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.

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.

PEO 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 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 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

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

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 (B**ioethics & 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.

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

PEO 2. 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

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.

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

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	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.

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 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.
PEO 3.	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.

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.

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.

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.

S**ubject 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.

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

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: 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	udents 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	udents can able to do the stress analysis of bar, truss, beam and simple mechanical structures and validate the results with theoretical results.
C316.3	udents will carry out static and dynamic analysis of simple beams and bars.

C316.4	udents will be able to analyze the thermal problems like conduction and convection using ANSYS.
C316.5	udents 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	udents can aware of about different configurations of strain rosettes and its error minimization.
C406.3	udents 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	fferentiate 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.

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

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.

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

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.

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

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.
PEO 3.	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

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 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 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

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 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 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.

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 differentIgnition 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	Lay down 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	Lay down maintenance schedule for two and three wheeled vehicles.