generics and collections in C#
C312.5	Compose queries to query in-memory data and define own operator behavior

Course Name:C313 Cryptography, Network Security And Cyber Law 17CS61

C313.1	Discuss cryptography and its need to various applications. Design and develop simple cryptography algorithms
C313.2	Understand cyber security and need cyber-Law

Course Name: C314 File Structures 17IS62

C314.1	Discuss appropriate file structure for storage representation.
C314.2	Illustrate a suitable sorting technique to arrange the data.
C314.3	lain indexing and hashing techniques for better performance to a given problem.

Course Name:C315 Software Testing 17IS63

C315.1	Discuss test cases for any given problem
C315.2	Compare the different testing techniques
C315.3	Illustrate the problem into suitable testing model
C315.4	Understand the appropriate technique for the design of flow graph.
C315.5	gn and Develop appropriate document for the software artefact.

Course Name:C316 Operating Systems 17CS64

C316.1	Demonstrate need for OS and different types of OS
C316.2	Discuss suitable techniques for management of different resources

C316.3	Illustrate processor, memory, storage, and file system commands
C316.4	Explain the different concepts of OS in platform of usage through case studies

Course Name:C401 Data Mining and Data Warehousing 17CS651

C401.1	Understand data mining problems and implement the data warehouse
C401.2	Demonstrate association rules for a given data pattern.
C401.3	uss between classification and clustering solution.

Course Name: C402 System Software 17IS652

C402.1	Explain system software such as assemblers, loaders, linkers and macroprocessors
C402.2	Design and develop lexical analyzers, parsers, and code generators
C402.3	Understand lex and yacc tools for implementing different concepts of system software

Course Name: C403 Python Application Programming 17CS664

C403.1	Understand Python syntax and semantics and be fluent in the use of Python flow control and functions.
C403.2	Demonstrate proficiency in handling Strings and File Systems.
C403.3	Implement Python Programs using core data structures like Lists, Dictionaries and use Regular Expressions.
C403.4	Interpret the concepts of Object-Oriented Programming as used in Python.

Course Name:C404 Multi-Core Architecture and Programming 17CS666

C404.1	Identify the issues involved in multicore architectures
C404.2	Explain fundamental concepts of parallel programming and its design issues
C404.3	Solve the issues related to multiprocessing and suggest solutions
C404.4	Discuss the salient features of different multicore architectures and how they exploit parallelism
C404.5	Illustrate OpenMP and programming concept

Course Name Web Technology and Its Applications /15CS71

C371.1	Adapt HTML and CSS syntax and semantics to build web pages.
C371.2	Construct and visually format tables and forms using HTML and CSS
C371.3	Develop Client-Side Scripts using JavaScript and Server-Side Scripts using PHP to generate and display the contents dynamically
C371.4	Appraise the principles of object-oriented development using PHP
C371.5	Inspect JavaScript frameworks like jQuery and Backbone which facilitates developer to focus on core features

Course Name Software Architecture and Design Patterns /15IS72

C372.1	Design and implement codes with higher performance and lower complexity
C372.2	Be aware of code qualities needed to keep code flexible
C372.3	Experience core design principles and be able to assess the quality of a design with respect to these principles.
C372.4	Capable of applying these principles in the design of object-oriented systems.
C372.5	Demonstrate an understanding of a range of design patterns. Be capable of comprehending a design presented using this vocabulary
C372.6	Be able to select and apply suitable patterns in specific contexts

Course Name Machine Learning / 15CS73

C373.1	Identify the problems for machine learning. And select the either supervised, unsupervised or reinforcement learning
C373.2	Explain theory of probability and statistics related to machine learning
C373.3	Investigate concept learning, ANN, Bayes classifier, k nearest neighbor, Q,

Course Name Cloud Computing and Its Applications / 15CS742

C374.1	Explain cloud computing, virtualization and classify services of cloud computing
C374.2	Illustrate architecture and programming in cloud
C374.3	Describe the platforms for development of cloud applications and List the application of cloud.

Course Name Storage Area Networks / 15CS754

C375.1	Identify key challenges in managing information and analyze different storage networking technologies and virtualization
C375.2	Explain components and the implementation of NAS
C375.3	Describe CAS architecture and types of archives and forms of virtualization
C375.4	Illustrate the storage infrastructure and management activities

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Department of Mathematics

Vision of the Institute

To be a respected and most sought after engineering educational institution engaged in equipping individuals capable of building learning organizations in the new millennium.

Mission of the Institute

To develop competent students with good value systems and face challenges of the continuously changing world.

Vision of the Department

We envision that our department will continue to grow as an intellectually stimulating environment that attracts engineers who have a knack for interdisciplinary research. We hope that the department will play a central role in bridging fundamental sciences and engineering.

Mission of the Department

Our mission is educating our students to excel in their work as well as mentor the next generation of engineers. We provide engineering Mathematics with theoretical and application-oriented technique and making them successful personally & professionally.

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Program Educational Objectives

PEO 1.	Be able to apply the fundamental knowledge of mathematics to analyze and solve the complex problem in electrical, electronics and allied interdisciplinary areas.
PEO 2.	Possess good leadership skills, function ethically in multidisciplinary areas to develop sustainable solutions for global, environmental, and social issues.
	Be able to inculcate lifelong learning to maintain and enhance professional skills.

Course Name: 18MAT11 (Advanced calculus and linear algebra)

CO1	Apply the knowledge of calculus to solve problems related to polar curves and its applications in determining the bentness of the curve.
CO2	Learn the notion of partial differentiation to calculate rate of change f multivariate functions and solve problems related to composite functions and Jacobeans.
CO3	Apply the concept of change of order of integration and variables to evaluate multiple integrals and their usage in computing the area and volumes.
CO4	Solve first order linear/nonlinear differential equations analytically using standard methods.
CO5	Make use of matrix theory for solving system of linear equations and compute Eigen values and Eigen vector required for matrix diagonalization process.
CO6	Understanding and Applying the real-world problem through engineering techniques.

Course Name: 18MAT31 (Transform calculus, Fourier series and numerical techniques)

CO1	Use Laplace transform and inverse Laplace transform in solving differential/integral equation arising in network analysis, control systems and other fields of engineering.
CO2	Demonstrate Fourier series to study the behavior of periodic functions and their applications in system communications, digital signal processing and field theory.
CO3	Make use of Fourier and Z- transforms to illustrate discrete/continuous function arising in wave and heat propagation, signals, and systems.
CO4	Solve first and second order ordinary differential equations arising in engineering problems using single step and multistep numerical methods.
CO5	Determine the extremals of functional using calculus of variations and solve problems arising in dynamics of rigid bodies and vibrational analysis.
CO6	Understanding the Euler's equations, Geodesics under the variational problems.

Course Name: 18MAT21 (Advanced calculus and numerical methods)

CO1	Illustrate the applications of multivariate calculus to understand the solenoidal and irrotational vectors and exhibit the inter dependence of line, surface, and volume integrals.
CO2	Demonstrate various physical models through higher order differential equations and solve such linear ordinary differential equations.
CO3	Construct a variety of partial differential equations and solution by exact methods/ methods of separation of variables.
CO4	Explain the applications of infinite series and obtain series solution of ordinary differential equations.
CO5	Apply the knowledge of numerical methods in the modeling of various physical and engineering phenomena.
CO6	To study the behavior of LCR circuits and oscillations of springs using ODE.

Course Name: 18MAT41 (Complex analysis, probability and statistical methods

CO1	Use the concept of analytic function and complex potentials to solve the problems arising in electromagnetic field theory.
CO2	Utilize conformal transformation and complex integral arising in aero foil theory, fluid flow visualization and image processing.
CO3	Apply discrete and continuous probability distributions in analyzing the probability models arising in engineering field.
CO4	Make use of the correlation and regression analysis to fit a suitable mathematical model for the statistical data.
CO5	Construct joint probability distributions and demonstrate the validity testing hypothesis.
CO6	Understanding and applying the real-world problem using through different mathematical models.

Course Name: 18CS36 (Discrete mathematical structures)

CO1	Use of propositional and predicate logic in knowledge representation and truth verification.
CO2	Demonstrate the applications of discrete structures in different fields of computer science.
CO3	Solve problems using recurrence relations and generating functions.
CO4	Apply different mathematical proofs and techniques in proving theorems in the courses.
CO5	Compare graphs trees and their applications.
CO6	Understand and analyze prefix code and design the algorithm.

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Department of Mechanical Engineering

Vision of the Institute

To be a respected and most sought after engineering educational institution engaged in equipping individuals capable of building learning organizations in the new millennium.

Mission of the Institute

To develop competent students with good value systems and face challenges of the continuously changing world.

Vision of the Department

To become a center of excellence providing state of the art engineering education in mechanical engineering and making individual to be capable of building nation in the new millennium.

Mission of the Department

Mission 1: To provide an excellent teaching and learning process for the students to meet the needs and standards of the current industries and higher learning process.

Mission 2: To promote research and development activity in the recent emerging trends of the mechanical engineering department.

Mission 3: To provide the students with good communication skill, lifelong learning, team spirit and leadership qualities to face the current society.

Program Educational Objectives

PEO 1: Graduates in Mechanical Engineering will apply the basic technical knowledge for design, product development and analysis of mechanical engineering systems.
PEO 2: Graduates in Mechanical Engineering will demonstrate skill for research, innovation, higher studies, and entrepreneurship.
PEO 3: Graduates in Mechanical Engineering will demonstrate good communication skills, dynamic leadership qualities and awareness about environmental protection. blended with ethics and human values.

Program Specific Outcomes

PSO1	Apply Mechanical Engineering knowledge to address wide range of technical and societal problems with lifelong learning and professional development creativity, imagination, confidence, and responsibility.
PSO2	To understand the concept of manufacturing and design analysis of Mechanical components in various industrial sectors and development of the products in mechanical engineering
PSO3	Analyzing, evaluating thermal aspects for design and development of engineering products like I.C Engines, Refrigeration, Air-conditioning, Conventional and Non-Conventional Power Generating Systems.

Course Name: Elements of Mechanical Engineering-18EME14/24

C104.1	Understand the concept of nonrenewable and renewable energy and the working principles of different types of boilers and accessories.
C104.2	Learn the basic principles of operations of steam, water and gas turbines, IC Engines
C104.3	Understand the concept of refrigeration and air conditioning systems
C104.4	Gains knowledge on material joining processes, understands the concept of lubrication and different types of bearings.
C104.5	Get exposure to machining operations on lathe, milling, drilling, and grinding machines
C104.6	Understands the principle of power transmissions through belt drives and gear trains

Course Name: Workshop Practice-18WSL16/26

C108.1	Identify the fitting tools and instruments.
C108.2	Apply knowledge of fitting tools and measuring instruments for getting an object of required shape and size
C108.3	Acquire the skill required for carrying out the welding using electric arc welding process.
C108.4	Applying the skill acquired for preparing the different welding joints.
C108.5	Demonstrate the sheet metal working and joining by soldering processes.
C108.6	Understand the working of various power tools and its applications in mechanical engineering.

Course Name: Computer Aided Engineering Drawing-18CED14

C112.1	Understand the importance of engineering drawing as language of engineers.
C112.2	Able to draw the front, top and side views of points and straight lines.
C112.3	Able to draw the orthographic projections of regular plane surfaces in different orientations.
C112.4	Develops skill to imagine and draw the projections of regular solids.
C112.5	Understand the concept of the development of lateral surfaces of regular solids.
C112.6	Develop skill to generate 3D views like isometric projection of different types of solids and combination solids.

Course Name: Material Science & Metallurgy-10ME32A

C202.1	An understanding of the basic concepts of heat treatment process and its influences on properties of metal.
C202.2	An understanding of types of structures, imperfections in metals, diffusion mechanism, evaluation of mechanical properties by subjecting to various stresses and failure mechanism.

C202.3	An understanding of the basic concepts of phase transformation during solidification, phase diagrams, iron carbon equilibrium diagram, classifications of steel, iron, AL, CU, and it's alloys.
C202.4	An understanding of the basic concepts of classification, fabrication, and applications of composite materials.
C202.5	To understand the various processes for manufacturing of composites and obtain a knowledge of contemporary issues and an ability to use the skills and techniques in engineering practice
C202.6	An ability to use the techniques, skills, and modern engineering tools necessary for engineering practice and lifelong learning.

Course Name: Basic Thermodynamics-18ME33

C203.1	Understand the fundamentals of thermodynamics.
C203.2	Demonstrate the work and heat transfer in thermodynamic systems.
C203.3	Formulate the heat, work, and energy of the system for various thermodynamic processes.
C203.4	Evaluate the performance of heat engines, heat pumps and refrigerators.
C203.5	Analyze the entropy change for various thermodynamic processes and thermodynamic properties of pure substances.
C203.6	Impart the knowledge in thermodynamic relations and distinguish between ideal and real gases.

Course Name: Mechanics of Materials-18ME34

C204.1	Learn basic concepts of simple stress and strain.
C204.2	Understand importance of stresses in composite sections, principal stresses and strains.
C204.3	Analyze the stresses in thick and thin cylinders.
C204.4	Draw shears force and bending moments.
C204.5	Gain knowledge on bending and shear stresses, deflection of beams.
C204.6	Impart knowledge of torsion of circular shafts and stability of columns.

Course Name: Manufacturing Process-I-18ME35

C205.1	Understand basic concept of foundry technology and identify various types of patterns, binders, additives, core, molding machines.
C205.2	Analyze working principle of gating and reserving systems, special molding processes
C205.3	Describe different furnaces used for melting of metals and special types of casting process.

C205.4	Demonstrate different methods of welding in the application of fabrication works and joining of two metals/alloys.
C205.5	Apply the concept of special types of welding, brazing, and soldering.
C205.6	Enhance the knowledge of metallurgical aspect in welding.

Course Name: Computer Aided Machine Drawing-18ME36A

C206.1	Student will be able to sketch sections of solids of various polyhedrons and visualize and draw orthographic views of simple machine parts.
C206.2	Student can understand and draw various thread forms, standard keys,
C206.3	Understanding of various types riveted joints and their drawings, couplings using memorable drawing
C206.4	The students can visualize and prepare detailed drawing of a given part and draw
C206.5	CO-5 Read and interpret a given drawing and Create 2-D and 3-D models using solid edge software with manufacturing purposes.
C206.6	Producing detailed sectional views drawing of a 3-D models using solid edge Software with parts list.

Course Name: Metallography & Material Testing Lab-18MEL37A

C207.1	e Students will be able to demonstrate the knowledge and the skills required for the conduction of Tensile, Shear and Compression test.
C207.2	The students will be able to determine the torsional and bending strength of different materials.
C207.3	e students will learn Identification of metals based on Microstructures.
C207.4	e students will be capable of detecting the defects like cracks, flaws in materials by using different NDT methods.
C207.5	e students will know the material behavior for impact and wear loads.
C207.6	e students will be capable of determining hardness of metals using different methods.

Course Name: Foundry & Forging Lab-18MEL38A

C208.1	Demonstrate various skills of sand preparation, molding.
C208.2	Conduct tests on foundry sands to determine properties for different ingredient compositions.
C208.3	Apply knowledge of design and practices of mold and pattern making.
C208.4	Analyze the design of gating system.
C208.5	Demonstrate various skills of forging operations.
C208.6	Work as a team keeping up ethical principles.

Course Name: Mechanical Measurements & Metrology-18ME42B

C210.1	Students shall demonstrate the knowledge associated with Comparators (Mech, Optical, and Electrical& Pneumatic), Use of Sine bar, Interferometer, and measurement of Screw threads & Gear tooth parameters.
C210.2	Students shall demonstrate the knowledge associated with Generalized Measurement system, Transducers, CRO, Oscillographs, and XY Plotters.
C210.3	Students shall demonstrate the knowledge associated with Measurement of Force, Torque, and Temperature& Strain measurement.
C210.4	Students shall demonstrate the knowledge associated with various Standards of length, use of slip gauges, and System of limits, fits and tolerance and Design of Gauges.
C210.5	Students will be able to work in Quality control and quality assurances divisions in industries.
C210.6	Students will be able to design a sensors and transducers used for stress analysis, design a measuring equipment's for the measurement of temperature and flow, to maintain quality in engineering products.

Course Name: Applied Thermodynamics-18ME43

C211.1	Describe the application; apply the concepts of combustion thermodynamics in engineering field.
C211.2	Analyze and implement various aspects of air standard cycles and basic concepts of gas power cycles.
C211.3	Evaluate the performance of various working aspects of internal combustion engines
C211.4	Understand the different concepts and implement various vapor power cycles, Analyze the concepts and functioning of reciprocating compressors.
C211.5	Apply knowledge of working procedure of gas turbine and Jet and Rocket Propulsion system.
C211.6	Describe the various psychometric processes; understand the working of air conditioning systems and refrigeration systems.

Course Name: Kinematics of Machines-18ME44

C212.1	To identify and select the proper mechanisms for the application in real life situations.
C212.2	Calculate mobility for various mechanisms and enumerate rigid links and types of joints within mechanisms.
C212.3	Explain different mechanisms and conduct a velocity and acceleration analysis of the different mechanisms.
C212.4	Construct CAM profile for the specific follower motion.
C212.5	To identify different gear trains for various practical applications and solve simple problems.

C212.6	To classify gears and calculate the various spur gear dimensions.

Course Name: Manufacturing Process-II18ME45

C213.1	Understand metal cutting principles, cutting tool materials, properties, and fluid selection.
C213.2	Classify and understand the principle and constructional features, operations performed on Lathe & drilling machine.
C213.3	Understand and to operate the Milling machine and to know the concept of indexing mechanism and its methods.
C213.4	Understand the concept of Grinding machines and its constructional features. And, to know the selection of grinding wheel.
C213.5	Understand the principles, applications, and features of super finishing, polishing and buffing operations, honing etc.
C213.6	Select the types of non-traditional machines and methods of operations along with applications.

Course Name: Fluid Mechanics18ME46B

C214.1	To impart basic knowledge of fluid, its properties and recognize the various types of fluid flow, also variation of Pressure in a fluid is at rest.
C214.2	To made them understand the concept of Euler's equation and extracting Bernoulli's equation also to understand and analyze the Head losses in laminar and turbulent flow through pipes.
C214.3	To Contend the importance of flow measurement and use of dimensional analysis to design physical or numerical experiments and to apply dynamic similarity.
C214.4	Can understand the reasons for Major and minor loss of energy through pipe
C214.5	To understand and analyze the Head losses in laminar and turbulent flow through pipes.
C214.6	To learn the concept of Buoyancy and importance of continuity equation and can implement the compressible flow and flow around immersed bodies.

Course Name: Mech. Measurements & Metrology Lab18MEL47B

C215.1	Understand the basic measurement units and calibrate various measuring devices.
C215.2	Use various measuring tools such as Sine Bar, Sine Center, Bevel Protractor to find taper and included angles.
C215.3	Gain knowledge on Optical Microscope, Tool Maker Microscope to measure screw thread parameters.
C215.4	Learn basic concepts of measuring temperature, pressure and strain using different methods.
C215.5	Gain knowledge on various measuring equipment's applied to engineering analysis in industries.

C215.6	Impart knowledge of error and correction factors of various measuring devices.

Course Name: Machine Shop18MEL48B

C216.1	Describe the knowledge and the skills required with respect to the operation, procedure, conduction and analyzing the results of experiments.
C216.2	Perform the operations in lathe machine.
C216.3	Analyze the operations in milling machine and its mechanism.
C216.4	To know the concepts of grooving operations using Shaping machine.
C216.5	Demonstrate of operations on drilling machine.
C216.6	Impart the knowledge of Eccentric turning using four jaw chuck

Course Name: Management and Entrepreneurship17AL51

C301.1	Understand the basic concepts of management and development of effective planning process.
C301.2	Understand the principles of organization and Illustrate different organizational structures.
C301.3	Understand the staff selection process, recruitment process and project selection process as well as directing, motivating, and controlling.
C301.4	To know how to motivate, directing and controlling the managers and management.
C301.5	Develop entrepreneurship and its concepts pertaining to small scale industries for sustainable development.
C301.6	Understand different schemes of government support to small scale industries and preparation of project report.

Course Name: Design of Machine Elements-I17ME52

C302.1	Apply the concept of mechanics of materials to estimate the stresses in a machine element & predict failure of components.
C302.2	Analyze failure of components using different theories of failure for static loadings
C302.3	Determine the stress concentration factor for different irregularities and strength of components under different impact loadings.
C302.4	Design the machine components for fatigue failure & also for threaded fasteners.
C302.5	Design of keys, Shafts, cotter & knuckle joint & couplings used for power transmission
C302.6	Design & Analyze the power screws and welded joints for different applications.

Course Name: Energy Engineering17ME53

C303.1	Describe the working principle of steam power plant and ability to solve problems involving height of chimney to produce a given draft.
C303.2	Apply knowledge of super heater, De-super heater, control of super heaters, economizer

C303.3	Evaluate the various methods of starting diesel engines and need for lubrication.
C303.4	Import the knowledge of Hydrograph, how to draw the hydrograph, flow duration and mass curve and its applications.
C303.5	Apply the knowledge of nuclear energy, solar energy and wind energy.
C303.6	Demonstrate the various energy conversion methods such as Tidal power energy, Ocean thermal energy conversion, geothermal energy and photosynthesis.

Course Name: Dynamics of Machines17ME54

C304.1	Students will be able to do static and dynamic analysis of different mechanisms subjected to forces using various principles.
C304.2	Students will be able to analyze the concept of friction in different bearings and belt drive.
C304.3	Students will be able to solve the problems on balancing of rotating masses in same and different planes.
C304.4	Analyze the concept of primary & secondary forces of reciprocating masses in different engines.
C304.5	Students will be able to determine the various parameters of governors and its usage.
C304.6	Course content helps the students to analyze gyroscopic effect on different vehicles and Analysis of Cams.

Course Name: Manufacturing Process-III17ME55

C305.1	Students will be able to understand necessity of forming process compared with other manufacturing techniques, and the knowledge of parameters effect on the processing of the wrought products.
C305.2	Students will be able to determine the process, load required and possible reasons for the formation of defects in forged components.
C305.3	Students will be able to identify the process, load calculations and reasons for defective rolled products.
C305.4	Students will be able to apply the knowledge of drawing and extrusion to find out defects and problems occurred in the processes.
C305.5	Students will be able to select the different process, related equipment's, and parameters for the fabrication of various sheet metal components.
C305.6	Students will be able to select the different high energy rate forming process and powder metallurgy for the fabrication of bulk components.

Course Name: Turbo Machines 17ME56

C306.1	Understanding the comparison of positive displacement machine and turbo machine.
C306.2	Gain the knowledge of working of centrifugal pumps.
C306.3	Study the performance of various hydraulic turbines.

C306.4	Impart the knowledge of performance of steam turbines.
C306.5	Sound knowledge of energy transfer in turbomachinery.
C306.6	Sound knowledge about stage efficiency, reheat factor and preheat factors in turbines and pumps, compression and expansion processes, the working of centrifugal and axial compressors.

Course Name: Fluid Mechanics & Machines Lab17MEL57

C307.1	Students will be able to analyze fluid flow principles.
C307.2	Gain the knowledge in analyzing the performance of turbines and pumps.
C307.3	Able to determine coefficient of friction, minor losses in flow through the pipes.
C307.4	Students will be able to calibrate flow measuring devices such as orifice meter, venture meter and V- Notch and performance of centrifugal pumps.
C307.5	Students will have the ability to test the performance of turbines like Pelton wheel, Francis turbine and Kaplan turbine.
C307.6	Students will have the ability to test the performance of two stages reciprocating air compressor and air blower.

Course Name: Energy Conversion Lab17MEL58

C308.1	At the end of the course, students will be able to determine the Flash point, Fire point, calorific value, and viscosity of various lubrication oils.
C308.2	Students will have the knowledge of engine operation through valve timing diagram.
C308.3	To conduct performance test on Two stroke Petrol Engine.
C308.4	To conduct performance test on 4 stroke Diesel Engine, Four Stroke Petrol Engines.
C308.5	Students able to draw valve timing and port timing diagram.
C308.6	Impart the knowledge of application of planimeter.

Course Name: Computer Integrated Manufacturing17ME61

C309.1	Understand basic concepts of computer integrated Manufacturing**,** utilization parameters of machine and their capabilities
C309.2	Apply different work transfer methods and mechanism for high volume production
C309.3	Design automated assembly systems for high volume production and analyzes single station, MultiTaction and automated guided vehicle system.
C309.4	Development of various types of computer aided manufacturing and planning systems
C309.5	Enhance various terminology, programming methods of robot and write part program in Robotics & CNC machine.
C309.6	Analyze flow lines and solve problems through line balancing methods for manufacturing

Course Name: Design of Machine Elements-II17ME62

C310.1	Demonstrate the fundamentals of stress analysis, different stress in curved beams and Design and select power transmission elements.
C310.2	Make proper assumptions with respect to material, size, static and dynamic loads for springs, clutches, and brakes.
C310.3	To change the existing design with minimum effort for better result/performance of IC-Engine parts
C310.4	Design of spur and helical gears for different power transmission ratio and to find BHN.
C310.5	Design bevel and worm gears based on strength, dynamic and wear loads.
C310.6	Performance of the rotating components can be increased with better knowledge of lubrication

Course Name: Heat & Mass Transfer17ME63

C311.1	Provide sound understanding of the basic principles and laws, modes of heat transfer, different types of Fins and fin efficiency.
C311.2	Capability to analyze transient mode of heat transfer and use of Heiselers Charts.
C311.3	To know various heat transfer processes and heat exchangers.
C311.4	Able to analyze different regimes of boiling and condensation.
C311.5	To impart the knowledge of natural and forced convection and non-dimensional numbers associated with it.
C311.6	Understand the concept of radiation heat transfer.

Course Name: Finite Element Methods17ME64

C312.1	Learn basic principles of finite element method for analysis of structures.
C312.2	Understand importance of principle of minimum potential energy, Raleigh's Ritz and Galperin's method to solve engineering problems.
C312.3	Analyze the finite element formulation of 2-D elements and higher order elements.
C312.4	Get exposure the finite element analysis of bars in engineering field.
C312.5	Gain knowledge on the finite element analysis of trusses.
C312.6	Impart knowledge of finite element analysis of beams and heat transfer problems.

Course Name: Mechatronics & Microprocessor17ME65

C313.1	Learn basic concepts of Mechatronics systems.
C313.2	Understand importance of Transducers and Sensors.
C313.3	Gain knowledge on electrical actuation system and signal conditioning.
C313.4	Learn basic concepts of Microprocessor and number system, logic gates.

C313.5	Gain knowledge on logic function of INTEL 8085A Microprocessor.
C313.6	Impart knowledge of CPU, organization, and programming of Microprocessor.

Course Name: TOE17ME66X

C314.1	Develop equations of equilibrium, Mohr's diagram & characteristic equation of principal stress for 2D & 3D stress systems
C314.2	Able to identify the possible strain field using compatibility equations. Reducing the complexity by assuming plane stress & plane strain condition.
C314.3	Derive the solutions for a two-dimensional problem in Cartesian coordinates using Airy's stress function method and to develop equations of equilibrium for 2D stress system in Polar co-ordinate system.
C314.4	Identify the stress distribution of different parts such as rotating disks & rotating cylinders. To derive equations for torsion of thin open sections & tubes.
C314.5	Derive equation for Radial & Circumferential stresses for disk, cylinders & sphere subjected to thermal loading.
C314.6	Understand the importance of basic theorems to solve practical problems.

Course Name: NTM17ME665

C314.1	To appreciate the importance of NTM methods and their advantages over conventional methods.
C314.2	To demonstrate the working of USM processes.
C314.3	To operate with the elements of AJM & WJM processes.
C314.4	To gain the knowledge of elements related to ECM & Chemical machining processes.
C314.5	To select an appropriate NTM process for the machining of the components and suitable electrodes of EDM.
C314.6	To correlate specific applications of PAM, LBM and EBM process.

Course Name: Heat & Mass Transfer Lab17MEL67

C315.1	Understand the concept and mechanism of forced, natural convection taking place in objects of different geometries, the various empirical correlations used in different fluid flow situations.
C315.2	Learn the thermal performance analysis of heat exchangers, their practical applications.
C315.3	At the end of the course, students will be able to understand conduction phenomenon thoroughly in objects of different geometries they can determine the thermal conductivity of composite wall, lagging material and critical heat flux.
C315.4	Understand the performance analysis of vapor compression refrigeration cycle and air conditioning system.
C315.5	Understand the concept of radiation heat transfer.
C315.6	To impart the knowledge non-dimensional numbers associated with natural and forced convection.

Course Name: CAMA Lab17MEL68

C316.1	le to define the different element types, properties and material models to the different structures being analyzed.
C316.2	dents can be able to do the stress analysis of bar, truss, beam and simple mechanical structures and validate the results with theoretical results.
C316.3	dents will carry out static and dynamic analysis of simple beams and bars.
C316.4	dents will be able to analyze the thermal problems like conduction and convection using ANSYS.
C316.5	dents will be able to do Air flow analysis of pipe and flat plate.
C316.6	Student will be able to solve thermal and mechanical stress problems**.**

Course Name: Engineering Economics 15ME71

C401.1	Students will be able to understand types of interest and its factors and use them in EMI and loan calculations.
C401.2	Students will be able to characterize different assets based on their Present, equivalent, and future worth and judge the best alternative.
C401.3	Students will be able to appreciate depreciation, costing, and estimation procedure. Perform tax analysis.
C401.4	Students will be able to Analyze the financial concepts and prepare financial statements for the company.
C401.5	Students will be able to use the knowledge of financial ratios for determining the firm's earning power.
C401.6	Students will be able to demonstrate the concepts of financial and profit planning through suitable budgeting.

Course Name: Mechanical Vibrations 15ME72

C402.1	Understand basic concepts of vibrations & learns to use the Fourier series method to idealize any motion in terms of sine & cosine curves which can be used in vibration analysis
C402.2	Able to write a mathematical model of undamped systems and can deploy the proper method to obtain the natural frequency of the system, which is required in failure analysis.
C402.3	Gains insight into the damped, forced vibrations and develops the skill to utilize the over, under and critically damped systems in different applications
C402.4	Realize the importance of vibration measuring, condition monitoring and methods to avoid vibrations.
C402.5	Learn to idealize any physical system into two DOF systems and determine their natural frequencies & mode shapes
C402.6	Able to solve multi DOF system and obtain their natural frequencies by numerical methods which helps the engineer to design stable system

Course Name: Hydraulics and Pneumatics 15ME73

C403.1	Describe the working principles of hydraulic and pneumatic system and its applications.
C403.2	Apply knowledge of pumps, motors and its application.
C403.3	Evaluate the various types of valves and its applications.
C403.4	Import the knowledge of circuit design, control valves and its applications
C403.5	Learn and apply multi-purpose cylinder applications
C403.6	Describe the working principles of hydraulic and pneumatic system and its applications.

Course Name: Operation Research-15ME74

C404.1	Ability to understand and analyze solution for linear programming problems in industry so that they can use resources (capitals, men, machine and materials) more effectively.
C404.2	Students will have the knowledge of optimizing the transportation models, assignment and travelling salesman problems. **Solve** the problem of transporting the products from origins to destinations with least transportation cost.
C404.3	Students will have the analysis of optimizing the Integer Programming models and Queuing theory.
C404.4	Students will have the Understand of Project management techniques: PERT-CPM & crashing techniques to reduce the man, machine, and material to increase the profits and reduce the losses.

C404.5	Students will have the knowledge of Game Theory analytical and graphical method problems solving for different types of Job's.
C404.6	Students will have the Describe the Sequencing of different types of Job's to reduce man, machine and material cost to increase the profit.

Course Name: Non-Conventional Energy Sources 15ME754

C405.1	Understand the present energy scenario and the available non-conventional energy sources.
C405.2	Describe the basics of solar radiation geometry and various measurement techniques.
C405.3	Analyze the knowledge gained in tapping the solar energy through solar thermal devices, PV conversion and their performance analysis.
C405.4	Demonstrate the various energy conversion methods such as Wind, Tidal, OTEC and Geothermal.
C405.5	Apply knowledge of Biomass and Hydrogen energy and their impact on environment and sustainability.
C405.6	Understand the present energy scenario and the available Non-conventional energy sources.

Course Name: Theory of Plasticity 15ME752

C405.1	Get exposed to concepts of theory of elasticity, importance of stress and strains which are needed to understand the theory of plasticity.
C405.2	They knew about types of strain and plastic deformation of ductile materials.
C405.3	Use different yield criteria and its importance.
C405.4	Realize the importance of experimental verification of stress- strain relationship and bending of beams and use it in design of mechanical components.
C405.5	They can analyze stress; shear and residual stresses are distributed on the different types of beam.
C405.6	Gain knowledge on torsion of circular & non-circular shafts.

Course Name: Experimental Stress Analysis 15ME761

C406.1	ility to brief about types, mounting and performance of strain gages and wheat stone bridge circuits.
C406.2	dents can be aware of about different configurations of strain rosettes and its error minimization.
C406.3	dents can brief about concepts of Photoelasticity, polar scope and calibration of different models.
C406.4	get exposure on Two- and Three-Dimensional photoelasticity models and techniques
C406.5	ey will understand about Birefringent and Brittle coating methods used in ESA.
C406.6	They can use moiré techniques for finding stresses and displacements.

Course Name: Design Lab 15MEL77

C407.1	Understand the concept of natural frequency and damping coefficient in a single DOF vibrating system.
C407.2	To analyze the balancing of rotating masses by using static and dynamic balance.
C407.3	To demonstrate the concept of stress concentration for photo- elastic materials.
C407.4	To determine pressure distribution in journal bearings.
C407.5	To find the principal stresses using strain gauges.
C407.6	Knowing the concepts of whirling of shaft, governor, and gyroscope.

Course Name: CIM & Automation Lab 15MEL78

C408.1	To practically relate to concepts discussed in Computer Integrated Manufacturing Course.
C408.2	To write CNC part programs for simulation of machining operations such as Turning, Drilling & Milling.
C408.3	Ability to identify the type of machining center for the geometry given (cylindrical or prismatic), write the part program, explain the instructions, examine for the error in the program and choose right G and M codes to optimize the program and construct the final geometry by running the simulation using the software.
C408.4	To understand & write programs for Flexible Manufacturing Systems & Robotics.
C408.5	To understand the operating principles and practical applications of hydraulics, pneumatics and electro–pneumatic systems.
C408.6	To apply these learning's to automate & improve efficiency of manufacturing process.

Course Name: Operations Management 15ME81

C409.1	Understand the history and development of Operation Management. Able to apply the Operation Management principles in manufacturing and service activities. Getting exposure to Environmental and contemporary issues. Understands the Importance of Productivity and able to apply mathematics to improve productivity.
C409.2	Gets exposure to Decision making process in an industry under different environments, importance of decision making. Able to apply Mathematical models like Break even analysis and tradeoffs.
C409.3	Understands about the importance of forecasting, different methods of Fore casting. Able to apply forecasting methods like qualitative or quantity. Getting exposed to Measure and controlling of forecasting. Understands the use of Aggregate and Master Scheduling Techniques.

C409.4	Learns about the importance of Purchasing and Supply Chain Management. Gets exposure to different Methods of Procurement, Tendering process, vendor development. Understands the importance of maintaining Transparency in Purchasing activity and able to apply Procurement methods in an Industry or Service Sector.
C409.5	Gets exposure to the various skills required finding out the Capacity requirement of Plant and Machinery, Plant location, and Plant lay out. Able to apply the acquired skill in an Industry or Service Sector.
C409.6	Gets exposure in material requirement, inventory, importance of MRP and Able to apply the recent management techniques like MRP-1 and ERP in an industry or service sector. Able to apply different Inventory methods in a manufacturing or Service activity.

Course Name: Control Engineering 15ME82

C410.1	Describe the concept of control action, types of controllers and its applications relevant to the system.
C410.2	Apply the many inter-relationships in mechanical and electrical models.
C410.3	Evaluate the concept of block diagram reduction technique and SFG.
C410.4	Import the knowledge the step, ramp, and impulse input concepts by stability analysis
C410.5	apply the importance of root locus and bode plots
C410.6	Import the knowledge of lead-lag compensator and frequency response analysis.

Course Name: Power Plant Engineering 15ME831

C411.1	derstand Types of fuels and Equipment used for burning of coal in steam power plant.
C411.2	ppose ash handling, coal handling method in a thermal power plant.
C411.3	ferentiate Diesel engine power plants and Gas turbine power plants.
C411.4	lculate performance of a hydro-electric plant.
C411.5	plain working principle of different types of nuclear power plant.
C411.6	ect the suitability of site for a power plant and Indicate safety aspects of power plant.

Course Name: TRIBOLOGY 15ME831

C411.1	Describe the viscosity, Newton's law of viscosity.
C411.2	Apply knowledge of Hydrostatic and hydro dynamic lubrications.
C411.3	Evaluate the various types of bearing and its applications.
C411.4	Import the knowledge of oil flow and thermal equilibrium of journal bearing

C411.5	apply load carrying capacity and coefficient of friction
C411.6	Describe the wear, wear rate and its effects.

Course Name: Foundry Technology 15ME838

C411.1	Students can be able to demonstrate the Oxidation of liquid metals, gas dissolution in liquid metals, methods of degassing, fluidity, factors affecting fluidity, fluidity tests, hot tearing, shrinkage of liquid metals.
C411.2	Students can be able to understand the concept of Crystallization and development of cast structure and concept of progressive and directional solidification, need of gating system and rise ring system in casting methods.
C411.3	Students can be able to demonstrate the Special Molding Techniques for manufacturing different components by using different pattern, Developments in cupola melting–hot blast cupola, water cooled cupola, balanced blast cupola, coke less cupola, cupola charge calculations.
C411.4	Ferrous Foundry: Melting procedures, casting characteristics, production, specification, and properties of some ferrous metals.
C411.5	Students can be able to demonstrate the Non-Ferrous Foundry: Melting procedures, casting characteristics, production, specification, and properties of some typical aluminum, copper and magnesium-based alloy castings.
C411.6	Modernization and Mechanization in foundry techniques in molding, core, material handling equipment's.

Course Name: Biomass Energy System 15ME843

C412.1	Knowledge about the various biomass resources and its energy content.
C412.2	Analyze the conversion of biomass to biofuels for combustion process.
C412.3	Evaluate the performance of biomass-based steam power plant for power generation.
C412.4	Demonstrate the concepts of bio-Methanization process.
C412.5	Apply knowledge of biofuels in IC Engine Combustion.
C412.6	Know the biogas production.

Course Name: Project Work 15ME85L

C413.1	Applying knowledge emerging areas of engineering and technology.
C413.2	Students able to apply engineering concepts with respect to different mechanical streams.
C413.3	Students focusing on more efficiency at most economically.
C413.4	Students improve communication skills, problem analyzing ability, design, and development skills.

C413.5	Developing new ideas, creative thinking, improvement in reverse engineering in mechanical engineering related technology.
C413.6	Improve their skills to work in a team as a member, to manage project in interdisciplinary environment and to draw appropriate conclusion.

Course Name: Seminar 15ME86L

C414.1	Enhancing knowledge in emerging area of technology.
C414.2	Students self-learning through seminar which may enable in lifelong learning.
C414.3	Improve their skills to work in a team.
C414.4	Improve their knowledge in project management and brought out their concern for ethical valve.
C414.5	Develop new ideas, creative thinking, improve in reverse engineering in related technology.
C414.6	Reduce the stage fear in leadership qualities.

CHILDREN'S EDUCATION SOCIETY (Regd.)
THE OXFORD COLLEGE OF ENGINEERING
(Recognised by the Govt. of Karnataka, Affiliated to Visvesvaraya Technological University, Belagavi.
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Department of Mechatronics

Vision of the Institute

To be a respected and most sought after engineering educational institution engaged in equipping individuals capable of building learning organizations in the new millennium.

Mission of the Institute

To develop competent students with good value systems and face challenges of the continuously changing world.

Vision of the Department

To develop the Mechatronics Engineering Department as a leading educational and research department with innovation in the design and development of electro-mechanical systems, intelligent machines, and products.

Mission of the Department

Mission 1. To provide an outstanding education in Mechatronics Engineering with a rich diversity of skills.

Mission 2. To contribute to the community prosperity through professional services and research.

Mission 3. To prepare graduates with ability to engage in life-long learning and capable of carrying out engineering practice with competence.

Program Educational Objectives

PEO 1.	Inculcate knowledge of basic engineering sciences and fundamentals of mechanical, electrical and computer systems.
PEO 2.	Create ability in graduates to design, develop product and applications in the field of Automation and Mechatronics and be able to use engineering tools that will enhance their productivity.
	Prepare graduates to be effective engineers with good analytical and problem-solving skill to innovate, research and develop in multidisciplinary Mechatronics environment.

Program Specific Objectives

PSO 1: An ability to understand the concepts of Mechatronics Engineering and to apply them to various areas like Mechanical, Electrical machines, Signal processing, Embedded systems, Communication Systems, Digital & Analog Devices, Computer fields etc.

PSO 2: An ability to solve complex Mechatronics Engineering problems, using latest hardware and software tools, along with analytical skills to arrive cost effective and appropriate solutions.

PSO 3: Excellent adaptability to changing work environment with good leadership qualities and zeal for social and environmental well-being.

Course Name: 18MT32 - Material Science & Technology

C232.1	Appreciate the necessity of engineering materials, Smart Sensors, and its applications in various fields.
C232.2	Identify possible cause of failure due to fatigue and Creep.
C232.3	Demonstrate the knowledge of nucleation, Crystal growth, Solid solution, and Phase diagrams.
C232.4	Appreciate the significance and applications of Various heat treatment processes.
C232.5	Explain the definition and classification and fabrication processes of composite materials.
C232.6	Identify the role of Carbon content in the material and accordingly the type of material and properties of material changes like steel and cast iron

Course Name: 18MT33-Machanics Of Materials

C233.1	Analyze the normal stresses and strains for axially loaded members using Hooke's law
C233.2	Enumerate principal stresses and shear stresses for simple two-dimensional loadings
C233.3	Elucidate the stresses and strains in thick and thin cylindrical pressure vessels.
C233.4	Perform analysis of beams for static loading.
C233.5	Design torsional shafts and structural columns
C233.6	Calculate and represent the stress diagrams in bars and simple structures

Course Name: 18MT34- Control Systems

C234.1	Apply modeling knowledge in implementation physical systems.
C234.2	Understand the reduction of block diagram & analyze using Signal flow graph.
C234.3	Comment on performance of a system by evaluating various parameters.
C234.4	Model a system by applying the concept of State Space analysis
C234.5	Determine the time and frequency-domain responses of first and second-order systems to step and sinusoidal (and to some extent, ramp) inputs.
C234.6	Apply root-locus technique to analyze and design control systems

Course Name: 18MT35 - Analog & Digital Electronics

C235.1	Analyze the Importance & Applications of Diode as Rectifiers, Filters, Zener Diode Regulators & Switching Circuits.
C235.2	With the Knowledge of Active Filters & Oscillators students can better understand the Real-time Communication Systems
C235.3	Students are prepared to Understand, Analyze & Design Various Analog Electronics circuits if recruited to Analog Electronics Industry.
C235.4	Students are prepared to Understand, Analyze & Design Digital Circuits, if interested to work in VLSI Industry

C235.5	Formulate and employ a Karnaugh Map to reduce Boolean expressions and logic circuits to their simplest forms.
C235.6	Design and implement combinational logic circuits using reprogrammable logic devices. Content

Course Name: 18MT36 - Computer Organization

C236.1	Define Basic structure of computers, machine instructions and assembly language programs
C236.2	Ability to differentiate Addressing modes, output operations, Stacks and Queues has been described
C236.3	Understand the role and responsibilities of OS in the computer system.
C236.4	I/O Devices, Interrupts, Direct Memory Access, Busses, Interface Circuits, and Standard I/O Devices has been described
C236.5	Analyze the working of the memory system and basic processing unit.
C236.6	Understand the interfacing concepts in input and output module.

Course Name: 18MT42 - Fluid Mechanics and Machines

C242.1	Appreciate the fluid mechanics fundamentals, including concepts of mass and energy conservation.
C242.2	Apply the fundamentals to flow measurement problems.
C242.3	Perform dimensional analysis for problems in fluid mechanics.
C242.4	Appreciate the understanding of turbo machines and principles of energy transfer in turbo machines.
C242.5	Apply the fundamentals for energy transfer problems in various turbo machines.
C242.6	Identify the role of Carbon content in the material and accordingly the type of material and properties of material changes like steel and cast iron

Course Name: 18MT43 – Microcontroller

C243.1	Understand the difference between microprocessor and microcontroller, operation of Peripherals of controller, and be able to program a microcontroller system in assembly code and C.
C243.2	Interface the system to switches, keypads, displays, A/D and D/A converters and build a microcontroller-based Robot.
C243.3	Design and Develop a microcontroller-based system.
C243.4	Understand of 8051 Microcontroller concepts, architecture, programming and application of Microcontrollers.
C243.5	Understand the basic idea about the data transfer schemes and its applications
C243.6	Impart the knowledge about the instruction set

Course Name: 18MT44 - Manufacturing Technology

C244.1	Understand the principles and techniques of casting, forging, rolling & drawing.
C244.2	Apply the knowledge of metal working process.
C244.3	To express the different techniques of joining process for metal & non-metals.
C244.4	Understanding and applying knowledge to execute CNC machining programs
C244.5	Calculate and understand appropriate single-point machining relationships taking tool material and machine constraints into consideration.
C244.6	Understand the principles and appropriateness of non-traditional machining processes

Course Name: 18MT45 - Theory of Machines

C245.1	Explain the concepts of mechanism, machines, and types of motion, and calculate the mobility of a mechanism.
C245.2	Explain basic cam terminology, analyze various types of CAMS, and draw CAM profile diagrams.
C245.3	Determine the positions, velocities, and accelerations of links of simple mechanisms by using graphical approach.
C245.4	Demonstrate the knowledge of various transmission mechanisms like gears and belts and apply them for simple problems.
C245.5	Appreciate the principles of Balancing, Governors, and Gyroscope, and their applications
C245.6	Understand the fundamentals of machine design for desired kinematic or dynamic performance.

Course Name: 18MT46 Instrumentation and Measurements

C246.1	Measure various electrical parameters with accuracy, precision, resolution.
C246.2	Use AC and DC bridges for relevant parameter measurement.
C246.3	Select appropriate passive or active transducers for measurement of physical phenomenon.
C246.4	Understand the errors in measurements and their rectification
C246.5	Understand the various measurement techniques available
C246.6	Understand the basic working of instruments used for measurement

Course Name: 17MT51 -Design of Machine Elements

C351.1	Have knowledge of theories of failures, stress concentration, power screws, shafts, keys, couplings, gears, bearings, and springs.
C351.2	Understand the technique of theories of failure, stress concentration, fatigue strength etc.

C351.3	Calculate the stresses; parameters of machine elements subjected to various loads also make proper assumptions with respect to material, FOS for various machine components.
C351.4	Design machine elements like couplings, gears, bearings ad springs
C351.5	Design machine elements like power screws.
C351.6	Design machine elements like shafts, keys.

Course Name: 17MT52 - Virtual Instrumentation

C352.1	Gain knowledge of Virtual Instrumentation and Lab View domain on various I/O Module, Sensor, DAQ Devices, Communication and Measurement System
C352.2	Understanding the basic programming concepts and various logical Instructions.
C352.3	Determine the extent and nature of electronic circuitry in Virtual Instrumentation
C352.4	Recognize the components of virtual instrumentation and use them for PC based Measurement.
C352.5	Publish Vis front panels on the web, view and control them remotely from LabVIEW or from a web
C352.6	Develop real time application using LabVIEW

Course Name: 17MT53 - Hydraulics& Pneumatics

C353.1	Engineering applications of hydraulic system
C353.2	Engineering applications of pneumatic system
C353.3	Gain knowledge of basis of hydraulic system
C353.4	Gain knowledge of basis of pneumatic system
C353.5	Understanding the working principle of hydraulic system
C353.6	Understanding the working principle of pneumatic system

Course Name: 17MT54 Micro and Smart system technology

C354.1	Know the basic concept of micro and smart system technology.
C354.2	Understand the need of micro size machines and devices.
C354.3	Know how this micro system technology is evolved in all fields of science amd technology
C354.4	Know the smart materials and their characteristics for the smart system applications.
C354.5	Understand the working of different sensors for smart system applications.
C354.6	Know how the different components of smart systems ate integrated with each other.

Course Name: 17MT551 Wireless Network & Communication

C355.1	Have Knowledge of the fundamental concepts of wireless communication and networks.
C355.2	To understand the basics of wireless voice and data communication

C355.3	Differentiation between Wireless LAN, Wireless MAN, Wireless WAN
C355.4	Understand the working of modern network architectures from a design and performance perspective.
C355.5	Design requirements of network architectures
C355.6	Brief description regarding different wireless networks.

Course Name: 17MT562 - Automation in Manufacturing

C356.1	Know the fundamentals of automation in manufacturing
C356.2	Need of automation in manufacturing
C356.3	Types of automation process and its requirement
C356.4	Knowledge about quality control and its requirement
C356.5	Understand the techniques of automation in manufacturing
C356.6	Operations performed in manufacturing industry

Course Name: 17MT61 - PLC &SCADA

C361.1	Describe typical components of a Programmable Logic Controller.
C361.2	Explain the basic concepts of a Programmable Logic Controller.
C361.3	Use timer, counter, and other intermediate programming functions.
C361.4	Design and program basic PLC circuits for entry-level PLC applications.
C361.5	Design and program a small, automated industrial production line.
C361.6	Explain SCADA basic concept and application process,

Course Name: 17MT62 - Embedded System (ARM)

C362.1	Gain the knowledge of various RISC and CISC architectures of processors
C362.2	Know the different register usage in processor core
C362.3	Know the function of Embedded system hardware and software components,
C362.4	Have knowledge of embedded system based on the ARM processor, various cache methods and instruction set.
C362.5	Understand the various instruction set for writing and optimizing ARM assembly and C code
C362.6	Able to optimize error in programming and debug error code in efficient way.

Course Name: 17MT63- Power Electronics

C363.1	Have knowledge of power semiconductor devices, thyristors, AC voltage controllers.
C363.2	Have knowledge of choppers and inverters.
C363.3	Understand the characteristics and working principle of thyristors, AC voltage controllers.
C363.4	Understand the characteristics and working principle of choppers and inverters.
C363.5	Apply control techniques to meet desired switching objectives.

C363.6	Analyst the importance and applications of diode as rectifiers, filters, Zener diode, regulators and switching circuits.

Course Name: 17MT64 Computer Aided Machine Drawing

C364.1	Have knowledge about Engineering Drawing
C364.2	Understand the concepts of sections of solids, orthographic views.
C364.3	Understand the concepts of threads, fasteners, couplings.
C364.4	Understand the concepts of joints and assembly drawing.
C364.5	Understand the concepts of Detailing.
C364.6	Students will be able to demonstrate the usage of CAD software

Course Name: 17MT652- Rapid Prototyping

C365.1	Have fundamental knowledge of modeling and simulation.
C365.2	Understand the techniques of discrete event simulation, random number generation.
C365.3	Understand the techniques to test for random number,
C365.4	Understand the techniques of random variants used in simulation study & simulation packages.
C365.5	Apply simulation packages for queuing system.
C365.6	Apply simulation packages for production system and maintenance system.

Course Name: 17MT662- Process Instrumentation

C366.1	Have the knowledge of Joints, Links.
C366.2	Have the knowledge of Sensors.
C366.3	Have the knowledge of Control units
C366.4	Have the knowledge of Actuators.
C366.5	Have the knowledge of Elements of Automation.
C366.6	**D**escribe motions and control system of Robots**.**

Course Name: 15MT71- : Industrial Robotics

C471.1	Gain knowledge of Robotics
C471.2	Gain knowledge of robotics in Automation
C471.3	Understand the working Methodology of Robotics and Automation
C471.4	Knowledge of robotics motion and sensors
C471.5	Write the program for Robot for various Application
C471.6	Knowledge of Robotic Control system and machine vision

Course Name: 15MT72: Thermal Engineering

C472.1	Understand the concepts of systems, energy interaction in systems and types
C472.2	Understand the energy interaction and thermodynamics equilibrium

C472.3	Know the thermodynamics concepts related terms
C472.4	Understand the difference between heat and work different process related to work
C472.5	Know the first law of thermodynamics to cyclic process and properties
C472.6	Understand steady flow energy equation for open system

Course Name: 15MT73 - Signal Processing

C473.1	Gain the Knowledge of signals and system transformation and filter
C473.2	Understand time domain, frequency domain signals analog and digital system
C473.3	Operate on signals and systems to bring out this characteristics and desired information
C473.4	Design Analog and Digital filters and implement discrete time systems
C473.5	Understand the basics of convolution sum and integral
C473.6	Properties of signals signal operation

Course Name: 15MT743- Real Time System

C474.1	Explain the types of real time systems and their properties
C474.2	Know concept of computer control
C474.3	Understand hardware and software requirements
C474.4	Know the languages for real time application
C474.5	Know the concept & working operation of operating systems
C474.6	Design RTSS and RTS developing Methodologies

Course Name: 15MT753 Safety & Security of System

C475.1	Have knowledge of IC Engines
C475.2	Have knowledge of Fuel, ignition, Lighting System
C475.3	Understand the working principle of Transmission System
C475.4	Understand the working principle of gear box
C475.5	Understand the working principle of Lubrication System
C475.6	Know about CMV safety rules

Course Name: 15MT81 Automotive Electronics & Hybrid vehicles

C481.1	Have knowledge of automotive electronics domain of various engine parts
C481.2	Have knowledge of automotive electronics sensors and types of sensors
C481.3	Know the electronics domain of various engine parts sensors, actuators, communication, and measurement system
C481.4	Understanding engine parameters and a critical awareness of current problems within the automotive electronics domain using various measurement technology
C481.5	Determine the extent and nature of electronic circuitry in automotive system including monitoring and control circuits for engines transmissions, brakes, steering, suspension, climate control system

C481.6	Understand the monitoring and control circuits for engines and instrumentations and radios and accessories involved in automotive industry

Course Name: 15MT-82- Communication System

C482.1	Know about communication systems, transmitter, receiver, and modulation in communication system.
C482.2	Know concepts of amplitude modulation and its types, coherent detection of different signals.
C482.3	Gain knowledge on angle modulation and demodulation, FM, and its types.
C482.4	Gain knowledge on phase locked loop, linear and nonlinear effects in FM systems.
C482.5	Know different waveform coding techniques.
C482.6	Gain knowledge on spread spectrum modulation, digital multiplexers, and its types.

Course Name: 15MT83 –Artificial Intelligence

C483.1	Understand the importance of Artificial systems, their domain details.
C483.2	Analyze the different Techniques used and algorithm applied to the system along with the system characteristics.
C483.3	Gain Knowledge of Artificial Intelligence, Production Rules, Search Algorithms, Expert System & its architectures, Machine Learning.
C483.4	Understand the working methodology of Search Algorithms, Expert System & Machine Learning.
C483.5	Ability to apply Artificial Intelligence techniques for problem solving.
C483.6	Explain the limitations of current Artificial Intelligence techniques.

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Department of Physics

Vision of the Institute

To be a respected and most sought after engineering educational institution engaged in equipping individuals capable of building learning organizations in the new millennium.

Mission of the Institute

To develop competent students with good value systems and face challenges of the continuously changing world.

Vision of the Department

To inculcate interest in Physics and promote the understanding of it, and to develop observational and computational skills, which will take the development in technology to new heights.

Mission of the Department

The department has been working towards fulfilling its vision through a synergic combination of teaching and research. The department also strives to promote excellence in technical education and scientific research through the effective use of Physics in real time engineering problems.

Program Educational Objectives

PEO 1.	Inculcate knowledge of basic engineering sciences and fundamentals of mechanical, electrical and computer systems.
PEO 2.	Create ability in graduates to design, develop product and applications in the field of Automation and Mechatronics and be able to use engineering tools that will enhance their productivity.
	Prepare graduates to be effective engineers with good analytical and problem-solving skill to innovate, research and develop in multidisciplinary Mechatronics environment.

Program Specific Objectives

PSO 1: Learn & understand more about basic principles & to develop problem solving skills and implementation in technology.

PSO 2: Study of material properties and their applications is the prime role to understand and usein engineering applications and studies.

PSO 3: Develop skills to impart practical knowledge in real time solution.

PSO 4: Understand measurement technology, usage of new instruments and real time applicationsin engineering studies.

Course Name: 18CHE12/22 (Engineering Physics)

CO1	Apprehend theoretical background of laser, construction and working of different types of laser and its applications in different fields and Compute Eigen values, Eigen functions, momentum of Atomic and subatomic particles using Time independent 1-D Schrodinger's wave equation.
CO2	Understand various electrical and thermal properties of materials like conductors, semiconductors, dielectrics using different theoretical models.
CO3	Understanding different types of optical fibers and their applications
CO4	Realize the interrelation between time varying electric field and magnetic field, the transverse nature of the EM waves and their role in optical fiber communication.
CO5	Understand various types of oscillations and their implications, the role of Shock waves in various fields.
CO6	Recognize the elastic properties of materials for engineering applications

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MBA

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Mission of the Institute

Our mission is to develop competent students with good value systems to face challenges of the continuously changing world.

Vision of the Department

To impart value-based management education to the students, to nurture and enhance their competencies and to prepare them to face the challenges of industry, society, and country.

Mission of the Department

To provide integrated knowledge and demonstrated ability to the students and to groom them towards building their careers as well equipped professional. To foster a passion for learning, creative thinking, leadership skills that helps in developing entrepreneurial abilities among the students.

Program Educational Objectives

PEO1: To equip the students with necessary knowledge and managerial skills to occupy positions of management and administration in business, industry, public system, and the government.

PEO2: To inculcate appropriate ethical values and attitudes among students to function effectively in the work environment.

PEO3: To provide a right mix of managerial and business exposure to function effectively in various domains of management.

Program Specific Outcomes

PSO1.To attain sufficient theoretical knowledge in areas of General Management, Marketing, Finance, Human Resources, Economics, Statistics, and its application to solve practical problems in business.

PSO2. An ability to demonstrate interpersonal skills, problem solving skills, and leadership qualities to facilitate management graduates to adapt to changes in the environment for self-sustenance and to enable lifelong learning.

PSO3. To instill a practice of professional standards and ethics and a sense of social responsibility in every management graduate.

Course Name:18MBA11(Management & Organizational Behavior)

C111.1	Comprehend & correlate all the management functions which are happening around with fundamental concepts and principles of management.
C111.2	Understand the overview of management, theory of management and practical applications of the same.
C111.3	Effectively use their skills for self-grooming, working in groups and to achieve organizational goals
C111.4	Demonstrate their acumen in applying managerial and behavioral concept in real world/situation.
C111.5	Understand and demonstrate their exposure on recent trends in management.

Course Name: 18MBA12(Managerial Economics)

C112.1	Understand the application of Economic Principles in Management decision making
C112.2	Acquire knowledge of micro economic concepts and apply them for effective functioning of a Firm and Industry
C112.3	Ability to understand, assess and forecast Demand.
C112.4	Apply the concepts of production and cost for optimization of production.
C112.5	Design Competitive strategies like pricing, product differentiation etc. And marketing according to the market structure.
C112.6	Design Competitive strategies like pricing, product differentiation etc. And marketing according to the market structure.
C112.7	Able to identify, assess profits and apply BEP for decision making.

Course Name:18MBA13(Accounting for Managers)

C113.1	Demonstrate theoretical knowledge and its application in real time accounting.
C113.2	Demonstrate knowledge regarding accounting principles and its application.
C113.3	Capable of preparing financial statement of sole trading concerns and companies.
C113.4	Independently undertake financial statement analysis and take decisions
C113.5	Comprehend emerging trends in accounting and computerization of Accounting systems.

Course Name:18MBA14(Business Statistics& Analytics)

C114.1	Facilitate objective solutions in business decision making under subjective conditions.
C114.2	Demonstrate different statistical techniques in business/real-life situations.
C114.3	Understand the importance of probability in decision making.
C114.4	Understand the need and application of analytics
C114.5	Understand and apply various data analysis functions for business problems.

Course Name:18MBA15(Marketing Management)

C115.1	Develop an ability to assess the impact of the environment on marketing function.
C115.2	To formulate marketing strategies that incorporate psychological and sociological factors which influence buying.
C115.3	Explain how companies identify attractive market segments, differentiate and position their products for maximum competitive advantage in the marketplace.
C115.4	Build marketing strategies based on product, price, place, and promotion objectives
C115.5	Synthesize ideas into a viable marketing plan.

Course Name:18MBA16(Managerial Communication)

C116.1	Awareness of the communication skills and know their potential to become successful managers.
C116.2	To get enabled with the mechanics of writing and can compose the business letters in English precisely and effectively.
C116.3	Introduced to the managerial communication practices in business those are in vogue.
C116.4	Trained in the art of business communication with emphasis on analyzing business situations
C116.5	Exposure in drafting business proposals to meet the challenges of competitive environment.

Course Name:18MBA21(Human Resource Management)

C121.1	Understanding of HRM functions, principles, Job analysis that facilitates students to design a job description and job specification for various levels of employees.
C121.2	Synthesize knowledge on effectiveness of recruitment process, sources & understanding of systematic selection procedure
C121.3	Identify the various training methods and design a training program.
C121.4	Understand the concept of performance appraisal process in an organization.
C121.5	List out the regulations governing employee benefit practices

Course Name: 18MBA22(Financial Management)

C122.1	Understand the basic financial concepts.
C122.2	Apply time value of money.
C122.3	Evaluate the investment decisions.
C112.4	Analyze the capital structure and dividend decisions.
C112.5	Estimate working capital requirements.

Course Name:18MBA23(Research Methodology)

C123.1	Understand various research approaches, techniques, and strategies in the appropriate in business.
C123.2	Apply a range of quantitative / qualitative research techniques to business and day to day management problems.
C123.3	Demonstrate knowledge and understanding of data analysis, interpretation and report writing.
C123.4	Develop necessary critical thinking skills to evaluate different research approaches in Business.

Course Name: 18MBA24(Legal and Business Environment)

C124.1	Develop an understanding of the macro environment of Business and various macroeconomic concepts.
C124.2	Understand the industrial policies of the past and the present and the evolution over time, and how Indian Industrial structure evolved over time.
C124.3	Exposure to various economic policies of the country and the state of economy

Course Name:18MBA25 (Strategic Management

C125.1	Understanding the concept of Strategic Management, its relevance, Characteristics, process nature and purpose.
C125.2	Understanding of how firms successfully institutionalize a strategy and create an organizational structure for domestic and overseas operations and gain competitive advantage
C125.3	An insight on strategy at different levels of an organization to gain competitive advantage.
C125.4	Understanding the strategic drive-in multinational firms and their decisions in different markets.
C125.5	Gain knowledge of strategy implementation and the control measures for effective decision-making.

Course Name:18MBA26 (Entrepreneurship Development)

C126.1	Display keen interest and orientation towards entrepreneurship, entrepreneurial opportunities to setup a business.
C126.2	As an entrepreneur learn to think creatively and understand the components in developing a Business plan
C126.3	Become aware about various sources of funding and institutions supporting entrepreneurs.
C126.4	Gain consciousness towards social entrepreneurship and rural entrepreneurship opportunities.

Course Name:18MBAMM301(Consumer Behavior)

C231.1	Explain the background and concepts vital for understanding Consumer Behavior.
C231.2	Identify the role of variables that determines Consumer Behavior in Social & cultural domain
C231.3	Identifying the psychological and behavioral practices adopted by organizations to enhance the Consumer Behavior.

Course Name: 18MBAMM302(Retail Management)

C232.1	Ability to identify the contemporary retail management, issues, and strategies.
C232.1	Evaluate the recent trends in retailing and its impact in the success of modern business.
C232.3	Relate store management and visual merchandising practices for effective retailing.

Course Name: 18MBAMM303(Services Marketing)

C233.1	Develop an understanding about the various concepts and importance of Services Marketing.
C233.2	Enhance knowledge about emerging issues and trends in the service sector.
C233.3	Learn to implement service strategies to meet new challenges.

Course Name: 18MBAFM301(Banking and Financial Services)

C234.1	Acquainted to various Banking and Non-Banking financial services in India
C234.2	Understand the activities of Merchant Banking and credit rating
C234.3	Equipped to understand micro financing and other financial services in India.
C234.4	Understand how to evaluate and compare leasing & hire purchase

Course Name:18MBAFM302(Investment Management)

C235.1	Understand the capital market and various Instruments for Investment
C235.2	Ability to assess the risk and return associated with investments and methods to value securities.
C235.3	Ability to analyses the Economy, Industry and Company framework for Investment Management.
C235.4	Learn the theories of Portfolio management and also the tools and techniques for efficient portfolio management.

Course Name: 18MBAFM303(Direct Taxation)

C236.1	Understand the basics of taxation and process of computing residential status
C236.2	Calculate taxable income under different heads.
C236.3	Understand deductions and calculation of tax liability of Individuals.
C236.4	Gain knowledge of the corporate tax system.

Course Name: 18MBAHR301(Recruitment & Selection)

C237.1	Gain the insights of various principles and practices of recruitment and selection in an industry.
C237.2	Equip students with various selection procedure practiced in industry.
C237.3	Develop students with latest selection tools in the corporate sector.
C237.4	Develop students with various testing of job recruitment and selection

Course Name:18MBAHR302(HR Analytics)

C238.1	Understanding of How HR function adds value and demonstrates the value in business terms
C238.2	Measure the value of Intangibles that HR helps builds for the organization given a particular business context to facilitate decision making
C238.3	Convert soft factors in a people management context into measurable variables across various domains.
C238.4	Devise, conduct and analyses a study on employees or any other related to the HR context in an organization.

Course Name:18MBAHR303(Compensation & Reward System)

C239.1	Gain insights of various conceptual aspects of Compensation and Benefits to achieve organizational goals
C239.2	Determine the performance-based compensation system for business excellence and solve various cases
C239.3	Designing the compensation strategies for attraction, motivation and retaining high quality workforce.
C239.4	Understand the Legal & Administrative Issues in global compensation to prepare compensation plan, CTC, wage survey and calculate various bonus.

Course Name:18MBAOS307(Organization Study)

C2310.1	Exposure to the working culture of the organization
C2310.2	Application of theoretical culture to real life situation at the workplace
C2310.3	Understanding of the various functions of the organization
C2310.4	Use of McKinsey's 7S framework and Porter's five force model
C2310.5	Analysis of the financial statements

Course Name:18MBAMM401(Sales Management)

C241.1	Understand the apply the selling techniques in an organization.
C241.2	Develop a plan for organizing staffing & training sales force.
C241.3	Organize sales territories to maximize selling effectiveness.

C241.4	Evaluate sales management strategies.

Course Name:18MBAMM402(Integrated Marketing Communication)

C242.1	Define and apply knowledge of various aspects of managerial decision making related to marketing communications strategy and tactics.
C242.2	Ability to create an integrated marketing communications plan which includes promotional strategies.
C242.3	Explain the role of IMC in the overall marketing &Use effectiveness measures to evaluate IMC strategies.
C242.4	Prepare advertising copy and design other basic IMC tools.

Course Name: 18MBAMM403(Digital & Social Media Marketing)

C243.1	Recognize appropriate e-marketing objectives.
C243.2	Appreciate the e-commerce framework and technology.
C243.3	Illustrate the use of search engine marketing, online advertising, and marketing strategies.
C243.4	Use social media & create templates
C243.5	Develop social media strategies to solve business problems.

Course Name: 18MBAFM401(Mergers, Acquisitions & Corporate Restructuring)

C244.1	Understand Mergers & Acquisitions with its different classifications, strategies, theories, synergy etc.
C244.2	Conduct financial evaluation of M&A
C244.3	Analyze the results after evaluation
C244.4	Critically evaluate different types of M&A, takeover, and antitakeover strategies.

Course Name:18MBAFM402(Risk Management and Insurance)

C245.1	Understand various types of risks.
C245.2	Assess the process of identifying and measuring the risk.
C245.3	Acquaint with the functioning of life Insurance in risk management.
C245.4	Understand general insurance contract

Course Name:18MBAFM403(Indirect Taxation)

C246.1	Have clarity about GST system in India.
C246.2	Understanding of levy and collection of GST in India.
C246.3	Have an overview of customs duty in India.
C246.4	Understanding of valuation for customs duty.

Course Name:**18MBAHR401(Public Relations)**

C247.1	To demonstrate an understanding of the fundamental's tools of public relations practices.
C247.2	To describe the various emerging trends in the field of public relations.
C247.3	To analyze the importance of employee communication and organizational change
C247.4	To evaluate the importance of community relations.

Course Name: **18MBAHR402(Organizational Leadership)**

C248.1	Comprehend & correlate organizational leadership styles which are happening around with fundamental concepts of team leadership.
C248.2	Understand the overview of leadership behavior and motivation in organization
C248.3	Effectively use their skills for self-grooming on leadership traits and ethics that influences them to effectively work in groups to achieve organizational goals.
C248.4	Demonstrate their acumen in applying their knowledge in organizational leadership and behavioral concept in real world/situation

Course Name:**18MBAHR403(International Human Resource Management)**

C249.1	Analyze the impact of contemporary issues and global imperatives on Human Resource concepts, policies, and practices.
C249.2	Apply concepts and knowledge in deployment, expatriate on international assignments.
C249.3	Evaluate the effects of different human resource and international industrial relations
C249.4	Develop students to adopt international industrial relation strategies.

Course Name: **18MBAPR407(Project Work)**

C2410.1	To understand the working of the organization/Company/industry
C2410.2	To take up an in-depth study of an issue/problem in the area of Marketing/Finance/Human Resources
C2410.3	Ability to analyze using statistical tools and statistical packages
C2410.4	Knowledge of comprehending the data collected and editing, tabulating and presenting for analysis.

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MCA

Vision of the Institute

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Program Educational Objectives

PEO1: Exhibit their expertise in problem Solving skills through design, analysis, Implementation and evaluation of hardware and software systems.

PEO2: Engage in the Computer Science and Applications related Profession locally and globally by contributing ethically to the competent and professional practices.

PEO3: Effectively adapt as individuals and as team members in multidisciplinary projects involving technical, managerial, economic, and social constraints.

PEO4: Demonstrate Leadership and Entrepreneurship Skills by incorporating organizational goals and providing facilities for peer members with defined objective.

Program Specific Outcomes

PSO1. The graduates of the Program will have firm foundation in understanding and applying the principles of mathematics, computing techniques and its applications.

PSO2. The graduates of the Program will have skills to develop, deploy and maintain applications for desktop, web, mobile, cloud and cross platforms using modern tools and technologies.

PSO3. The graduates of the Program will be prepared to achieve their career goals in the software industry or pursue higher studies and enhance their professional knowledge.

Course Name: Data Structures with Algorithms(20MCA11)

CO1	Demonstrate different data structures, its operations using C programming.
CO2	Analyze the performance of Stack, Queue, Lists, Trees, Hashing, Searching and Sorting techniques
CO3	Implement some applications of data structures in a high-level language such as C/C++
CO4	Design and apply appropriate data structures for solving computing problems
CO5	Compute the efficiency of algorithms in terms of asymptotic notations for the given problem.

Course Name: Operating System with UNIX (20MCA12)

CO1	Analyze the basic Operating System Structure and concept of Process Management
CO2	Analyze the given Synchronization/ Deadlock problem to solve and arrive at valid conclusions.
CO3	Analyze OS management techniques and identify the possible modifications for the given problem context.
CO4	Demonstrate the working of basic commands of Unix environment including file processing
CO5	Demonstrate the usage of different shell commands, variable and AWK filtering to the given problem

Course Name: Computer Networks(20MCA13)

CO1	Apply the basic concepts of networking and to analyze different parameters such as bandwidth, delay, throughput of the networks for the given problem
CO2	Apply different techniques to ensure the reliable and secured communication in wired and wireless communication
CO3	Analyze the networking concepts of TCP/IP for wired and wireless components
CO4	Identify the issues of Transport layer to analyze the congestion control mechanism
CO5	Design network topology with different protocols and analyse the performance using NS2

Course Name: Mathematical Foundation for Computer Applications(20MCA14)

CO1	Apply the fundamentals of set theory and matrices for the given problem.
CO2	Apply the types of distribution, evaluate the mean and variance for the given case study/ problem.
CO3	Solve the given problem by applying the Mathematical logic concepts
CO4	Model the given problem by applying the concepts of graph theory.
CO5	Design strategy using gaming theory concepts for the given problem.

CO6	Identify and list the different applications of discrete mathematical concepts in computer science.

Course Name: Research Methodology and IPR (20MCA15)

CO1	Identify the suitable research methods and articulate the research steps in a proper sequence for the given problem.
CO2	Carry out literature survey, define the problem statement and suggest suitable solution for the given problem and present in the format of the research paper (IEEE).
CO3	Analyze the problem and conduct experimental design with the samplings
CO4	Perform the data collection from various sources segregate the primary and secondary data
CO5	Apply some concepts/section of Copy Right Act /Patent Act /Cyber Law/Trademark to the given case and develop –conclusions

Course Name: Data Structures with Algorithms Lab(20MCA16)

CO1	Implement sorting / searching techniques, and validate input/output for the given problem
CO2	Implement data structures (namely Stacks, Queues, Circular Queues, Linked Lists, and Trees), its operations and algorithms.
CO3	Implement the algorithm to find whether the given graph is connected or not and conclude on the performance of the technique implemented.
CO4	Design and apply appropriate data structures for solving computing problems
CO5	Implement the techniques for evaluating the given expression.

Course Name: Unix Programming Lab(20MCA17)

CO1	Demonstrate the working of basic commands of Unix environment including file processing
CO2	Apply Regular expression to perform pattern matching using utilities like grep, sed and awk.
CO3	Implement Unix commands/ system calls to demonstrate process management
CO4	Demonstrate the usage of different shell commands, variable and AWK filtering too the given problem.
CO5	Develop shell scripts for developing the simple applications to the given problem.

Course Name: Computer Networks Lab(20MCA19)

CO1	Apply the basic concepts of networking and to analyze different parameters such as bandwidth, delay, throughput of the networks for the given problem.
CO2	Apply different techniques to ensure the reliable and secured communication in wired and wireless communication
CO3	Analyze the networking concepts of TCP/IP for wired and wireless components

CO4	Identify the issues of Transport layer to analyze the congestion control mechanism
CO5	Design network topology with different protocols and analyse the performance using any simulator

Course Name: Bridge Course: Basics of Programming and Computer Organisation(20MCA19-BC)

CO1	Demonstrate the key concepts introduced in C programming by writing and executing the programs.
CO2	Demonstrate the concepts of structures and pointers for the given application/ problem.
CO3	Implement the single/multi-dimensional array for the given problem.
CO4	Demonstrate the application of logic gates in solving some societal/industrial problems.
CO5	Analyse how memory organization, operations, instruction sequencing, and interrupts are useful in executing the given program.

Course Name: Database Management System(20MCA21)

CO1	Apply the basic concepts of database management in designing the database for the given problem
CO2	Design entity-relationship diagrams to the given problem to develop database application with appropriate fields and validations.
CO3	Implement a database schema for the given problem domain
CO4	Formulate and execute SQL queries to the given problem.
CO5	Apply normalization techniques to improve the database design to the given problem.

Course Name: Object Oriented Programming with Java(20MCA22)

CO1	Demonstrate the basic programming constructs of Java and OOP concepts to develop Java programs for a given scenario
CO2	Illustrate the concepts of generalization and run time polymorphism applications to develop reusable components.
CO3	Demonstrate the usage of Packages, Interfaces, Exceptions and Multithreading in building given applications.
CO4	Apply Enumerations, Wrappers, Auto boxing, Collection framework and I/O operations for effective coding to the given problem.
CO5	Implement the concepts of Applets, and networking using Java network classes for developing the distributed applications to the given problem.

Course Name: Web Technologies(20MCA23)

CO1	Apply the features jQuery for the given web-based problem.
CO2	Demonstrate the development of XHTML documents using JavaScript and CSS
CO3	Illustrate the use of CGI and Perl programs for different types of server side applications

CO4	Design and implement user interactive dynamic web-based applications.
CO5	Demonstrate applications of Angular JS and jQuery for the given problem

Course Name: Software Engineering(20MCA24)

CO1	Identify and define different requirements for the given problem and present in the IEEE format.
CO2	Use modern tool to create dynamic diagrams to represent the design for the given problem.
CO3	Draw class diagram, analyze the different types of association that exists as per the given problem and represent them using UML notations
CO4	Analyze the given system to identify actors, use cases to design use case diagrams for the given problem using RSA/open-source tool.
CO5	Design the static/dynamic models to meet application requirements of the given system and generate code (skeleton) using the modern tool.

Course Name: Cyber Security(20MCA251)

CO1	Apply IT ACT (Cyber law) to the given case/problem and infer from the given case and analyze the gap if exists.
CO2	Analyze the working of cyber security principles in designing the system.
CO3	Analyze the given problem (cybercrime, vulnerability, threat), develop a strategy (physical, logical or administrative controls) to mitigate the problem and articulate consequences on Society and National Economy.
CO4	Examine relevant network defense / web application tool to solve given cyber security problem and evaluate its suitability.
CO5	Evaluate provisions available in Indian cyber law to handle infringement of intellectual property rights that happen on the cyber platform.

Course Name: User Interface Design(20MCA254)

CO1	Analyze the new technologies that provide interactive devices and interfaces.
CO2	Apply the guidelines to develop the UID and evaluate for the given problem.
CO3	Apply the development methodologies with an analysis of the social impact and legal issues Understand Direct Manipulation and Virtual Environment
CO4	Discuss the command, natural languages, and issues in design for maintaining QoS
CO5	Demonstrate techniques for information search and visualization for the given problem.

Course Name: Mobile Applications Development(20MCA263)

CO1	Develop effective user interfaces that leverage evolving mobile devices

CO2	Develop applications using software development kits (SDKs), frameworks and toolkits.
CO3	Implement suitable methods to integrate database and server-side technologies
CO4	Design and develop open-source software based mobile application to the given problem.
CO5	Build and deploy competent mobile application to solve the societal/industrial problems.

Course Name: Natural Language Processing(20MCA265)

CO1	Apply parsing technique to the given problem and verify the output and give valid conclusions
CO2	Illustrate the approaches to syntax and semantics in NLP.
CO3	Formulate solutions for a range of natural language components using existing algorithms, techniques and frameworks, including part-of-speech tagging, language modelling, parsing and semantic role labelling.
CO4	Evaluate NLP solutions of the given problem and arrive at valid conclusions
CO5	Illustrate information retrieval techniques.

Course Name: Database Management Systems Laboratory(20MCA27)

CO1	Design entity-relationship diagrams to solve given database applications
CO2	Implement a database schema for a given problem.
CO3	Formulate SQL queries in Oracle for the given problem.
CO4	Apply normalization techniques to improve the database design for the given problem.
CO5	Build database and verify for its appropriate normalization for any given problem

Course Name: Java Programming Lab(20MCA28)

CO1	Demonstrate the fundamental data types and constructs of Java Programming by writing executable/interpretable programs.
CO2	Illustrate the object-oriented principles with the help of java programs.
CO3	Develop reusable and efficient applications using inheritance and multi-threading concepts of java.
CO4	Apply client-side programming and networking concepts to develop distributed applications.
CO5	Write java programs to demonstrate the concepts of interfaces, inner classes and I/O streams

Course Name: Web Technologies Laboratory(20MCA29)

CO1	Apply the concept and usages web-based programming techniques

CO2	Learning and Developing XHTML documents using JavaScript and CSS.
CO3	To be familiar in the use of CGI and Perl programs for different types of server side applications.
CO4	Design and implement user interactive dynamic web-based applications.

Course Name: Data Analytics using Python(20MCA31)

CO1	Demonstrate basic data analytics principles and techniques
CO2	Apply control structures to the given problems
CO3	Apply the concepts of inheritance and overloading for a given problem.
CO4	Demonstrate the concepts of learning and decision trees for a given problem.
CO5	Demonstrate the concepts of neural networks and genetic algorithms for a given problem

Course Name: Internet of Things(20MCA32)

CO1	Analyze the IoT architecture and design along with functional/compute stack and data management.
CO2	Apply IOT architecture for a given problem
CO3	Analyze the application protocol, transport layer methods for the given business case.
CO4	Analyze the application of data analytics for IOT for a given
CO5	Analyse the architecture and develop programming using modern tools for the given use case

Course Name: Advances in Java(20MCA33)

CO1	Apply the concept of Servlet and its life cycle to create web application
CO2	Apply JSP tags and its services to web application.
CO3	Create packages and interfaces in the web application context.
CO4	Build Database connection for the web applications.
CO5	Develop enterprise applications using Java Beans concepts for the given problem.

Course Name: Cloud Computing(20MCA342)

CO1	Demonstrate the system & software models and mechanisms that support cloud computing
CO2	Classify various cloud services and their providers
CO3	Compare various cloud deployment models
CO4	Differentiate various types of computing environments
CO5	Identify enabling technologies of cloud computing.

Course Name: Software Testing20MCA344)

CO1	Acquire knowledge of basic principles and knowledge of software testing and debugging and test cases.
CO2	Will be able to understand the perceptions on testing like levels of testing, generalized pseudo code and with related examples.
CO3	To study the various types of testing.
CO4	Differentiate between functional testing and structural testing.
CO5	Analyse the performance of fault-based testing, planning and Monitoring the process, Documentation testing.

Course Name: Deep Learning(20MCA351)

CO1	Demonstrate the basics of deep learning for a given context.
CO2	Implement various deep learning models for the given problem
CO3	Realign high dimensional data using reduction techniques for the given problem
CO4	Analyze optimization and generalization techniques of deep learning for the given problem.
CO5	Evaluate the given deep learning application and enhance by applying latest techniques.

Course Name: Big data Analytics(20MCA352)

CO1	Identify the business problem for a given context and frame the objectives to solve it through data analytics tools
CO2	Apply various algorithms for handling large volumes of data.
CO3	Illustrate the architecture of HDFS and explain functioning of HDFS clusters.
CO4	Analyze the usage of Map-Reduce techniques for solving big data problems.
CO5	Conduct experiment with various datasets for analysis / visualization and arrive at valid conclusions.

Course Name: Data Analytics Lab(20MCA36)

CO1	Develop python program to perform search/sort on a given data set
CO2	Demonstrate object-oriented principles
CO3	Demonstrate data visualization using NumPy for a given problem
CO4	Demonstrate regression model for a given problem
CO5	Design and develop an application for the given problem

Course Name: Mini project with IOT Lab(20MCA37)

CO1	Demonstrate the IoT architecture design for a given problem

CO2	Apply IOT techniques for a given problem
CO3	Analyze the application protocol, transport layer methods for the given business case.
CO4	Design and develop an application for the given problem for the societal/industrial problems
CO5	Develop python program by applying suitable feature for the given problem and verify the output

Course Name: Advances in Java Lab(20MCA38)

CO1	Apply the concept of Servlet and its life cycle to create web application.
CO2	Apply JSP tags and its services to web application
CO3	Create packages and interfaces in the web application context.
CO4	Build Database connection for the web applications.
CO5	Develop application programs using beans concept.

Course Name: Advances in Web Technologies(20MCA41)

CO1	Build the Web Applications using jQuery, PHP, XML for the given problem
CO2	Design the Web Pages using AJAX for the given problem
CO3	Analyze the advances in Web2.0 and demonstrate its usage for the problem considered
CO4	Analyze the web services and demonstrate its usage for the problem considered.
CO5	Design responsive web applications using Bootstrap for the given problem.

Course Name: Programming using C#(20MCA42)

CO1	Analyze C#andclient-serverconceptsusing. Net Framework Components.
CO2	Apply delegates, eventandexceptionhandlingtoincorporatewithASP, WinForms, ADO.NET
CO3	Analyzetheuseof.NetComponentsdependingontheproblemstatement.
CO4	Implement&developawebbasedandConsolebasedapplicationwithDatabase connectivity
CO5	Implement & develop a web-based application with Database connectivity

Course Name: Industry Internship(20MCA43)

CO1	Analyze the real-time industry/research work environment with emphasis on organizational structure/job process/different departments and functions / tools /technology.
CO2	Develop applications using modern tools and technologies
CO3	Demonstrate self-learning capabilities with an effective report and detailed presentation.

Course Name: Project Work(20MCA44)

CO1	Identify a suitable problem making use of the technical and engineering knowledge gained from previous courses with the awareness of impact of technology on the society and their ethical responsibilities.
CO2	Work as an individual and team to segregate work and execute/implement projects using appropriate tools.
CO3	Develop skills to disseminate technical and general information by means of oral as well as written presentation and professional skills
CO4	To conduct testing of application using appropriate techniques and tools.
CO5	To enhance interpersonal skills and group cohesion among the peers during the project work

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M. Tech in Digital Electronics & Communication

Vision of the Institute

To be a respected and most sought after engineering educational institution engaged in equipping individuals capable of building learning organizations in the new millennium.

Mission of the Institute

To develop competent students with good value systems and face challenges of the continuously changing world.

Vision of the Department

To impart technical education par excellence and prepare leaders to serve the industries and society.

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Program Educational Objectives

Graduates apply their knowledge of mathematics and science to identify, analyze and solve problems in the field of Electronics & communication to develop sophisticated communication systems.

Graduates to design and build up interdisciplinary systems by solving core engineering problems in communication systems which are technically sound, economically feasible and socially acceptable.

Graduates exhibit desire for life-long learning which directs them to obtain thorough knowledge in their chosen fields and motivate them for higher studies/research.

Program Specific Objectives

PSO 1: An ability to understand the basic core courses of Electronics & Communication Engineering and to relate them to various areas of application like Communication Systems, control system, Signal processing, VLSI and Embedded systems.

PSO 2: Should have capability to apply modern tools to analyze and solve complex designs with optimal solutions for various real-world applications

PSO 3: Excellent adaptability to changing work environment with good leadership qualities and zeal for social and environmental well-being.

Program Outcomes

1. Engineering knowledge: Apply the knowledge of mathematics, science, engineering fundamentals, and an engineering specialization to the solution of complex engineering problems.

2. Problem analysis: Identify, formulate, review research literature, and analyze complex engineering problems reaching substantiated conclusions using first principles of mathematics, natural sciences, and engineering sciences.

3. Design/development of solutions: Design solutions for complex engineering problems and design system components or processes that meet the specified needs with appropriate consideration for the public health and safety, and the cultural, societal, and environmental considerations.

4. Conduct investigations of complex problems: Use research-based knowledge and research methods including design of experiments, analysis and interpretation of data, and synthesis of the information to provide valid conclusions.

5. Modern tool usage: Create, select, and apply appropriate techniques, resources, and modern engineering and IT tools including prediction and modelling to complex engineering activities with an understanding of the limitations.

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Course Name: C101 (Advanced Engineering Mathematics-18ELD11)

C101.1	Understand vector spaces, basis, linear transformations and the process of obtaining matrix of linear transformations arising in magnification and rotation of images.
C101.2	Apply the technique of singular value decomposition for data compression, least square approximation in solving inconsistent linear systems.
C101.3	Utilize the concepts of functional and their variations in the applications of communication systems, decision theory, synthesis and optimization of digital circuits.
C101.4	Learn the idea of random variables (discrete/continuous) and probability distributions in analyzing the probability models arising in control systems and system communications.
C101.5	Analyze random process through parameter-dependent variables in various random processes.

Course Name: C102 (Advanced Digital Signal Processing-18ECS12)

C102.1	Design adaptive filters for a given application
C102.2	Design multirate DSP Systems
C102.3	Implement adaptive signal processing algorithm
C102.4	Design active networks
C102.5	Understand advanced signal processing techniques, including multi-rate processing and time-frequency analysis techniques

Course Name: C103 (Advanced Embedded systems-18EVE13)

C103.1	Understand the basic hardware components and their selection method based on the characteristics and attributes of an embedded system.
C103.2	Explain the hardware software co-design and firmware design approaches.
C103.3	Acquire the knowledge of the architectural features of ARM CORTEX M3, a 32 bit Microcontroller including memory map, interrupts and exceptions.
C103.4	Apply the knowledge gained for Programming ARM CORTEX M3 for different Applications.

Course Name: C104 (Advanced Communication Systems-1-18ECS14)

C104.1	Explain the concept of low pass and Bandpass signals representations at the Transmitter, the process of Detection and Estimation at the receiver in the presence of AWGN only.
C104.2	Evaluate Receiver performance for various types of single carrier symbol modulations through ideal and AWGN Non-bandlimited and bandlimited channels.

C104.3	Design single carrier equalizers for various symbol modulation schemes and detection methods for defined channel models, and compute parameters to meet desired rate and performance requirements.
C104.4	Design and Evaluate Non band limited and Non-power limited spread spectrum systems for communications in a Jamming environment, multiuser situation and low power intercept environment.

Course Name:C105(Advanced Communication Networks-18ECS15)

C105.1	Choose appropriate Network Infrastructure and Networking Architectures which suits current practice in networking
C105.2	Identify the suitable random-access methods which suits wireless networks
C105.3	Identify IP configuration for the network with suitable routing mechanisms
C105.4	Analyze and develop various network traffic management and control techniques
C105.5	Analyze and develop various congestion and flow control

Course Name:C106 (Advanced Digital Signal Processing Lab-18ECSL16)

C106.1	Develop a Filter design
C106.2	Develop a Filter Realization
C106.3	Signal Manipulations using MatLab
C106.4	Design using Wavelet Transforms
C106.5	Estimating PSD using various techniques

Course Name:C106 (Research Methodology and IPR-18RMI17)

C107.1	Discuss research methodology and the technique of defining a research problem
C107.2	Explain the functions of the literature review in research, carrying out a literature search, developing theoretical and conceptual frameworks and writing a review.
C107.3	Explain various research designs and their characteristics.
C107.4	Explain the art of interpretation and the art of writing research reports
C107.5	Discuss various forms of the intellectual property, its relevance

Course Name: C111 (Advanced Communication Systems-2 -18ECS21)

C111.1	Explain the concepts of multi-channel signaling (including OFDM) scheme and synchronization for carrier and symbol timing recovery at receiver.
C111.2	Evaluate the capacity and degradation in performance of various symbol signaling schemes in a multipath fading environment.
C111.3	Develop & analyze schemes to improve performance in a multipath fading environment including maximal ratio combining, RAKE receivers, OFDM and MIMO.
C111.4	Develop and evaluate the performance of a OFDM MIMO scheme to meet specified rate in a given multipath environment.

Course Name: C112 (Antenna Theory and Design -18ECS22)

C112.1	Classify different types of antennas
C112.2	Define and illustrate various types of array antennas
C112.3	Design antennas like Yagi-Uda, Helical antennas and other broad band antennas
C112.4	Describe different antenna synthesis methods
C112.5	Apply methods like MOM

Course Name: C113 (Error Control Coding-18ECS23)

C113.1	Analyze a discrete memoryless channel, given the source and transition probabilities.
C113.2	Apply the concept of modern linear algebra for the error control coding technique.
C113.3	Construct and Implement efficient LBC, Cyclic codes etc encoder and decoders.
C113.4	Apply decoding algorithms for efficient decoding of Block codes and Convolutional codes.

Course Name: C114 (Cryptography and Network Security-18ECS243)

C114.1	Use basic cryptographic algorithms to encrypt the data.
C114.2	Generate some pseudorandom numbers required for cryptographic applications.
C114.3	Provide authentication and protection for encrypted data.
C114.4	Provide Web security

Course Name: C115 (Multimedia Over Communication links-18ECS251)

C115.1	Understand basics of different multimedia networks and applications.
C115.2	Analyze media types like audio and video to represent in digital form.
C115.3	Understand different compression techniques to compress audio.
C115.4	Understand different compression techniques to compress audio video.
C115.5	Describe the basics of Multimedia Communication Across Networks

Course Name: C116 (Advanced Communication Lab-18ECSL26)

C116.1	Plot the radiation pattern of some antennas using Matlab and wave guide setup
C116.2	Obtain the S-parameters of Magic tee and directional couplers.
C116.3	Test the IC CD4051 for modulation techniques.
C116.4	Study multiplexing techniques using OFC kit.

Course Name: C201 (LTE 4G Broadband-18ECS31)

C211.1	Understand the system architecture and the function standard specified components of the system of LTE 4G.

C211.2	Analyze the role of LTE radio interface protocols and EPS Data convergence protocols to set up, reconfigure and release data and voice from a number of users.
C211.3	Demonstrate the UTRAN and EPS handling processes from set up to release including mobility management for a variety of data call scenarios.
C211.4	Test and Evaluate the Performance of resource management and packet data processing and transport algorithms.

Course Name: C202 (Advances in Image Processing-18ECS321)

C212.1	Understand the representation of the digital image and its properties
C212.2	Apply pre-processing techniques required to enhance the image for its further analysis.
C212.3	Use segmentation techniques to select the region of interest in the image for analysis
C212.4	Represent the image based on its shape and edge information.
C212.5	Describe the objects present in the image based on its properties and structure.
C212.6	Use morphological operations to simplify images, and quantify and preserve the main shape characteristics of the objects.

Course Name: C203 (Pattern Recognition & Machine Learning -18ESP332)

C213.1	Identify areas where Pattern Recognition and Machine Learning can offer a solution.
C213.2	Describe the strength and limitations of some techniques used in computational Machine Learning for classification, regression and density estimation problems.
C213.3	Describe and model data.
C213.4	Solve problems in Regression and Classification.

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M. Tech in VLSI Design & Embedded System

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C101.4	Utilize the concepts of functional and their variations in the applications of communication systems, decision theory, synthesis and optimization of digital circuits.
C101.5	Apply the idea of joint probability distributions and the role of parameter-dependent random variables in random process.

Course Name: C102 (ASIC Design -18EVE12)

C102.1	Describe the concepts of ASIC design methodology, data path elements, logical effort and FPGA architectures
C102.2	Analyze the design of FPGAs and ASICs suitable for specific tasks, perform design entry and explain the physical design flow.
C102.3	Design data path elements for ASIC cell libraries and compute optimum path delay.
C102.4	Create floor plan including partition and routing with the use of CAD algorithms.

Course Name: C103 (Advanced Embedded systems-18EVE13)

C103.1	Understand the basic hardware components and their selection method based on the characteristics and attributes of an embedded system.
C103.2	Explain the hardware software co-design and firmware design approaches.
C103.3	Acquire the knowledge of the architectural features of ARM CORTEX M3, a 32 bit Microcontroller including memory map, interrupts and exceptions.
C103.4	Apply the knowledge gained for Programming ARM CORTEX M3 for different Applications.

Course Name: C104 (VLSI Testing-18EVE14)

C104.1	Analyze the need for fault modeling and testing of digital circuits
C104.2	Generate fault lists for digital circuits and compress the tests for efficiency
C104.3	Create tests for digital memories and analyze failures in them
C104.4	Apply boundary scan technique to validate the performance of digital circuits

C104.5	Design built-in self-tests for complex digital circuits

Course Name: C105 (DVD-18EVE15)

C105.1	Analyze issues of On-chip interconnect Modeling and Interconnect delay calculation.
C105.2	Analyze the Switching Characteristics in Digital Integrated Circuits.
C105.3	Use the Dynamic Logic circuits in state-of-the-art VLSI chips.
C105.4	Study critical issues such as ESD protection, Clock distribution, Clock buffering, and Latch phenomenon
C105.5	Use Bipolar and Bi-CMOS circuits in very high-speed design.

Course Name:C106 (VLSI and ES Lab1-18EVEL16)

C106.1	Develop Verilog Code for the design of digital circuits
C106.2	Use FPGA/CPLD board and Logic Analyzer or Chipscope to verify the results
C106.3	Develop Assembly language programs for different applications using ARMCortex M3 Kit and Keil uVision-4 tool.
C106.4	Develop C language programs for different applications using ARM-Cortex M3 Kit and Keil uVision-4 tool

Course Name:C107 (Research Methodology-18RMI17)

C107.1	Discuss research methodology and the technique of defining a research problem
C107.2	Explain the functions of the literature review in research, carrying out a literature search, developing theoretical and conceptual frameworks and writing a review.
C107.3	Explain various research designs and their characteristics.
C107.4	Explain the art of interpretation and the art of writing research reports
C107.5	Discuss various forms of the intellectual property, its relevance and business impact in the changing global business environment and leading International Instruments concerning IPR

Course Name: C111 (Design of Analog and Mixed Mode VLSI Circuits-18EVE21)

C111.1	Use efficient analytical tools for quantifying the behavior of basic circuits by inspection.
C111.2	Design high-performance, stable operational amplifiers with the tradeoffs between speed, precision and power dissipation.
C111.3	Design and study the behavior of phase-locked-loops for the applications.
C111.4	Identify the critical parameters that affect the analog and mixed-signal VLSI circuits 'performance
C111.5	Perform calculations in the digital or discrete time domain, more sophisticated data converters to translate the digital data to and from inherently analog world.

Course Name: C112 (Real Time Operating System-16EVE22)

C112.1	Develop programs for real time services, firmware and RTOS, using the fundamentals of Real Time Embedded System, real time service utilities, debugging methodologies and optimization techniques.
C112.2	Select the appropriate system resources (CPU, I/O, Memory, Cache, ECC Memory, and Microcontroller/FPGA/ASIC to improve the system performance.
C112.3	Apply priority based static and dynamic real time scheduling techniques for the given specifications.
C112.4	Analyze deadlock conditions, shared memory problem, critical section problem, missed deadlines, availability, reliability and QoS.
C112.5	Develop programs for multithreaded applications using suitable techniques and data structure

Course Name: C113(System Verilog-18EVE23)

C113.1	Write test benches for moderately complex digital circuits
C113.2	Use System Verilog language
C113.3	Appreciate functional coverage
C113.4	Apply constrained random tests benches using System Verilog
C113.5	Analyze a verification case and apply System Verilog to verify the design

Course Name: C114 (Advances in VLSI Design-18EVE241)

C114.1	Apply design automation for complex circuits using the different Implementation methodology like custom versus semi-custom, hardwired versus fixed, regular array versus ad-hoc.
C114.2	Use the approaches to minimize the impact of interconnect parasitic on performance, power dissipation and circuit reliability
C114.3	Impose the ordering of the switching events to meet the desired timing Constraints using synchronous, clocked approach.
C114.4	Infer the reliability of the memory

Course Name: C115 (LPVD-18EVE251)

C115.1	Identify the sources of power dissipation in CMOS circuits.
C115.2	Perform power analysis using simulation-based approaches and probabilistic analysis.
C115.3	Use optimization and trade-off techniques that involve power dissipation of digital circuits.
C115.4	Make the power design a reality by making power dimension an integral part of the design process

C115.5	Use practical low power design techniques and their analysis at various levels of design abstraction and analyses how these are being captured in the latest design automation environments.

Course Name: C116 (VLSI and ES Lab-2-18EVEL26)

C116.1	Learn the various issues in Mixed signal designs basically data converters.
C116.2	Acquire hands-on skills of using CAD tools in VLSI design.
C116.3	Appreciate the design process in VLSI through a mini-project on the design of a CMOS sub-system.
C116.4	Select a suitable task switching technique in a multithreaded application.
C116.5	Implement different techniques of message passing and Inter task Communication.
C116.6	Implement different data structures such as pipes, queues and buffers in multithreaded programming.

Course Name: C201 (CAD of Digital Systems-18EVE31)

C201.1	Solve graph theoretic problems.
C201.2	Evaluate the computational complexity of an algorithm
C201.3	Write algorithms for VLSI Automation
C201.4	Simulate and synthesize digital circuits using VLSI automation tools.

Course Name: C202 (Advances in Image Processing-18ECS321)

C202.1	Understand the representation of the digital image and its properties
C202.2	Apply pre-processing techniques required to enhance the image for its further analysis.
C202.3	Use segmentation techniques to select the region of interest in the image for analysis
C202.4	Represent the image based on its shape and edge information.
C202.5	Describe the objects present in the image based on its properties and Structure.
C202.6	Use morphological operations to simplify images, and quantify and Preserve the main shape characteristics of the objects.

Course Name: C203 (IOT-18ECS333)

C203.1	Understand the basic concepts IOT Architecture and devices employed.
C203.2	Analyze the sensor data generated and map it to IOT protocol stack for transport
C203.3	Apply communications knowledge to facilitate transport of IOT data over various available communications media.
C203.4	Design a use case for a typical application in real life ranging from sensing devices to analyzing the data available on a server to perform tasks on the device.

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E-mail: engprincipal@theoxford.edu Web: www.theoxfordengg.org

M. Tech in Power Electronics

Vision of the Institute

To be a respected and most sought after engineering educational institution engaged in equipping individuals capable of building learning organizations in the new millennium.

Mission of the Institute

To develop competent students with good value systems and face challenges of the continuously changing world.

Vision of the Department

To meet the educational and research needs of the student community and staff through collaboration with other academic and technical institutions, industry and government agencies and make the students to face problems of the country and society as a whole.

Mission of the Department

M1 - To develop and train competent Electrical and Electronics Engineers with adequate practical skills.

M2 - To provide state-of-the-art resources that contribute to achieve excellence in teaching-learning, research and development activities.

M3 - To inculcate, ethics, leadership, moral values and social activities.

Program Educational Objectives

PEO 1.	Be able to apply the fundamental knowledge of mathematics, science, electrical and electronics engineering to analyze and solve the complex problem in electrical, electronics and allied interdisciplinary areas.
PEO 2.	Possess good leadership skills, function ethically in multidisciplinary areas to develop sustainable solutions for global, environmental and social issues. Be able to inculcate lifelong learning to maintain and enhance professional skills.

Program Specific Objectives

PSO 1: Apply fundamental knowledge to identify, formulate, design and investigate various problems of electrical and electronic circuits, power electronics, control systems and power systems.

PSO 2: Apply modern software tools for design, simulation and analysis of electrical systems to engage in life- long learning and to successfully adapt in multi-disciplinary environments.

PSO 3: Solve ethically and professionally various Electrical Engineering problems in societal and environmental context and communicate effectively by applying project management techniques to complex engineering problems.

Program Outcomes

1. Engineering knowledge: Apply the knowledge of mathematics, science, engineering fundamentals, and an engineering specialization to the solution of complex engineering problems.

2. Problem analysis: Identify, formulate, review research literature, and analyze complex engineering problems reaching substantiated conclusions using first principles of mathematics, natural sciences, and engineering sciences.

3. Design/development of solutions: Design solutions for complex engineering problems and design system components or processes that meet the specified needs with appropriate consideration for the public health and safety, and the cultural, societal, and environmental considerations.

4. Conduct investigations of complex problems: Use research-based knowledge and research methods including design of experiments, analysis and interpretation of data, and synthesis of the information to provide valid conclusions.

5. Modern tool usage: Create, select, and apply appropriate techniques, resources, and modern engineering and IT tools including prediction and modelling to complex engineering activities with an understanding of the limitations.

6. The engineer and society: Apply reasoning informed by the contextual knowledge to assess societal, health, safety, legal and cultural issues and the consequent responsibilities relevant to the professional engineering practice.

7. Environment and sustainability: Understand the impact of the professional engineering solutions in societal and environmental contexts, and demonstrate the knowledge of, and need for sustainable development.

8. Ethics: Apply ethical principles and commit to professional ethics and responsibilities and norms of the engineering practice.

9. Individual and team work: Function effectively as an individual, and as a member or leader in diverse teams, and in multidisciplinary settings.

10. Communication: Communicate effectively on complex engineering activities with the engineering community and with society at large, such as, being able to comprehend and write effective reports and design documentation, make effective presentations, and give and receive clear instructions.

11. Project management and finance: Demonstrate knowledge and understanding of the engineering and management principles and apply these to one's own work, as a member and leader in a team, to manage projects and in multidisciplinary environments.

12. Life-long learning: Recognize the need for, and have the preparation and ability to engage in independent and life-long learning in the broadest context of technological change.

Course Name: 18EEE11/ Mathematical Methods in Control

C111.1	Understand the fundamentals of vector space and bases in reference to transformations
C111.2	Solve system of linear equations using direct and iterative methods.
C111.3	Use the idea of Eigen values and Eigen vectors for the application of SVD
C111.4	Describe the basic notions of discrete and continuous probability distributions
C111.5	Find out responses of linear systems using statistical and probability tools

Course Name: 18EPE12/ Power Semiconductor Devices and Components

C112.1	Discuss power electronic concepts, electronic switches and semiconductor physics
C112.2	Explain representation of switches in P-spice and power computations.
C112.3	Explain the internal structure, the principle of operation, characteristics and base drive circuits of power semiconductor devices; power diodes, power BJT, power MOSFET
C112.4	Explain the internal structure, the principle of operation, characteristics and base drive circuits of power semiconductor devices; thyristors, power IGBT, power FET
C112.5	Design a heat sink to control the temperature rise of semiconductor devices
C112.6	Design magnetic components inductors and transformers used in the power electronic circuits

Course Name: 18EPE13 / Power Electronic Converters

C113.1	Use the knowledge of PWM techniques in controlling different power electronic converters
C113.2	Apply the knowledge of power electronics in design and analysis of DC –DC PWM converters
C113.3	Design and analyze DC –AC and AC – DC converters and control their operation using PWM techniques
C113.4	Design and analyze different resonant converters and their control circuits
C113.5	Design & Analyze of AC – AC converters
C113.6	Design & Analyze of multilevel converters.

Course Name: 18EPE14 / Modelling and Design of Controllers

C114.1	Describe the role of computer simulations in the analysis and design of power electronics systems
C114.2	Understand the functional modelling of static systems.
C114.3	Use sampling technique to determine a digital equivalent to a continuous time system
C114.4	Design digital controllers in discrete time and frequency domain
C114.5	Design optimal and robust controllers by different methods

C114.6	Explain essentials of discrete computation

Course Name: 18EPE15 / Modelling and Analysis of Electrical Machines

C115.1	Develop mathematical models for DC motors for transient state analysis
C115.2	Use reference frame theory to transform three phases to two phases
C115.3	Develop dynamic model for three phase induction motor in stator ad rotor reference frames
C115.4	Model synchronous machine using Park's transformation for the analysis of steady state operation
C115.5	Model synchronous machine to perform dynamic analysis under different conditions
C115.6	Develop mathematical model of single-phase transformers

Course Name: 18EPEL16 / Power Electronics Laboratory-1

C116.1	Analyze the static and dynamic characteristics of various semiconductor devices.
C116.2	Apply the knowledge of converters in assessing the performance of single phase and three phases fully controlled and semi controlled converters for RL load for continuous current modes.
C116.3	Apply the knowledge of converters in assessing the performance of single phase and three phases fully controlled and semi controlled converters for RL load for discontinuous current modes.
C116.4	Assess the performance of single-phase bridge inverter for RL load and control the voltage by pulse width modulation
C116.5	Apply the knowledge of power electronics in performance analysis of chopper converter
C116.6	Apply the knowledge of power electronics in performance analysis of synchronous buck converter

Course Name: 18RMI17 / Research Methodology and Ipr

C117.1	Discuss research methodology and the technique of defining a research problem
C117.2	Explain the functions of the literature review in research, carrying out a literature search, developing theoretical and conceptual frameworks and writing a review.
C117.3	Explain various research designs, sampling designs, measurement and scaling techniques and also different methods of data collections
C117.4	Explain several parametric tests of hypotheses, Chi-square test, art of interpretation and writing research reports
C117.5	Discuss various forms of the intellectual property, its relevance and business impact in the changing global business environment

C117.6	Discuss various forms of the intellectual property and leading International Instruments concerning IPR.

Course Name: 18EPE21 / Electric Drives

C121.1	Explain characteristics of DC motors, induction motors and synchronous motors
C121.2	Explain braking of electric motors.
C121.3	Classify electric drives
C121.4	Discuss dynamics conditions and stability considerations of Electric drive
C121.5	Suggest a drive for a specific application
C121.6	Explain using microprocessor in the control of an electric drive.

Course Name: 18EPE22 / Switched - Mode Power Supplies

C122.1	Explain a SMPS, its characteristics, new technologies, basic principles and control modes
C122.2	Suggest a suitable DC/DC converter for an SMPS.
C122.3	Explain the method of selecting key peripheral components of SMPS
C122.4	Design the power factor correction circuit of SMPS
C122.5	Explain selection of magnetic core and designing of high-frequency transformer
C122.6	Design protection and monitoring circuit for SMPS

Course Name: 18EPE23 / Power System Harmonics

C123.1	Explain the fundamentals that facilitate the understanding of the issues of harmonics
C123.2	Explain the causes for generation of harmonics
C123.3	Explain the effects of harmonics distortion on power system equipment and loads and suppression of harmonics in power systems
C123.4	Discuss standard limits of harmonic distortion and modeling of power system components for harmonic analysis study
C123.5	Model transmission lines and cables for harmonic analysis.
C123.6	Discuss implementation of harmonic studies

Course Name: 18EPE243 / Hybrid Electric Vehicles

C124.1	Explain the basics of electric and hybrid electric vehicles, their architecture, technologies and fundamentals
C124.2	Explain plug – in hybrid electric vehicle architecture, design and component sizing
C124.3	Explain the use of different power electronics devices in hybrid electric vehicles
C124.4	Suggest a suitable electric drive for a specific type of hybrid electric vehicle.
C124.5	Explain the use of different energy storage devices used for hybrid electric vehicles, their technologies and control

C124.6	Simulate electric hybrid vehicles by different techniques for the performance analysis

Course Name: 18EPE252 / Digital Power Electronics

C125.1	Explain traditional parameters computation, multiple quadrant operation and choppers
C125.2	Explain the disadvantages of analog power electronics and conversion technology, energy factor and sub-sequential parameters
C125.3	Explain basic mathematics of digital control systems and mathematical modelling of digitally controlled power electronic devices such as rectifiers, inverters and converters
C125.4	Describe mathematical modelling of AC/DC rectifiers, DC/AC inverters, DC/DC converters and AC/AC (AC/DC/AC) converters are working in the discrete-time state
C125.5	Discuss DC/AC pulse-width-modulation (PWM) inverters and AC /AC converters modelled as a first order-hold (FOH) element in digital control systems.
C125.6	To explain open loop and closed loop control of power electronic devices and energy factor application of AC and DC motor drives

Course Name: 18EPEL26/ Power Electronics Laboratory-2

C126.1	Conduct experiments on single phase fully controlled converter fed separately excited DC motor to assess the performance in continuous and discontinuous current modes
C126.2	Conduct experiments to assess the performance of Chopper fed DC drives for class A and class C commutation in continuous current mode
C126.3	Conduct experiments on three phase fully controlled converter fed separately excited DC motor to assess the performance in continuous and discontinuous current modes
C126.4	Simulate different converters for analyzing the waveform in continuous current modes
C126.5	Simulate different converters for analyzing the waveform in discontinuous current modes
C126.6	Simulate forward converter, fly back converter and resonant converter to study their performance

Course Name: 18EPE27/ Technical Seminar

C127.1	Attain, use and develop knowledge in the field of electrical and electronics engineering
C127.2	Identify, understand and discuss current, real-time issues
C127.3	Improve oral and written communication skills

C127.4	Explore an appreciation of the self in relation to its larger diverse social and academic contexts
C127.5	Apply principles of ethics and respect in interaction with others.
C127.6	Attain, use and develop knowledge in the field of other disciplines through independent learning and collaborative study

Course Name: 18EPE31/ HVDC Power Transmission

C231.1	Explain importance of DC power transmission
C231.2	Describe the basic components of a converter, the methods for compensating the reactive power demanded by the converter.
C231.3	Explain the methods for simulation of HVDC systems and its control.
C231.4	Describe filters for eliminating harmonics and the characteristics of the system impedance resulting from AC filter designs
C231.5	Explain the protection of HVDC system and other converter configurations used for the HVDC transmission
C231.6	Explain the recent trends for HVDC applications.

Course Name: 18EPE322/ EMC In Power Electronics

C232.1	Describe Electromagnetic interference and its classification and measurement of conducted high frequency disturbance
C232.2	Survey electromagnetic interference specific to power electronic equipment
C232.3	Explain the characteristics of circuit elements used for noise suppression
C232.4	Explain EMI suppression methods used in semiconductor and electromechanical devices.
C232.5	Explain design of EMI filter circuits and filtering methods
C232.6	Explain EMS reduction techniques for power electronic equipment

Course Name: 18EPE331/ Advanced Control Systems

C233.1	Evaluate Z transform of a continuous time signal
C233.2	Explain the process of reconstructing the analog signal from a digital signal
C233.3	Use state variable representation to design control law and observers for a system in both continuous and discrete time domains
C233.4	Solve optimal control problems
C233.5	Construct Lyapunov functions to evaluate the stability of a system
C233.6	Use describing function, phase plane methods and Lyapunov method to assess the stability of the nonlinear system

Course Name: 18EPE34/ Project Work Phase – I

C234.1	Present the project and be able to defend it

C234.2	Make links across different areas of knowledge and to generate, develop and evaluate ideas and information so as to apply these skills to the project task
C234.3	Habituated to critical thinking and use problem solving skills
C234.4	Communicate effectively and to present ideas clearly and coherently in both the written and oral forms
C234.5	Work in a team to achieve common goal.
C234.6	Learn on their own, reflect on their learning and take appropriate actions to improve it

Course Name: 18EPEI35/ Internship

C235.1	Gain practical experience within industry in which the internship is done
C235.2	Acquire knowledge of the industry in which the internship is done
C235.3	Develop a greater understanding about career options while more clearly defining personal career goals
C235.4	Develop and refine oral and written communication skills
C235.5	Identify areas for future knowledge and skill development
C235.6	Acquire the knowledge of administration, marketing, finance and economics

Course Name: 18EPE41/ Project Work Phase – II

C241.1	Present the project and be able to defend it
C241.2	Make links across different areas of knowledge and to generate, develop and evaluate ideas and information so as to apply these skills to the project task
C241.3	Habituated to critical thinking and use problem solving skills
C241.4	Communicate effectively and to present ideas clearly and coherently in both the written and oral forms
C241.5	Work in a team to achieve common goal.
C241.6	Learn on their own, reflect on their learning and take appropriate actions to improve it

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M. Tech in Structural Engineering

Vision of the Institute

To be a respected and most sought after engineering educational institution engaged in equipping individuals capable of building learning organizations in the new millennium.

Mission of the Institute

To develop competent students with good value systems and face challenges of the continuously changing world.

Vision of the Department

To impart very high-quality education to the students to make them do innovative sustainable engineering relevant to industry and people at large.

Mission of the Department

Mission 1. To emphasize on basics of engineering as well as their applications relevant to the industry

Mission 2. To serve the society with due consideration of economy, ecology and ethical issues of nation.

Mission 3. To sensitize the students and faculty to take up research and consultancy to be on par with international standards.

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Program Educational Objectives

Apply fundamental concepts of civil engineering in developing economically viable and sustainable sound solutions.

To work collaboratively on multidisciplinary problems

To achieve their professional aims keeping good ethics

Program Specific Objectives

PSO 1: Graduates will be able to apply technical skills and modern engineering tools for civil engineering day to day practice.

PSO 2: Graduates will be able to participate in critical thinking and problem solving of civiL engineering field that requires analytical and design requirements

PSO 3: Graduates will be able to participate in critical thinking and problem solving of civil engineering field that requires analytical and design requirements.

Program Outcomes

1. Engineering knowledge: Apply the knowledge of mathematics, science, engineering fundamentals, and an engineering specialization to the solution of complex engineering problems.

2. Problem analysis: Identify, formulate, review research literature, and analyze complex engineering problems reaching substantiated conclusions using first principles of mathematics, natural sciences, and engineering sciences.

3. Design/development of solutions: Design solutions for complex engineering problems and design system components or processes that meet the specified needs with appropriate consideration for the public health and safety, and the cultural, societal, and environmental considerations.

4. Conduct investigations of complex problems: Use research-based knowledge and research methods including design of experiments, analysis and interpretation of data, and synthesis of the information to provide valid conclusions.

5. Modern tool usage: Create, select, and apply appropriate techniques, resources, and modern engineering and IT tools including prediction and modeling to complex engineering activities with an understanding of the limitations.

6. The engineer and society: Apply reasoning informed by the contextual knowledge to assess societal, health, safety, legal and cultural issues and the consequent responsibilities relevant to the professional engineering practice.

7. Environment and sustainability: Understand the impact of the professional engineering solutions in societal and environmental contexts, and demonstrate the knowledge of, and need for sustainable development.

8. Ethics: Apply ethical principles and commit to professional ethics and responsibilities and norms of the engineering practice.

9. Individual and team work: Function effectively as an individual, and as a member or leader in diverse teams, and in multidisciplinary settings.

10. Communication: Communicate effectively on complex engineering activities with the engineering community and with society at large, such as, being able to comprehend and write effective reports and design documentation, make effective presentations, and give and receive clear instructions.

11. Project management and finance: Demonstrate knowledge and understanding of the engineering and management principles and apply these to one's own work, as a member and leader in a team, to manage projects and in multidisciplinary environments.

12. Life-long learning: Recognize the need for, and have the preparation and ability to engage in independent and life-long learning in the broadest context of technological change.

Course Name: C101 Computational Structural Mechanics 18CSE11

C101.1	Formulate force displacement relation by flexibility and stiffness method
C101.2	Analyze the plane trusses, continuous beams and portal frames by transformation approach
C101.3	Analyze the structures by direct stiffness method

Course Name: C102 Advanced Design of RC Structures 18CSE12

C102.1	Achieve Knowledge of design and development of problem-solving skills
C102.2	Understand the principles of Structural Design.
C102.3	Design and develop analytical skills.
C102.4	Summarize the principles of Structural Design and detailing
C102.5	Understands the structural performance

Course Name: C103 Mechanics of Deformable Bodies 18CSE13

C103.1	Achieve Knowledge of design and development of problem-solving skills.
C103.2	Understand the principles of stress-strain behavior of continuum
C103.3	Design and develop analytical skills.
C103.4	Describe the continuum 3- di in 2 and mensions
C103.5	Understand the concepts of elasticity and plasticity

Course Name:C105 Structural Dynamics18CSE15

C105.1	Achieve Knowledge of design and development of problem-solving skills.
C105.2	Understand the principles of Structural Dynamics
C105.3	Design and develop analytical skills.
C105.4	Summarize the Solution techniques for dynamics of Multi-degree freedom systems
C105.5	Understand the concepts of damping in structures.

Course Name:C106 Research Methodology and IPR 18RMI17

C106.1	Discuss research methodology and the technique of defining a research problem
C106.2	Explain the functions of the literature review in research, carrying out a literature search, developing theoretical and conceptual frameworks and writing a review.
C106.3	Explain various research designs, sampling designs, measurement and scaling techniques and also different methods of data collections
C106.4	Explain several parametric tests of hypotheses, Chi-square test, art of interpretation and writing research reports

C106.5	Discuss various forms of the intellectual property, its relevance and business impact in the changing global business environment and leading International Instruments concerning IPR.

Course Name: C111 Advanced Design of Steel Structures 18CSE21

C111.1	Able to understand behavior of Light gauge steel members
C111.2	Able to understand design concepts of cold formed/unrestrained beams
C111.3	Able to understand Fire resistance concept required for present days
C111.4	Able to analyze beam column behavior

Course Name: C112finite Element Method of Analysis 18CSE22

C112.1	Explain the basic theory behind the finite element method.
C112.2	Formulate force-displacements relations for 2-D elements
C112.3	Use the finite element method to analyze real structures.
C112.4	Use a Finite Element based program for structural analysis

Course Name:C113earthquake Resistant Structures 18CSE23

C113.1	Achieve Knowledge of design and development of problem-solving skills. Understand the principles of engineering seismology
C113.2	Design and develop analytical skills.
C113.3	Summarize the Seismic evaluation and retrofitting of structures
C113.4	Understand the concepts of earthquake resistance of reinforced concrete buildings.

Course Name: C114 Analysis and Design of Plates and Shells 18CSE241

C114.1	Achieve Knowledge of design and development of problem-solving skills.
C114.2	Understand the principles of Analysis and Design
C114.3	Design and develop analytical skills.
C114.4	Summarize the performance of shells
C114.5	Understand the concepts of energy principle

Course Name: C114 Course Name Design of Tall Structures 18CSE254

C115.1	Achieve Knowledge of design and development of problem-solving skills.
C115.2	Understand the principles of Analysis and Design
C115.3	Design and develop analytical skills.
C115.4	Summarize the performance of shells
C115.5	Understand the concepts of energy principle

Course Name: C211 Design of Bridges 18CSE31

C211.1	Achieve Knowledge of design and development of problem-solving skills.
C211.2	Understand the principles of Analysis and Design
C211.3	Design and develop analytical skills.
C211.4	Summarize the performance of shells
C211.5	Understand the concepts of energy principle

Course Name: C212 Design of Masonry Structure 18CSE332

C212.1	Achieve Knowledge of design and development of problem-solving skills.
C212.2	Understand the principles of design and construction of masonry structures
C212.3	Design and develop analytical skills.
C212.4	Summarize the masonry Characteristics.
C212.5	Evaluate the strength and stability of the masonry structures

Course Name: C204 Reliability Analysis of Structures 18CSE324

C212.1	Understand the concepts of statistics for probabilistic analysis and importance
C212.2	of uncertainty (randomness) in structural analysis and design.
C212.3	Apply the theoretical principles of randomness of variables in structural
C212.4	engineering through density functions.
C212.5	Analyze components of structure to assess safety using concepts related to structural reliability by various methods.

Course Name: C213 18CSE31Design Of Bridges

C213.1	Describe historical growth, select ideal site and bridge, calculate values of design parameters of slab culvert at critical section as per IRC, design and detailing required for the execution of the project.
C213.2	Carry out analysis of box culvert as per IRC to obtain the values of design parameters and to design and detail the components following IS code procedure.
C213.3	Demonstrate the use of Pigeauds Method and Courbon's Method in the analysis of T beam bridge as per IRC, design to obtain the safe dimensions various components, optimum reinforcement required following IS code procedure
C213.4	Analysis a balanced cantilever bridge as per IRC and to obtain the safe values of design parameters and to design and detail the components as per IS code procedure
C213.5	Display the use of Courbon's Method in the analysis of PSC bridge as per IRC, design to obtain the safe value of prestressing force, obtain the dimensions of various components to keep the stresses within codal provisions following IS code procedure.

Course Name: C214 18CSE323 Stability of Structures

C214.1	Achieve Knowledge of design and development of problem-solving skills
C214.2	Understand the principles of strength and stability

C214.3	Design and develop analytical skills
C214.4	Appraise the Stability analysis by finite element approach.
C214.5	Understand the concepts of lateral buckling of beams

Course Name: C215 18CSE332 Design of Masonry Structures

C215.1	Achieve Knowledge of design and development of problem-solving skills.
C215.2	Understand the principles of design and construction of masonry
C215.3	Design and develop analytical skills.
C215.4	Summarize the masonry Characteristics.
C215.5	Evaluate the strength and stability of the masonry structures.

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M. Tech in Computer Science & Engineering

Vision of the Institute

To be a respected and most sought after engineering educational institution engaged in equipping individuals capable of building learning organizations in the new millennium. To produce technocrats with creative technical knowledge and intellectual skills to sustain and excel in the highly demanding world with confidence.

Mission of the Institute

To develop competent students with good value systems and face challenges of the continuously changing world.

Vision of the Department

To produce technocrats with creative technical knowledge and intellectual skills to sustain and excel in the highly demanding world with confidence.

Mission of the Department

Mission 1. The department's aim is to develop the best computer science professionals who work creatively, communicate effectively & become technologically competent, and also to mould them into good citizens by inculcating sense of ethical values in them.

Mission 2. To Encourage the students to build self-help, Power of initiative, courage to change and create new things.

Mission 3. To inculcates the spirit of cooperation and capacity for organization with special emphasis on their self-reliance and sustainability to meet ever changing requirements of local and global industries.

Program Educational Objectives

PEO To create graduates equipped with life-long learning skills and have a successful professional career in IT industry.

PEO To prepare graduates to pursue higher education and get inclined towards research & development in computer science engineering.

PEO To provide adequate training and opportunities, with exposure to emerging cutting-edge technologies and to work in teams on multidisciplinary projects with effective communication skills and leadership qualities.

Program Specific Objectives

PSO 1: To design efficient algorithms and develop effective code for real-time computations.

PSO 2: To apply software engineering principles in developing optimal software solutions.

Program Outcomes

1. Engineering knowledge: Apply the knowledge of mathematics, science, engineering fundamentals, and an engineering specialization to the solution of complex engineering problems.

2. Problem analysis: Identify, formulate, review research literature, and analyze complex engineering problems reaching substantiated conclusions using first principles of mathematics, natural sciences, and engineering sciences.

3. Design/development of solutions: Design solutions for complex engineering problems and design system components or processes that meet the specified needs with appropriate consideration for the public health and safety, and the cultural, societal, and environmental considerations.

4. Conduct investigations of complex problems: Use research-based knowledge and research methods including design of experiments, analysis and interpretation of data, and synthesis of the information to provide valid conclusions.

5. Modern tool usage: Create, select, and apply appropriate techniques, resources, and modern engineering and IT tools including prediction and modeling to complex engineering activities with an understanding of the limitations.

6. The engineer and society: Apply reasoning informed by the contextual knowledge to assess societal, health, safety, legal and cultural issues and the consequent responsibilities relevant to the professional engineering practice.

7. Environment and sustainability: Understand the impact of the professional engineering solutions in societal and environmental contexts, and demonstrate the knowledge of, and need for sustainable development.

8. Ethics: Apply ethical principles and commit to professional ethics and responsibilities and norms of the engineering practice.

9. Individual and team work: Function effectively as an individual, and as a member or leader in diverse teams, and in multidisciplinary settings.

10. Communication: Communicate effectively on complex engineering activities with the engineering community and with society at large, such as, being able to comprehend and write effective reports and design documentation, make effective presentations, and give and receive clear instructions.

11. Project management and finance: Demonstrate knowledge and understanding of the engineering and management principles and apply these to one's own work, as a member and leader in a team, to manage projects and in multidisciplinary environments.

12. Life-long learning: Recognize the need for, and have the preparation and ability to engage in independent and life-long learning in the broadest context of technological change.

Course Name: C101 (Basic Electronics-18SCS11)

C101.1	Understand the numerical methods to solve and find the roots of the equations.
C101.2	Utilize the statistical tools in multi variable distributions.
C101.3	Use probability formulations for new predictions with discrete and continuous RV's.
C101.4	To understand various graphs in different geometries related to edges.
C101.5	Understand vector spaces and related topics arising in magnification and rotation of images.

Course Name: C102 (Advances in Operating Systems -18SCS12)

C102.1	Demonstrate the Mutual exclusion, Deadlock detection and agreement protocols of Distributed operating system
C102.2	Learn the various resource management techniques for distributed systems
C102.3	Identify the different features of real time and mobile operating system
C102.4	Modify existing open-source kernels in terms of functionality or features used
C102.5	Demonstrate the Mutual exclusion, Deadlock detection and agreement protocols of Distributed operating system

Course Name: C103 (Advances in Data Base Management Systems-18SCS13)

C103.1	Select the appropriate high-performance database like parallel and distributed database
C103.2	Infer and represent the real-world data using object-oriented database
C103.3	Interpret rule set in the database to implement data warehousing of mining
C103.4	Discover and design database for recent applications database for better interoperability

Course Name: C104 (Internet of Things-18SCS14)

C104.1	Develop schemes for the applications of IOT in real time scenarios
C104.1	Manage the Internet resources
C104.3	Model the Internet of things to business
C104.4	Understand the practical knowledge through different case studies
C104.5	Understand data sets received through IoT devices and tools used for analysis

Course Name:C105(Advances in Computer Networks-18SCS151

C105.1	List and classify network services, protocols and architectures, explain why they are layered.

C105.2	Choose key Internet applications and their protocols, and apply to develop their own applications (e.g., Client Server applications, Web Services) using the sockets API.
C105.3	Explain develop effective communication mechanisms using techniques like
	connection establishment, queuing theory, recovery Etc.
C105.4	Explain various congestion control techniques.

Course Name: C201 (Managing Big Data -18SCS21)

C201.1	Describe big data and use cases from selected business domains
C201.2	Explain NoSQL big data management
C201.3	Install, configure, and run Hadoop and HDFS
C201.4	Perform map-reduce analytics using Hadoop
C201.5	Use Hadoop related tools such as HBase, Cassandra, Pig, and Hive for big data Analytics

Course Name: C202 (Advanced Algorithms-18SCS22)

C202.1	Design and apply iterative and recursive algorithms.
C202.2	Design and implement optimization algorithms in specific applications.
C202.3	Design appropriate shared objects and concurrent objects for applications

Course Name: C203 (Cloud Computing-18SCS23)

C203.1	Compare the strengths and limitations of cloud computing
C203.2	Identify the architecture, infrastructure and delivery models of cloud computing
C203.3	Apply suitable virtualization concept.
C203.4	Choose the appropriate cloud player
C203.5	Address the core issues of cloud computing such as security, privacy and interoperability
C203.6	Design Cloud Services
C203.7	Set a private cloud

Course Name: C204 (Advances in Storage Area Networks-18SCS241)

C204.1	Identify the need for performance evaluation and the metrics used for it
C204.2	Apply the techniques used for data maintenance.
C204.3	Realize strong virtualization concepts
C204.4	Develop techniques for evaluating policies for LUN masking, file systems

Course Name: C205 (Object Oriented Software Engingeering-18SCS251)

C205.1	Apply Object Oriented Software Engineering approach in every aspect of software project
C205.2	Analyze the requirements from various domains
C205.3	Adapt appropriate object-oriented design aspects in the development process
C205.4	Implement and test the software projects using object-oriented approach
C205.5	Learn the issues and concepts relating to maintenance of software projects
C205.6	Adapt the concepts and tools related to software configuration management

Course Name: C301 (Machine Learning Techniques-18SCS31)

C301.1	Choose the learning techniques with this basic knowledge.
C301.2	Apply effectively neural networks and genetic algorithms for appropriate applications.
C301.3	Apply Bayesian techniques and derive effectively learning rules.
C301.4	Choose and differentiate reinforcement and analytical learning techniques

Course Name: C302 (Information and Network Security-18SCS322)

C302.1	Analyze the vulnerabilities in any computing system and hence be able to design a security solution.
C302.2	Identify the security issues in the network and resolve it.
C302.3	Evaluate security mechanisms using rigorous approaches, including theoretical.

Course Name: C303 (Application and Web Security -18SCS331)

C303.1	Achieve Knowledge of web application's vulnerability and malicious attacks.
C303.2	Understand the basic web technologies used for web application development
C303.3	Understands the basic concepts of Mapping the application.
C303.4	Able to illustrate different attacking illustrations
C303.5	Basic concepts of Attacking Data Stores.

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M. Tech in SCN

Vision of the Institute

To be a respected and most sought after engineering educational institution engaged in equipping individuals capable of building learning organizations in the new millennium.

Mission of the Institute

To develop competent students with good value systems and face challenges of the continuously changing world.

Vision of the Department

To meet the educational, research & service needs of the region through collaboration with academic, technical institutions, businesses, government agencies & cultural organizations, thereby, providing a platform that encourages students & faculty to continue their intellectual & professional growth.

Mission of the Department

To develop the best Information Science Professionals, who work creatively, communicate effectively & become technologically competent and also to mould them into good citizens by inculcating sense ethical values in them.

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Program Educational Objectives

Be capable of understanding, analyzing and applying current & emerging technologies to design and develop solutions to IT/ITES/Software/Telecom related problems and acquire value and employment.

To have sound foundation in mathematical, scientific and Information science engineering fundamentals necessary to formulate, solve and analyze practical problems and to prepare students for further studies and research.

Function effectively as individuals and team members in the workplace, growing into highly technical or project management and leadership roles, in various organizations.

Create an awareness of the life-long learning process, to communicate effectively, learn necessary tools to successfully identify and adapt to ever changing technologies, by ethical means and code of professional practice.

Program Specific Objectives

Provide effective and efficient real time solutions with the application of knowledge in IT, ITES,

Demonstrate the ability to work in a team, with professional ethics, good communication and documentation skills in designing, implementation and management of software products and services, at optimal cost.

Proven capability to exchange views/concepts, incubate ideas and to carry out learning with zeal, to be aware of the state of art technologies and their development.

Course Name: (Advances in Computer Networks/18SCN12)

C112.1	List and classify network services, protocols and architectures, explain why they are layered.
C112.2	Choose key Internet applications and their protocols, and apply to develop their own applications (e.g., Client Server applications, Web Services) using the sockets API.
C112.3	Explain develop effective communication mechanisms using techniques like connection establishment, queuing theory, recovery Etc.
C112.4	Explain various congestion control techniques.

Course Name: (Information and Network Security/18SCN13)

C113.1	Analyze the vulnerabilities in any computing system and hence be able to design a security solution.
C113.2	Identify the security issues in the network and resolve it.
C113.3	Evaluate security mechanisms using rigorous approaches, including theoretical.

Course Name: C114. (Internet of Things/18SCN14)

C114.1	Develop schemes for the applications of IOT in real time scenarios
C114.2	Manage the Internet resources
C114.3	Model the Internet of things to business
C114.4	Understand the practical knowledge through different case studies
C114.5	Understand data sets received through IoT devices and tools used for analysis

Course Name: (Wireless Networks and Mobile Computing/18SCN151)

C115.1	Explain state of art techniques in wireless communication.
C115.2	Discover CDMA, GSM. Mobile IP, WImax
C115.3	Demonstrate program for CLDC, MIDP let model and security concerns

Course Name:(Multi-Core Architecture and Programming/18SCN152)

C115.1	Identify the limitations of ILP and the need for multicore architectures
C115.2	Define fundamental concepts of parallel programming and its design issues
C115.3	Solve the issues related to multiprocessing and suggest solutions
C115.4	Make out the salient features of different multicore architectures and how they exploit parallelism
C115.5	Demonstrate the role of OpenMP and programming concept

Course Name: (Social Network Analysis/18SCN153)

C115.1	Define notation and terminology used in network science.

C115.2	Demonstrate, summarize and compare networks.
C115.3	Explain basic principles behind network analysis algorithms.
C115.4	Analyzing real world network.

Course Name: (Cloud Security/18SCN154)

C115.1	Demonstrate the growth of Cloud computing, architecture and different modules of implementation.
C115.2	Evaluate the different types of cloud solutions among IaaS, PaaS, SaaS.
C115.3	Access the security implementation flow, actions and responsibilities of stake holders.
C115.4	Generalize the Data Centre operations, encryption methods and deployment details.
C115.5	Provide recommendations for using and managing the customer's identity and choose the type of virtualization to be used.

Course Name: (Computer Networks and IOT Laboratory/18SCNL16)

C116.1	Apply key Internet applications and their protocols, and ability to develop their own applications (e.g., Client Server applications, Web Services) using the sockets API.
C116.2	Design and evaluate application layer protocol
C116.3	Analyze the vulnerabilities in any computing system and hence be able to design a security solution.
C116.4	Identify the security issues in the network and resolve it.
C116.5	Evaluate security mechanisms using rigorous approaches, including theoretical.

Course Name:(Multimedia Communications/18SCN21)

C121.1	Deploy the right multimedia communication models.
C121.2	Apply QoS to multimedia network applications with efficient routing techniques.
C121.3	Solve the security threats in the multimedia networks.
C121.4	Develop the real-time multimedia network applications

Course Name: (Network Programming/18SCN22)

C122.1	Develop applications that communicate with each other using TCP and SCTP.
C122.2	Identify the IPv4 and IPv6 compatibility.
C122.3	Evaluate socket programming APIs

Course Name: (Wireless Ad-Hoc Networks/18SCN23)

C123.1	Design their own wireless network
C123.2	Evaluate the existing network and improve its quality of service

C123.3	Choose appropriate protocol for various applications
C123.4	Examine security measures present at different level
C123.5	Analyze energy consumption and management

Course Name: (Advances in Storage Area Networks/18SCN241)

C124.1	Identify the need for performance evaluation and the metrics used for it
C124.2	Apply the techniques used for data maintenance.
C124.3	Realize strong virtualization concepts
C124.4	Develop techniques for evaluating policies for LUN masking, file systems

Course Name: (Switching & Statistical Multiplexing in Telecommunications/18SCN242)

C124.1	Explain basics of telecommunications and digital form
C124.2	Elaborate switching and multiplexing, telecommunication.
C124.3	Illustrate transmission control in telecommunication
C124.4	Design and develop switching, multiplexing and traffic control.

Course Name: (Ethernet Technology/18SCN243)

C124.1	Classify different types of Ethernet systems
C124.2	Contrast Ethernet Media systems
C124.3	Evaluate a complete Ethernet system

Course Name: (Mobile Application Development/18SCN244)

C124.1	Describe the requirements for mobile applications
C124.2	Explain the challenges in mobile application design and development
C124.3	Develop design for mobile applications for specific requirements
C124.4	Implement the design using Android SDK
C124.5	Implement the design using Objective C and iOS
C124.6	Deploy mobile applications in Android and iPone marketplace for distribution

Course Name: (Wireless Sensor Networks/18SCN251)

C125.1	Explain existing applications of wireless sensor actuator networks
C125.2	Apply in the context of wireless sensor networks and explain elements of distributed computing and network protocol design
C125.3	Contrast Various hardware, software platforms that exist for sensor networks
C125.4	Summarize various network level protocols for MAC, routing, time synchronization, aggregation, consensus and distributed tracking

Course Name: (Managing Big Data/18SCN252)

C125.1	Describe big data and use cases from selected business domains

C125.2	Explain NoSQL big data management
C125.3	Install, configure, and run Hadoop and HDFS
C125.4	Perform map-reduce analytics using Hadoop
C125.5	Use Hadoop related tools such as HBase, Cassandra, Pig, and Hive for big data Analytics

Course Name: (Network Management/18SCN253)

C125.1	Analyze the issues and challenges pertaining to management of emerging network technologies such as wired/wireless networks and high-speed internets.
C125.2	Apply network management standards to manage practical networks
C125.3	Formulate possible approaches for managing OSI network model.
C125.4	Use on SNMP for managing the network
C125.5	Use RMON for monitoring the behavior of the network
C125.6	Identify the various components of network and formulate the scheme for the managing them

Course Name: (Advances in Operating Systems/18SCN254)

C125.1	Demonstrate the Mutual exclusion, Deadlock detection and agreement protocols of Distributed operating system.
C125.2	Learn the various resource management techniques for distributed systems
C125.3	Identify the different features of real time and mobile operating system
C125.4	Modify existing open-source kernels in terms of functionality or features used

Course Name: (Cloud Computing/18SCN31)

C231.1	Compare the strengths and limitations of cloud computing
C231.2	Identify the architecture, infrastructure and delivery models of cloud computing
C231.3	Apply suitable virtualization concept.
C231.4	Choose the appropriate cloud player
C231.5	Address the core issues of cloud computing such as security, privacy and interoperability
C231.6	Design Cloud Services

Course Name: (Computer Systems Performance Analysis /18SCN321)

C232.1	Identify the need for performance evaluation and the metrics used for it
C232.2	Implement Little's law and other operational laws
C231.3	Apply the operational laws to open and closed systems
C232.4	Use discrete-time and continuous-time Markov chains to model real world systems
C232.5	Develop analytical techniques for evaluating scheduling policies

Course Name: (Network Routing Algorithms/18SCN322)

C232.1	Given the network and user requirements and the type of channel over which the network has to operate, the student would be in a position to apply his knowledge for identifying a suitable routing algorithm, implementing it and analyzing its performance.
C232.2	The student would also be able to design a new algorithm or modify an existing algorithm to satisfy the evolving demands in the network and by the user applications.

Course Name: (Information Security Policies in Industry/18SCN323)

C232.1	Explain the content, need, and responsibilities of information security policies.
C232.2	Explain the standards, guidelines, Procedures, and key roles of the organization.
C231.3	Able to write policy document for securing network connection and interfaces.
C232.4	Explain the threats to the stored data or data in transit and able to write policy document.
C232.5	Able to write, monitor, and review policy document.

Course Name: (Machine Learning Techniques/18SCN324)

C232.1	Choose the learning techniques with this basic knowledge.
C232.2	Apply effectively neural networks and genetic algorithms for appropriate applications.
C231.3	Apply Bayesian techniques and derive effectively learning rules.
C232.4	Choose and differentiate reinforcement and analytical learning techniques

Course Name: (Analysis of Computer Networks/18SCN331)

C233.1	List and classify network services, protocols and architectures, explain why they are layered.
C233.2	Implement key Internet applications and their protocols, and will apply to develop their own applications (e.g., Client Server applications, Web Services) using the sockets API.

Course Name: (Protocol Engineering/18SCN332)

C233.1	Describe the requirements for protocol engineering systems
C233.2	Explain the challenges in designing protocol engineering systems
C233.3	Implement the design using SDL

Course Name: (Web Engineering/18SCN333)

C233.1	Ability to Model the requirements of a web application.
C233.2	Contrast technology-aware Web Application.

C233.3	Ability to analyze the performances of web applications

Course Name: (Web Mining/18SCN334)

C233.1	Identify the application areas for web content mining, web structure mining and web usage mining.
C233.2	Design to retrieval the web data
C233.3	Develop schemes to crawl the web data, organize and index
C233.4	Cluster the documents for fast access
C233.5	Develop algorithms used by web mining applications.
C233.6	Select between different approaches and techniques of web mining

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M. Tech in Machine Design

Vision of the Institute

To be a respected and most sought after engineering educational institution engaged in equipping individuals capable of building learning organizations in the new millennium.

Mission of the Institute

To develop competent students with good value systems and face challenges of the continuously changing world.

Vision of the Department

To become a center of excellence providing state of the art engineering education in mechanical engineering and making individual to be capable of building nation in the new millennium.

Mission of the Department

Mission 1: To provide an excellent teaching and learning process for the students to meet the needs and standards of the current industries and higher learning process.

Mission 2: To promote research and development activity in the recent emerging trends of the mechanical engineering department.

Mission 3: To provide the students with good communication skill, lifelong learning, team spirit and leadership qualities to face the current society.

Program Outcomes

1. Engineering knowledge: Apply the knowledge of mathematics, science, engineering fundamentals, and an engineering specialization to the solution of complex engineering problems.

2. Problem analysis: Identify, formulate, review research literature, and analyze complex engineering problems reaching substantiated conclusions using first principles of mathematics, natural sciences, and engineering sciences.

3. Design/development of solutions: Design solutions for complex engineering problems and design system components or processes that meet the specified needs with appropriate consideration for the public health and safety, and the cultural, societal, and environmental considerations.

4. Conduct investigations of complex problems: Use research-based knowledge and research methods including design of experiments, analysis and interpretation of data, and synthesis of the information to provide valid conclusions.

5. Modern tool usage: Create, select, and apply appropriate techniques, resources, and modern engineering and IT tools including prediction and modeling to complex engineering activities with an understanding of the limitations.

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11. Project management and finance: Demonstrate knowledge and understanding of the engineering and management principles and apply these to one's own work, as a member and leader in a team, to manage projects and in multidisciplinary environments.

12. Life-long learning: Recognize the need for, and have the preparation and ability to engage in

independent and life-long learning in the broadest context of technological change.

Course Name: C101 (Mathematical Method in Engg-18MDE11)

C101.1	To understand the course are to enhance the knowledge of various methods in finding the roots of an algebraic
C101.2	To understand Transcendental or simultaneous system of equations
C101.3	To solve Numerical Integration: Newton –Cotes and Guass Quadrature Integration formulae, Integration of Equations, Romberg integration
C101.4	To solve Direct methods, Cramer's Rule, Gauss Elimination Method, Gauss-Jordan Elimination Method
C101.5	To evaluate integrals numerically and differentiation of complex functions with a greater Accuracy. These concepts occur frequently in their subjects like finite element method
C101.6	To Analysis for direct methods, Iteration Methods.

Course Name: C102 (Advanced Theory of vibrations-18MDE12)

C102.1	To teach students how to use the theoretical principles of vibration, and vibration analysis techniques, for the practical solution of vibration problems
C102.2	To understand the concepts of Vibration Measurement and applications, Modal analysis & Condition Monitoring
C102.3	To understand the concepts of Transient Vibration of single Degree-of freedom systems and Random vibrations
C102.4	To understand the concepts of Non-Linear Vibrations
C102.5	To understand the concepts of Continuous Systems
C102.6	To understand the importance of vibrations in mechanical design of machine parts subject to vibrations.

Course Name: C103 (Continuum Mechanics-18MDE13)

C103.1	To understand the analysis of stress
C103.2	To study the deformation and strain
C103.3	To understand the generalized Hooke's law
C103.4	Formulation of Two-Dimensional Electrostatic problems
C103.5	To understand the Basic equations of Viscoelasticity
C103.6	Continuum Mechanics background essential to mathematically model physical problems in Solid Mechanics

Course Name: C104 (Dynamics and Mechanism Design-18MDE14)

C104.1	To provide a theoretical and practical foundation for analysis and design of articulated mechanical systems for desired applications
C104.2	Develop skills to analyze the displacement, velocity, and acceleration of mechanisms
C104.3	Improve understanding of the synthesis of mechanisms for given tasks
C104.4	To include dynamics considerations in the design of mechanisms
	For engineering applications.

Course Name: C105 (Fracture Mechanics -18MDE15)

C105.1	Develop basic fundamental understanding of the effects of crack like defects on the performance of aerospace, civil and mechanical Engineering structures
C105.2	Learn to select appropriate materials for engineering structures to insure damage tolerance.
C105.3	Learn to employ modern numerical methods to determine critical crack sizes and fatigue crack propagation rates in engineering structures.
C105.4	To understand the concepts of Dynamics and crack arrest
C105.5	Provides a methodology for prediction, prevention and control of fracture in materials, components and structures.
C105.6	Gain an appreciation of the status of academic research in field of fracture mechanics

Course Name: C106 (Research Methodology and IPR-18RMI17)

C106.1	understand some basic concepts of research and its methodologies
C106.2	identify appropriate research topics
C106.3	select and define appropriate research problem and parameters
C106.4	prepare a project proposal (to undertake a project)
C106.5	organize and conduct research (advanced project) in a more appropriate manner

Course Name: C212 (Finite Element Methods -18MDE21)

C212.1	Knowledgeable about the FEM as a numerical method for the solution of solid mechanics, structural mechanics and thermal problems
C212.2	To present Finite element formulation using variational and weighted residual approaches
C212.3	To present Finite elements for the analysis of bars & trusses, beams & frames.
C212.4	To present Finite elements for the analysis of plane stress & plane strain problems and 3-D solids.
C212.5	To present Finite elements for the analysis of thermal and dynamics problems
C212.6	Developing skills required to use a commercial FEA software

Course Name: C213 (Tribology and Bearing Design -18MDE23)

C213.1	Focuses regarding hydrodynamic, hydrostatic lubrication and various bearings, with their design and applications
C213.2	To understand the concepts of Reynolds's 2D equation
C213.3	To understand the concepts of EHL Contacts
C213.4	To understand the concepts of Antifriction bearings
C213.5	To understand the concepts of Magnetic Bearings
C213.6	To develop skills to design and selection of bearings on various tribological factors to be considered in moving and rotating parts.

Course Name: C213 (Rotor Dynamics-18MDE243)

C214.1	To understand the rotor dynamics phenomena with the help of simple rotor models and subsequently the modern analysis methods for real life rotor systems.
C214.2	To understand modeling of bearings, shafts and rotor stages (compressors, turbines including blades) to predict instability like whirling including gyroscopic and Corialis effect.
C214.3	Provides the student understanding of modeling rotating machine elements theoretically.
C214.4	Upon completion of this course, students will have gained an understanding of the design, application
C214.5	Upon completion of this course, students will have gained an understanding of the reliability evaluation of bearings in rotating machinery applications.

Course Name: C215 (Automobile System Design- 18MEA252)

C215.1	To understand of the stages involved in automobile system design.
C215.2	To expose industrial practices in design of various systems of an automobile.
C215.3	To study importance and features of different systems like axle, differential, brakes, Steering, suspension, and balancing etc.
C215.4	To study working of various Automobile Systems.
C215.5	To know some modern trends in Automotive Vehicles.

Course Name: C215 (Design for manufacture and Assembly- 18MDE31)

C311.1	To understand various general design rules for manufacturability and criteria for material selection
C312.2	To study various machining process and tolerance aspects in machining.
C313.3	To know the design considerations for casting, forging and welding process.
C314.4	To study the general design guidelines for manual assembly and development of DFA Methodology.

C315.5	Select proper materials and manufacturing processes for designing products/components by applying the relevant principles for ease and economic 36 production.

Course Name: C311 (Experimental Mechanics-18CAE321)

C311.1	To introduce the concepts of dynamic measurements and analysis of experimental data.
C312.2	To expose them to the techniques of Data Acquisition, Signal conditioning and processing.
C313.3	To introduce students to different aspects of measuring deformation, strains, and stresses for developing a mechanistic understanding of both the material and the structure behavior.
C314.4	To familiarize the student with state-of-the-art experimental techniques employing strain gauges, photoelasticity, Mo reinter of ergometry, brittle coating, Moiré fringes and holography.
C315.5	Apply the principles and techniques of holographic interferometry.

Course Name: C312 (Composite Materials Technology-18MDE332)

C311.1	To impart a basic understanding of micro-mechanics of layered composites, analysis and design of composite structures and failure analysis of laminated panels.
C312.2	To understand the principles, matrix and reinforcement material options, advantages and disadvantages of different manufacturing techniques of composites.
C313.3	To comprehend recent developments in composites, including metal, ceramic and polymer matrix composites.
C314.4	To know the use of composites in engineering applications.
C315.5	Analyze the performance of composites in engineering applications.

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M. Tech in Thermal Power Engineering

Vision of the Institute

To be a respected and most sought after engineering educational institution engaged in equipping individuals capable of building learning organizations in the new millennium.

Mission of the Institute

To develop competent students with good value systems and face challenges of the continuously changing world.

Vision of the Department

To become a center of excellence providing state of the art engineering education in mechanical engineering and making individual to be capable of building nation in the new millennium.

Mission of the Department

Mission 1: To provide an excellent teaching and learning process for the students to meet the needs and standards of the current industries and higher learning process.

Mission 2: To promote research and development activity in the recent emerging trends of the mechanical engineering department.

Mission 3: To provide the students with good communication skill, lifelong learning, team spirit and leadership qualities to face the current society.

Program Outcomes

1. Engineering knowledge: Apply the knowledge of mathematics, science, engineering fundamentals, and an engineering specialization to the solution of complex engineering problems.

2. Problem analysis: Identify, formulate, review research literature, and analyze complex engineering problems reaching substantiated conclusions using first principles of mathematics, natural sciences, and engineering sciences.

3. Design/development of solutions: Design solutions for complex engineering problems and design system components or processes that meet the specified needs with appropriate consideration for the public health and safety, and the cultural, societal, and environmental considerations.

4. Conduct investigations of complex problems: Use research-based knowledge and research methods including design of experiments, analysis and interpretation of data, and synthesis of the information to provide valid conclusions.

5. Modern tool usage: Create, select, and apply appropriate techniques, resources, and modern engineering and IT tools including prediction and modeling to complex engineering activities withan understanding of the limitations.

6. The engineer and society: Apply reasoning informed by the contextual knowledge to assess societal, health, safety, legal and cultural issues and the consequent responsibilities relevant to the professional engineering practice.

7. Environment and sustainability: Understand the impact of the professional engineering solutions in societal and environmental contexts, and demonstrate the knowledge of, and need for sustainable development.

8. Ethics: Apply ethical principles and commit to professional ethics and responsibilities and norms of the engineering practice.

9. Individual and team work: Function effectively as an individual, and as a member or leader indiverse teams, and in multidisciplinary settings.

10. Communication: Communicate effectively on complex engineering activities with the engineering community and with society at large, such as, being able to comprehend and write effective reports and design documentation, make effective presentations, and give and receiveclear instructions.

11. Project management and finance: Demonstrate knowledge and understanding of the engineering and management principles and apply these to one's own work, as a member and leader in a team, to manage projects and in

multidisciplinary environments.

12. Life-long learning: Recognize the need for, and have the preparation and ability to engage in independent and life-long learning in the broadest context of technological change.

Course Name: C101 (Mathematical Method in Engg-18MTP11)

C101.1	To understand the course are to enhance the knowledge of various methods in finding the roots of an algebraic
C101.2	To understand Transcendental or simultaneous system of equations
C101.3	To solve Numerical Integration: Newton –Cotes and Guass Quadrature Integration formulae, Integration of Equations, Romberg integration
C101.4	To solve Direct methods, Cramer's Rule, Gauss Elimination Method, Gauss-Jordan Elimination Method
C101.5	To evaluate integrals numerically and differentiation of complex functions with a greater Accuracy. These concepts occur frequently in their subjects like finite element method
C101.6	To Analysis for direct methods, Iteration Methods.

Course Name: C102 (Finite Element Methods -18MTP21)

C102.1	Knowledgeable about the FEM as a numerical method for the solution of solid mechanics, structural mechanics and thermal problems
C102.2	To present Finite element formulation using variational and weighted residual approaches
C102.3	To present Finite elements for the analysis of bars & trusses, beams & frames.
C102.4	To present Finite elements for the analysis of plane stress & plane strain problems and 3-D solids.
C102.5	To present Finite elements for the analysis of thermal and dynamics problems
C102.6	Developing skills required to use a commercial FEA software

Course Name: C103 (Advanced Fluid Mechanics-18MTP13)

C103.1	Explain the basic concepts fluid flow and their governing equations
C103.2	Understand the concepts in the analysis of fluid flow problems in laminar and Turbulent flows
C103.3	Formulate and solve one dimensional incompressible and compressible fluid flow problems
C103.4	Distinguish normal and oblique shocks and their governing equations.
C103.5	Identify relevant instruments and methods for flow measurements

Course Name: C104 (Thermodynamics &Combustion Engineering-18MTP14)

C104.1	Understand the concepts of combustion phenomena in energy conversion devices.
C104.2	Apply the knowledge of adiabatic flame temperature in the design of combustion devices.
C104.3	Identify the phenomenon of flame stabilization in laminar flames.
C104.4	Identify the phenomenon of flame stabilization in turbulent flames.
C104.5	Analyze the pollution formation mechanisms in combustion of solid, liquid and
	gaseous fuels.

Course Name: C105 (Energy Conservation and Management-18MTP15)

C105.1	Understand the various conservation techniques
C105.2	Explain various Energy Efficiency Improvement technique
C105.3	Employ the principles of thermal engineering and energy management to improve the performance of thermal systems.
C105.4	Assess energy projects on the basis of economic and financial criteria.
C105.5	Describe methods of energy production for improved utilization

Course Name: C107 (Thermal Engineering measurement - Lab 1-18RMI17)

C106.1	Perform experiments to determine the coefficient of discharge of flow measuring devices.
C106.2	Conduct experiments on hydraulic turbines and pumps to draw characteristics.
C106.3	Test basic performance parameters of hydraulic turbines and pumps and execute the knowledge in real life situations.
C106.4	Identify exhaust emission, factors affecting them and report the remedies.
C106.5	Determine the energy flow pattern through the hydraulic machines and I C Engine
C106.6	Exhibit his competency towards preventive maintenance of IC engines.

Course Name: C107 (Research Methodology and IPR-18RMI17)

C107.1	understand some basic concepts of research and its methodologies
C107.2	identify appropriate research topics
C107.3	select and define appropriate research problem and parameters
C107.4	prepare a project proposal (to undertake a project)
C107.5	organize and conduct research (advanced project) in a more appropriate manner

Course Name: C212 (Advanced Heat Transfer- 18MTP21)

C212.1	Summarize both the physics and the mathematical treatment of the advanced topics pertaining to the modes of heat transfer.

C212.2	Use principles of heat transfer to develop mathematical models for uniform and non-uniform fins.
C212.3	Employ mathematical functions and heat conduction charts in tackling two-dimensional and three-dimensional heat conduction problems.
C212.4	Identify free and forced convection problems involving complex geometries with proper boundary conditions.
C212.5	Use the concepts of radiation heat transfer for enclosure analysis.

Course Name: C213 (Steam &Gas Turbines- 18MTP22)

C213.1	Summarize the working principles of Gas and steam turbines nozzle and diffusers.
C213.2	Use the principles of thermodynamics to determine the performance of steam and gas turbines.
C213.3	Distinguish and demonstrate the working principle and performance of impulse and reaction turbines
C213.4	Explain the concepts of axial flow and centrifugal compressors
C213.5	Differentiate axial flow and radial flow gas turbines for their analysis.

Course Name: C213 (Alternate Fuels for 1C Engines- 18MTP243)

C214.1	Explain about the availability and usage of conventional fuels for IC engines.
C214.2	Identify possible alternative fuels for IC engines.
C214.3	Demonstrate the use of alternative fuels for different types of engines
C214.4	Assess the environmental impact standards
C214.5	Performance using alternate fuels.

Course Name: C215 (Theory of 1C Engines- 18MTP251)

C215.1	Distinguish different Fuel-air and actual cycles.
C215.2	Demonstrate the different types of injection and carburetor systems
C215.3	Formulate the flow and combustion phenomenon for modeling
C215.4	Identify the various types of emissions, noise and their control systems
C215.5	Recommend the suitable alternative fuel for IC Engine.

Course Name: C215 (Simulation Laboratory Projects on Thermal Engineering - Lab 2- 18MTPL26

C311.1	Explain the basic principles and concepts underlying in modeling techniques
C312.2	Explain the basic principles and concepts underlying in simulation techniques
C313.3	Optimize the design of thermal systems.
C314.4	Develop representational modes of real processes and systems.
C315.5	Generate suitable modeling techniques to compute the performance.

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Course Name: C311 (Design of heat Transfer Equipment's for thermal power Plant - 18CAE321)

C311.1	Understand the physics and the mathematical treatment of typical heat exchangers.
C312.2	Employ LMTD and Effectiveness methods in the design of heat exchangers and analyze the importance of LMTD approach over AMTD approach.
C313.3	Examine the performance of double-pipe counter flow (hair-pin) heat exchangers.
C314.4	Design and analyze the shell and tube heat exchanger.
C315.5	Understand the fundamental, physical and mathematical aspects of boiling and condensation.
C316.6	Classify cooling towers and explain their technical features.

Course Name: C312 (Convective Heat and Mass Transfer- 18MTP321

C311.1	Understand the fundamental and advanced principles of forced and natural convection heat transfer processes.
C312.2	Formulate and solve convective heat transfer problems
C313.3	Relate the principles of convective heat transfer to estimate the heat dissipation from devices.
C314.4	Estimate the energy requirements for operating a flow system with heat transfer.
C315.5	Relate to the current challenges in the field of convective heat transfer.

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