QUALITY AUDIT REPORT

ON

GREEN CAMPUS MANAGEMENT AUDIT

OF

THE OXFORD COLLEGE OF ENGINEERING

10TH MILESTONE, BOMMANAHALLI, HOSUR ROAD,

BANGALORE - 560 068

ECO ENERGIME ENGINEERS LLP

ENHANCING RESOURCE EFFICIENCY

QUALITY AUDIT REPORT

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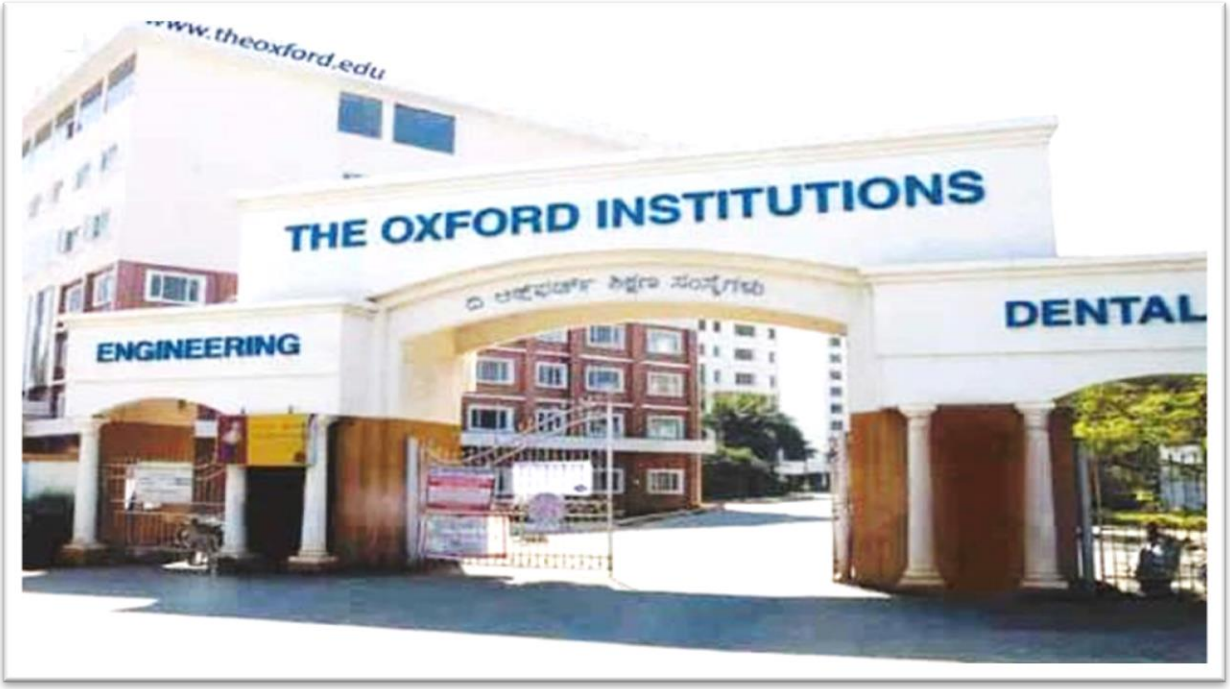
10TH MILESTONE, BOMMANAHALLI, HOSUR ROAD, BANGALORE - 560 068



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- Ms. Aparna Reddy, B.Arch., MBA

ACKNOWLEDGEMENTS

We are thankful to the management of **The Oxford College of Engineering, Bengaluru,** for the support, guidance and, giving us the opportunity to be involved in this very interesting and challenging assignment.

We would be happy to provide any further clarifications, if required, to facilitate the implementation of the recommendations.

We received full co-operation and support from the concerned personnel/ staff members of the college. We would like to thank:

Chairman – The Oxford Educational Institutions

The Oxford College of Engineering

And other Staff in personnel who have given full co-operation and support. They took a keen interest and gave valuable inputs during the course of study.

Certificate

of Completion

This is to certify that

The Oxford College of Engineering, Bommanahalli, Bengaluru

has successfully completed

Green Campus Management Audit

The study was conducted by

Eco Energime Engineers LLP, Bengaluru.

Start Date : 02.11.2020
End Date : 05.11.2020

Date Of Issue : 24.11.2020
Valid Till : 23.11.2021

Aparna R.

Aparna Reddy
Director
EEELLP

A.Govindaraj
Director
EEELLP

Smart Solutions for Sustainable Tomorrow

Issued by Eco Energime Engineers LLP, Bangalore.
www.eeellp.com

EEELLP ACKNOWLEDGEMENT

EEELLP team thanks the management of **The Oxford College of Engineering, Bengaluru** for assigning this interesting work to us. We appreciate the co-operation extended to our team during the entire process.

Our special thanks are due to Principal & Team of colleagues for giving us necessary inputs to carry out this very vital exercise. We would like to thank all the head of the departments and staff members who were actively involved while collecting the data and conducting field measurements.

DISCLAIMER

The Audit Team has prepared this report for The Oxford College of Engineering, Bengaluru based on the input data submitted by the representatives of college complemented with the best judgment capacity of the expert team.

While all reasonable care has been taken in its preparation, details contained in this report have been compiled in good faith based on information gathered.

It is further informed that the recommendations are arrived following best judgments and no representation, warranty or undertaking, express or implied is made and no responsibility is accepted by Audit Team in this report or for any direct or consequential loss arising from any use of the information, statements or forecasts in the report

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ABBREVIATION AND ACRONYMS

1.	A	:	Amperes
2.	AC	:	Air Conditioner
3.	APFC	:	Automatic Power Factor Controller
4.	AMF	:	Automatic Mains Failure
5.	BBMP	:	Bruhat Bengaluru Mahanagara Palike
6.	BESCOM	:	Bangalore Electricity Supply Company
7.	BWSSB	:	Bangalore Water Supply and Sewerage Board
8.	CC Camera	:	Closed Circuit Camera
9.	DG	:	Diesel Generators
10.	EE Fan	:	Energy Efficient Fan
11.	E-Waste	:	Electronic Waste
12.	FTL	:	Fluorescent Tube Light
13.	GHG	:	Green House Gas
14.	Hz	:	Hertz
15.	HP	:	Horse Power
16.	HT	:	High Tension
17.	I	:	Current
18.	ICT	:	Information and Communications Technology
19.	IQAC	:	Internal Quality Assurance Cell
20.	ISO	:	International Organization for Standardization
21.	kgs	:	Kilograms
22.	kL	:	Kilo Liters
23.	kV	:	kilo volt
24.	kVA	:	kilo volt ampere
25.	kVAr	:	Reactive kilo volt ampere
26.	kW	:	Kilo Watt
27.	kWh	:	kilo Watt hour
28.	kWp	:	kilo Watt peak
29.	LCD	:	Liquid Crystal Display
30.	LED	:	Light Emitting Diode
31.	LT	:	Low Tension
32.	mA	:	Milli Amperes
33.	MoU	:	Memorandum of Understanding
34.	NA	:	Not Applicable
35.	NAAC	:	National Assessment and Accreditation Council
36.	NSS	:	National Service Scheme
37.	OHT	:	Over Head Tank
38.	Prim/Sec	:	Primary/Secondary
39.	PF	:	Power factor
40.	Ph.D.	:	Doctor of Philosophy

41.	PV	:	Photo Voltaic
42.	RCC	:	Reinforced Cement Concrete
43.	RO	:	Reverse Osmosis
44.	RR. No.	:	Revenue Register Number.
45.	Sq. Ft.	:	Square Feet
46.	Sq.m.	:	Square Meter
47.	SRTPV	:	Solar Roof Top Photo Voltaic
48.	TL	:	Tube Light
49.	TR	:	Ton of Refrigeration
50.	TV	:	Television
51.	V	:	Volts
52.	W	:	Watts
53.	Wi-Fi	:	Wireless Fidelity
54.	Wp	:	Watt peak
55.	#	:	Number

1. INTRODUCTION

The Oxford College of Engineering was started in the year 2000, is one of the most prestigious institutions in Bengaluru that provides quality teaching and training in professional UG courses in 10 streams of Engineering in, Computer Science, AIML, Electronics and Communication, Electrical and Electronics, Mechanical, Civil, Bio-Technology, Mechatronics & Automobile. College also offers 10 Postgraduate programs in Technology (M. Tech), Computer Application (MCA) and Business Administration (MBA), and 11 Research centers recognized by VTU to offer Ph.D. programs. College is affiliated with the Visvesvaraya Technological University (VTU) and approved by the All-India Council for Technical Education (AICTE). The college also has been accredited by the NBA, and IAO quality-assessed organizations. The Institute name is also included in the NIRF & AICTE CII Survey of Industry Linked Technical Institute- 2020. Institution is categorized in Band promising in ARIIA ranking in the year 2021. The college is set in a sprawling 11.5 acres campus in the prestigious IT corridor, ideal for education in a serene environment with over 85,000 square meters of built-up area spread over 2 blocks, with enormous investment for academic purposes. The college has well equipped with state-of-the-art infrastructure facilities to carry out various real-time projects, research, and consultancy activities in recent technologies. All the Departments have undertaken many research/consultancy projects funded both by multinationals and government agencies. The college has a good number of research publications in various reputed journals and patents. College has a good number of R&D projects sponsored by AICTE, VGST, VTU, IEEE, ICMR BRNS, NIF, NRB(DRDO) & BIRAC. It has a history of excellent placement track record in various multinational companies' offers with high salary packages.

VISION

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

MISSION

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

QUALITY POLICY

To equip the students with highest standard of education, knowledge and ethics. To prepare them to meet the challenges of life with full confidence. Aim at all round development of the personality to be useful citizens.

Campus Area and Built-up area

The area of the campus (built up and total) area is given in table 1-1.

S. No.	Description	Units	Details
1	Engineering Campus total area	Acres	11.5
2	Built up area	Sq. mt.	85,000

Table 1-1: College Area

Committee and Cells

The Oxford College of Engineering (TOCE) has various functional committees and cells. They are listed below,

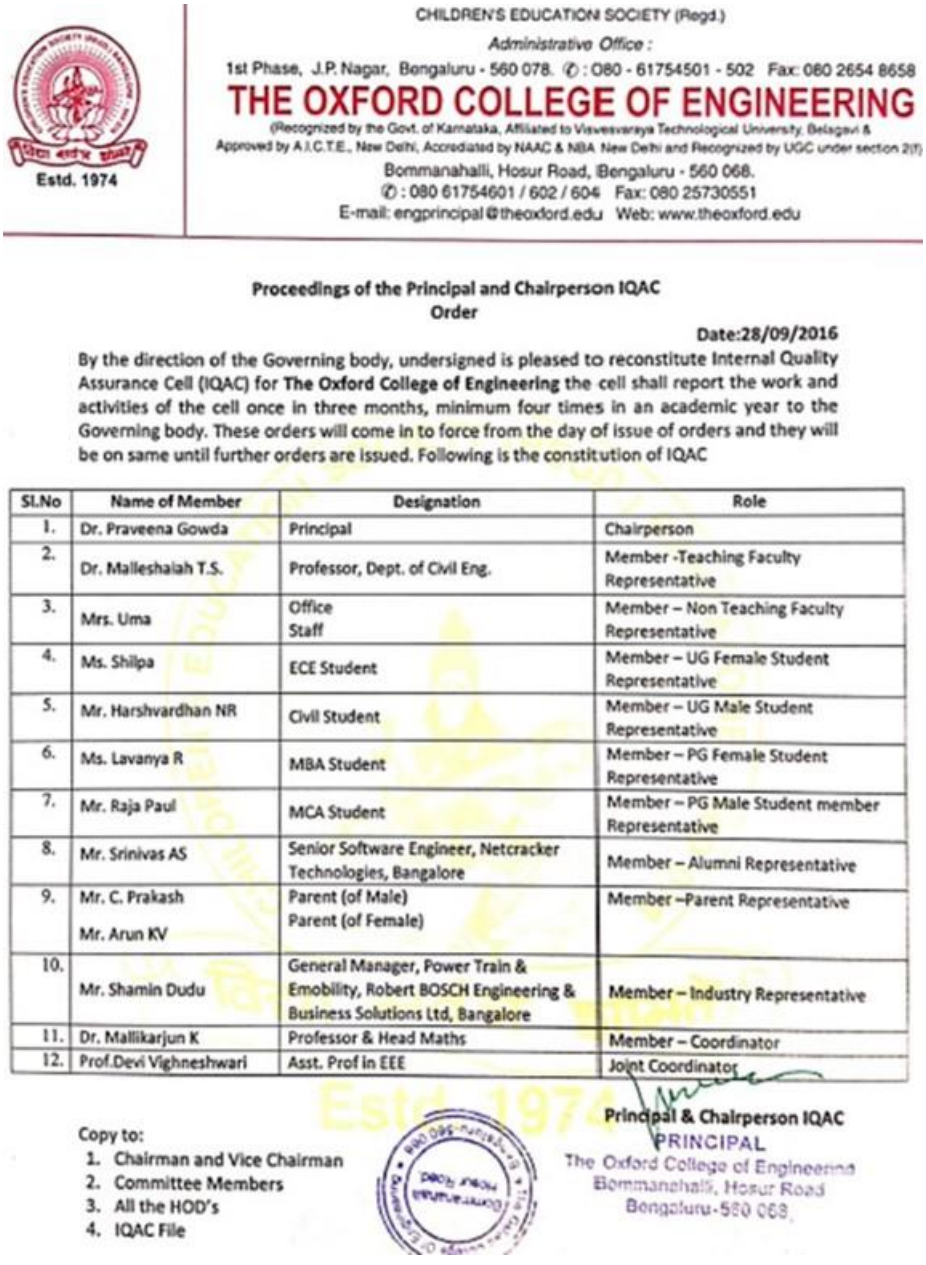
- VTU/AICTE Committee
- Planning & Accreditation Committee
- Library Committee
- Research and Development Committee
- Training & Placement Committee
- Faculty Development Committee
- Purchase & Budget Committee
- College Magazine/Calendar /Newsletter Committee
- Professional Societies / Chapters
- Cultural Association

- Alumni Association
- Sports Committee
- NSS
- Students Grievances Redressal Committee
- Discipline Committee
- Women's Grievance Redressal Committee
- Anti-sexual Harassment Committee
- Entrepreneurship & Incubation cell
- Anti-Ragging Committee
- Website, Server & Internet Committee
- Public Relation Committee
- Hostel & Canteen Committee
- Prevention of Caste Based Discrimination Cell
- College Internal Complaints Committee
- Internal Task Force Team - COVID 19 Coordination Committee
- Internal Quality Assurance Cell (IQAC)
- Exam Cell
- Disability Recourse Centre
- IPR Cell
- IA Answer Scripts Evaluation Review Committee
- IA Question Paper Scrutiny Committee

Internal Quality Assurance Cell (IQAC)

The college management constitutes the Internal Quality Assurance Cell including Principal, teaching faculty, non-teaching faculty, UG students (Male & Female), PG students (Male & Female), alumni, parent and industry representatives every year.

The list of Internal Quality Assurance Cell members for the academic year 2016-2017 is shown in figure 1-1.



CHILDREN'S EDUCATION SOCIETY (Regd.)
Administrative Office :
1st Phase, J.P. Nagar, Bengaluru - 560 078. ✆ : 080 - 61754501 - 502 Fax: 080 2654 8658

THE OXFORD COLLEGE OF ENGINEERING

(Recognized by the Govt. of Karnataka, Affiliated to Visvesvaraya Technological University, Belagavi & Approved by A.I.C.T.E., New Delhi, Accrediated by NAAC & NBA New Delhi and Recognized by UGC under section 2(f)
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E-mail: engprincipal@theoxford.edu Web: www.theoxford.edu

Estd. 1974

Proceedings of the Principal and Chairperson IQAC
Order

Date:28/09/2016

By the direction of the Governing body, undersigned is pleased to reconstitute Internal Quality Assurance Cell (IQAC) for **The Oxford College of Engineering** the cell shall report the work and activities of the cell once in three months, minimum four times in an academic year to the Governing body. These orders will come in to force from the day of issue of orders and they will be on same until further orders are issued. Following is the constitution of IQAC

Sl.No	Name of Member	Designation	Role
1.	Dr. Praveena Gowda	Principal	Chairperson
2.	Dr. Malleshaiah T.S.	Professor, Dept. of Civil Eng.	Member -Teaching Faculty Representative
3.	Mrs. Uma	Office Staff	Member – Non Teaching Faculty Representative
4.	Ms. Shilpa	ECE Student	Member – UG Female Student Representative
5.	Mr. Harshvardhan NR	Civil Student	Member – UG Male Student Representative
6.	Ms. Lavanya R	MBA Student	Member – PG Female Student Representative
7.	Mr. Raja Paul	MCA Student	Member – PG Male Student member Representative
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11.	Dr. Mallikarjun K	Professor & Head Maths	Member – Coordinator
12.	Prof.Devi Vighneshwari	Asst. Prof in EEE	Joint Coordinator

Principal & Chairperson IQAC
PRINCIPAL
The Oxford College of Engineering
Bommanahalli, Hosur Road
Bengaluru-560 068.

Copy to:
1. Chairman and Vice Chairman
2. Committee Members
3. All the HOD's
4. IQAC File

Figure 1-1: List of IQAC members 2016-2017

The list of Internal Quality Assurance Cell members for the academic year 2017-2018 is shown in figure 1-2.

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Figure 1-2: List of IQAC members 2017-2018

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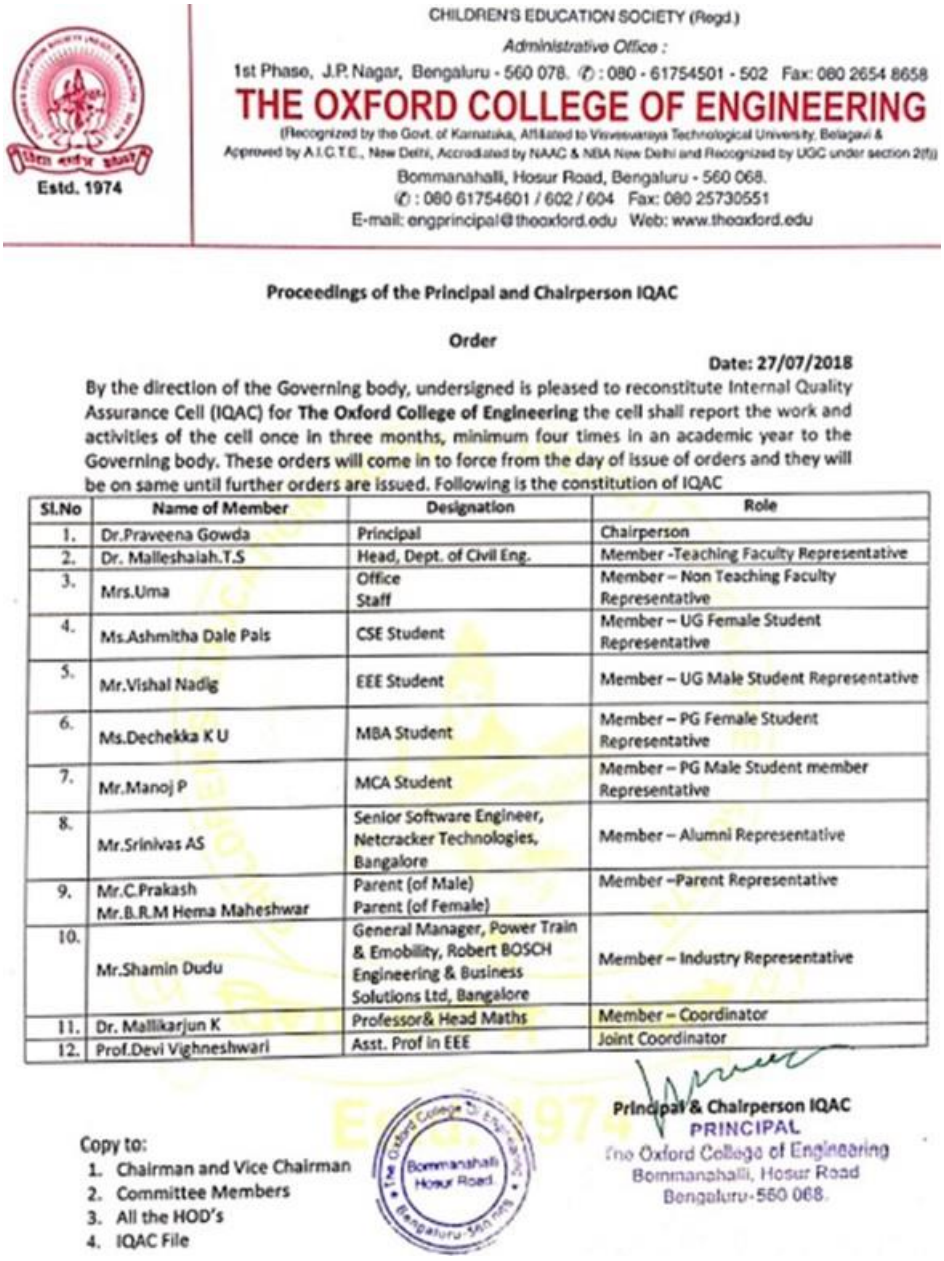

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Figure 1-3: List of IQAC members 2018-2019

The list of Internal Quality Assurance Cell members for the academic year 2019-2020 is shown in figure 1-4.

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Figure 1-4: List of IQAC members 2019-2020

The list of Internal Quality Assurance Cell members for the academic year 2020-2021 is shown in figure 1-5.

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The Oxford College of Engineering Bommanahalli Hosur Road

Principal & Chairperson IQAC

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Figure 1-5: List of IQAC members 2020-2021

Overview of Quality Audit:

Quality Audit helps college / facility to:

- Understand the usage of electricity, water and other natural resources
- Identify opportunities to conserve various natural resources
- Identify various technological improvements
- Evaluate the techno-commercial of identified conservative measures
- Create awareness among the students and staff
- Disseminate the commitment of management towards saving nature
- Develop a culture among students, staff and management to be socially responsible

2. PRE – AUDIT PHASE

A Pre-audit meeting is a prerequisite for the audit, it helps to meet and discuss about the schedule and documents required during the audit. The pre-audit meeting was conducted at The Oxford College of Engineering. During the meeting, introduction of team members, scope and objectives of the audit were discussed.

Management Commitment

The Management of the college has shown great commitment towards Quality Audit during the pre-audit meeting. They were ready to encourage all green activities. It is decided to promote all activities that are environment friendly such as awareness programmes on the environment, campus farming, planting more trees on the campus etc., after the Quality Auditing.

College administration is vital to the process of realizing campus sustainability, and college policy is an essential instrument for any substantial change in the campus environment.

Scope and Goals of Quality Auditing

A clean and healthy environment aids effective learning and provides conducive learning environment. There are various efforts around the world to address environmental education issues. Quality auditing is one among them for educational institutions.

Once a baseline is established, the data can serve as a point of departure for further action in campus greening. Existing data will allow the college to compare its programs and operations with those of peer institutions, identify areas in need of improvement, and prioritize the implementation of future projects.

This data will also provide a basis for calculating the economic benefits of resource conservation projects, by establishing the current rates of resource use and their associated costs. This audit initiative focused initially on educating colleges and universities through workshops, guidebooks, fact sheets and ensuring compliance through inspections and self-audits.

3. ON-SITE AUDIT PHASE

3.1. Scope / Target Areas of Quality Auditing

3.1.1. Water Audit

Water Audit addresses water consumption, water sources, appliances and fixtures. Aquifer depletion and water contamination are taking place at unprecedented rates. It is therefore essential that any environmentally responsible institution should examine its water use practices.

3.1.2. Energy Audit

Energy Audit addresses energy consumption, energy sources, energy monitoring, lighting, appliances, and vehicles. Energy use is clearly an important aspect of campus sustainability.

3.1.3. Waste Management Audit

Waste Audit addresses waste production and disposal, plastic waste, paper waste, food waste, and recycling. Municipal solid waste has a number of adverse environmental impacts, most of which are well known and not in need of elaboration.

3.1.4. Green Campus Management Audit

Green campus initiatives are becoming an integral part of modern day's university systems. Green campus Audit helps in maintaining the air and water clean. It regulates the climatic conditions and provides a healthy and comfortable environment for living.

3.1.5. Environment Footprint Audit

Environment Footprint Audit addresses the usage of fossil fuels (coal, diesel, petrol and gas). The mode of commute to and from college each day has an impact on the environment through the emission of greenhouse gases into the atmosphere by the burning of fossil fuels.

3.2. Audit Methodology and Approach

The methodology and approach adopted for the study involve various steps that include:

- Review of Document and records
- Review of Policies
- Review of MoU
- Review of various measures implemented
- Site Walkthrough
- Data Collection
- Interviews

3.2.1. Review of Document and Records

The various documents and records such as:

- Electricity bills
- Water bills
- Equipment registers
- List of appliances
- Internal Quality Audit document
- Purchase document
- Cash payment receipts
- Equipment service report
- Maintenance and service payment receipts

were reviewed and, relevant data and inputs required for analysis have been collected.

3.2.2. Review of Policies

College has various policies that include safety policy and Anti-ragging policy.

A. Safety Policy:

All the students, teaching staff, non-teaching staff, maintenance and house-keeping staff have been given training to use fire extinguishers in emergency situations of fire and explosion. Fire hydrant system is available at the campus. Also, fire extinguishing cylinders have been installed in each floor and in laboratory areas. Fire order statements and use of fire extinguisher has been posted at each block. Fire alarm is also installed at the premises. Photos of fire order and fire alarm are shown in figure 3-1 and 3-2.

Figure 3-1: Fire order displayed at college premises

Figure 3-2: Fire alarm panel at engineering old block

B. Anti-Ragging policy:

Ragging in all its forms shall be totally banned in the entire institution, including its departments, constituent units, all its premises (academic, hostel, sports, canteen, etc.) whether located within the campus or outside and in all means of transportation of students whether public or private. **'Say No to Ragging'** poster is placed in each block of the campus and a sample photo is as shown in the figure 3-3.

Figure 3-3: Anti-ragging poster

3.2.3. Review of various measures implemented

During the Quality Audit study, it was observed the college has taken various initiatives in conserving natural resources that include:

- Internal Quality Assurance Cell including Staff, Students, Alumni, parents and industrial members.
- Installation of Solar Roof Top Photo Voltaic (SRTPV) system for power generation.
- Wheeling to grid is done.
- Installation of LED fixtures to reduce electricity consumption
- Installation of LCD/LED monitors for all the desktops to conserve electricity
- Switching OFF lights and fans whenever not in use to save electricity
- Installation of RO plant to provide purified drinking water.
- Dual water piping system for washrooms and toilets, to use STP treated water for flushing
- Sewage treatment and using the treated final water for toilet flushing, gardening and cleaning purposes
- Rain water harvesting system is available in the campus.
- Regular testing of STP treated water quality parameters
- Dedicated watering system for greeneries.
- The use of sign boards in all the wash rooms were observed, to create awareness for water conservation
- Installation of waste segregation bins at all the rooms to separate the dry and wet waste
- Maintenance of logbooks and registers is done properly.
- Training is conducted on regular basis regarding usage of fire extinguisher, conservation of resources such as electricity, water, food and green campus.
- Maintenance team is available for electrical, plumbing, waste management and green campus management.

3.2.4. Site walk through

Site walk through was conducted with staff members, students and audit team members. Staff and students have shown very keen interest in the data collection process and methods to be followed in field data collection. The staff and students have given inputs and suggestions for resource conservation as well.

College Infrastructure

The Oxford College of Engineering campus has various blocks and departments. Each floor has state of the art class rooms, staff rooms, laboratories, libraries and many more. Details of infrastructure are as follows:

- Inhouse hostel for boys and girls
- Bank facility
- 24 hrs. atm in the campus
- Solar plant
- Rain water harvesting
- RO water facility
- Lifts & ramps
- Cafeteria
- Gymnasium
- Cricket stadium / basketball court / badminton court
- Wi-Fi facility in the campus
- CCTV security
- Telephone and fax facility
- Photocopying facility
- The oxford enterprises (stationery)
- Library

- Digital library
- Extended library hours
- Hospital facility
- Free dental treatment
- First aid, medical and counseling facility
- Scholarships
- Group insurance
- Placements
- Placements training
- English language coaching
- Add-on courses
- Cloud based ERP for students
- Transport
- Parking facility
- Cultural activities center
- Incubation Centre for research activity
- Staff room
- Smart class rooms
- Conference room
- Student common room
- Green campus

3.2.5. Inventory Collection

To understand the types of appliances used, inventory collection was carried out by the audit team members. The various types of appliances used are lights, fans, computers, projectors, printers, scanners etc., The consolidated list of inventories is given in table 3-1.

S. No.	Dept	Florescent Tube Light		LED		CFL	Fan		Computer		Exhaust Fans	Scanners	Printers	Xerox Machine	CC Camera	TV Screen	Projector	AC	Refridgerator
		40 W	MOR (36W)	18W Tube	12 W		Ceiling Fan	Wall mount Fan	LED /LCD Monito	CRT Monitors									
1	AUTO ENGG	64	0	12	0	0	26	6	5	0	0	1	2	0	0	0	1	0	
2	BT	86	0	0	0	0	42	0	10	9	2	2	2	2	8	0	1	2	4
3	Chemistry	0	0	17	0	0	12	0	0	0	0	0	0	0	0	0	0	0	
4	CSE	52	0	141	0	0	59	13	3	218	0	0	0	4	0	12	0	5	1
5	Civil	52	0	16	0	0	56	4	30	0	0	1	3	0	0	0	0	0	
6	ECE	81	0	0	0	0	44	11	48	0	3	0	4	0	7	0	3	1	
7	EEE	48	2	0	6	0	54	2	41	0	0	0	2	0	7	0	1	0	0
8	ISE	34	0	77	0	0	29	5	128	0	0	0	2	0	0	0	1	0	
9	Library	0	45	0	0	0	53	0	30	0	0	1	1	0	0	0	0	0	
10	Maths	16	0	0	0	0	14	1	5	0	0	0	7	0	0	0	0	0	
11	MBA	39	0	0	0	96	42	0	16	0	0	0	2	0	0	0	3	3	
12	MCA	51	0	0	0	0	31	0	242	0	0	0	2	0	3	0	0	9	
13	MECH	89	0	0	0	0	59	0	84	0	2	0	2	0	5	2	3	0	
14	MTE	24	0	0	0	0	19	0	3	0	0	0	1	0	4	0	1	0	
15	PHYSICS	39	0	0	0	0	27	1	2	0	0	0	1	0	6	0	0	0	
Total (College)		675	47	263	6	96	567	43	647	227	7	5	31	6	40	14	14	20	5
Total(Hostel)		413	0	71	0	0	431	0	1	0	0	0	1	0	0	0	0	0	0
Total (Overall)		1088	47	334	6	96	998	43	648	227	7	5	32	6	40	14	14	20	5

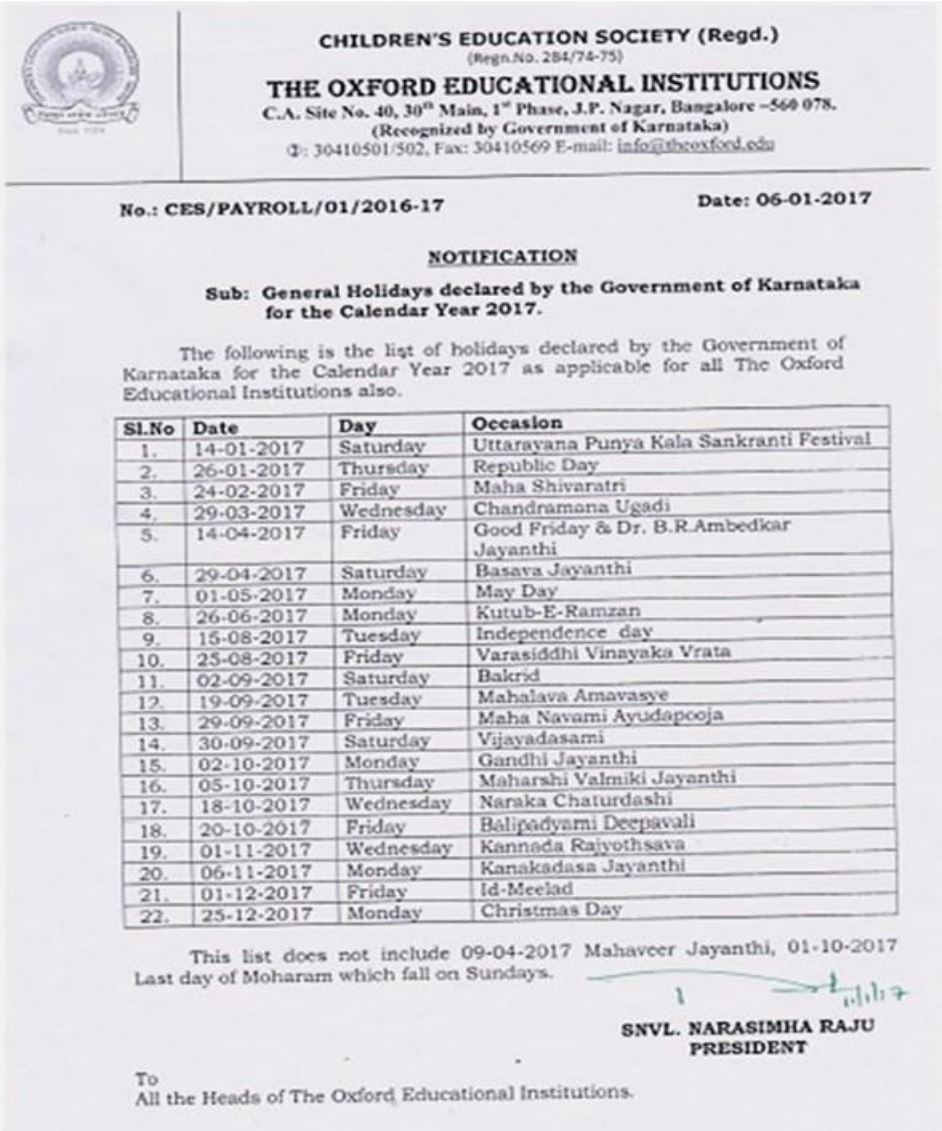
Table 3-1: Consolidated list of inventories

3.2.6. Interviews

To collect the various data, information and operating patterns, interviews were conducted with college staff (Principal, teaching staff, non-teaching staff) and students. The consolidated information from the interviews is given in the following sub-sections.

3.2.6.1. List of Holidays:

The lists of holidays were collected during the study and the same is given below. The list of holidays for the year 2017 is shown in figure 3-4.



CHILDREN'S EDUCATION SOCIETY (Regd.)
(Regn.No. 284/74-75)
THE OXFORD EDUCATIONAL INSTITUTIONS
C.A. Site No. 40, 30th Main, 1st Phase, J.P. Nagar, Bangalore –560 078.
(Recognized by Government of Karnataka)
✆: 30410501/502, Fax: 30410569 E-mail: info@theoxford.edu

No.: CES/PAYROLL/01/2016-17 Date: 06-01-2017

NOTIFICATION

Sub: General Holidays declared by the Government of Karnataka for the Calendar Year 2017.

The following is the list of holidays declared by the Government of Karnataka for the Calendar Year 2017 as applicable for all The Oxford Educational Institutions also.

Sl.No	Date	Day	Occasion
1.	14-01-2017	Saturday	Uttarayana Punya Kala Sankranti Festival
2.	26-01-2017	Thursday	Republic Day
3.	24-02-2017	Friday	Maha Shivaratri
4.	29-03-2017	Wednesday	Chandramana Ugadi
5.	14-04-2017	Friday	Good Friday & Dr. B.R.Ambedkar Jayanthi
6.	29-04-2017	Saturday	Basava Jayanthi
7.	01-05-2017	Monday	May Day
8.	26-06-2017	Monday	Kutub-E-Ramzan
9.	15-08-2017	Tuesday	Independence day
10.	25-08-2017	Friday	Varasiddhi Vinayaka Vrata
11.	02-09-2017	Saturday	Bakrid
12.	19-09-2017	Tuesday	Mahalaya Amavasye
13.	29-09-2017	Friday	Maha Navami Ayudapooja
14.	30-09-2017	Saturday	Vijayadasami
15.	02-10-2017	Monday	Gandhi Jayanthi
16.	05-10-2017	Thursday	Maharshi Valmiki Jayanthi
17.	18-10-2017	Wednesday	Naraka Chaturdashi
18.	20-10-2017	Friday	Balipadyami Deepavali
19.	01-11-2017	Wednesday	Kannada Rajyothsava
20.	06-11-2017	Monday	Kanakadasa Jayanthi
21.	01-12-2017	Friday	Id-Meelad
22.	25-12-2017	Monday	Christmas Day

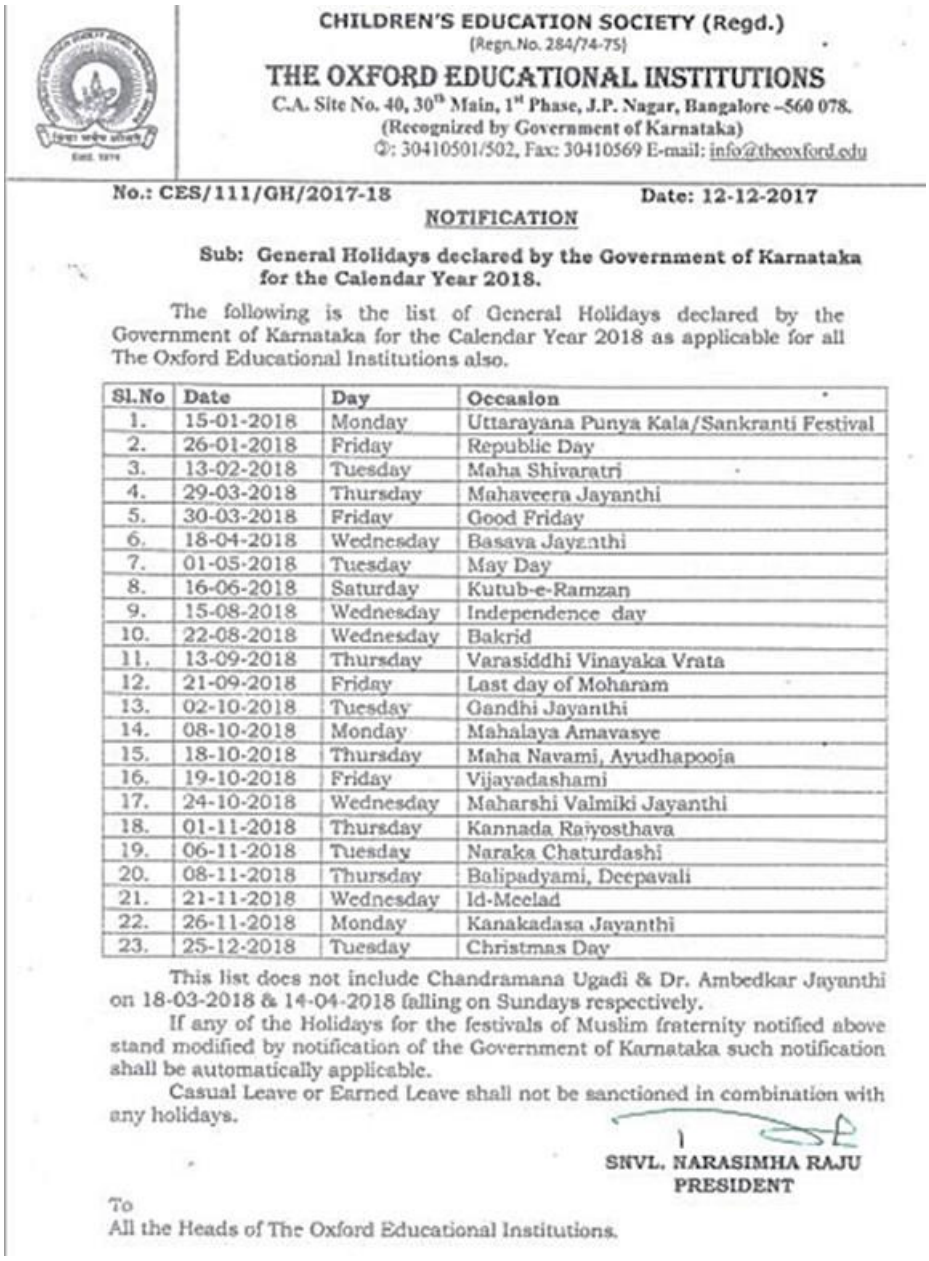
This list does not include 09-04-2017 Mahaveer Jayanthi, 01-10-2017 Last day of Moharam which fall on Sundays.

SNVL. NARASIMHA RAJU
PRESIDENT

To
All the Heads of The Oxford Educational Institutions.

Figure 3-4: List of Holidays-2017

The list of holidays for the year 2018 is shown in figure 3-5.



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✆: 30410501/502, Fax: 30410569 E-mail: info@theoxford.edu

No.: CES/111/GH/2017-18 Date: 12-12-2017

NOTIFICATION

Sub: General Holidays declared by the Government of Karnataka for the Calendar Year 2018.

The following is the list of General Holidays declared by the Government of Karnataka for the Calendar Year 2018 as applicable for all The Oxford Educational Institutions also.

Sl.No	Date	Day	Occasion
1.	15-01-2018	Monday	Uttarayana Punya Kala/Sankranti Festival
2.	26-01-2018	Friday	Republic Day
3.	13-02-2018	Tuesday	Maha Shivaratri
4.	29-03-2018	Thursday	Mahaveera Jayanthi
5.	30-03-2018	Friday	Good Friday
6.	18-04-2018	Wednesday	Basava Jayanthi
7.	01-05-2018	Tuesday	May Day
8.	16-06-2018	Saturday	Kutub-e-Ramzan
9.	15-08-2018	Wednesday	Independence day
10.	22-08-2018	Wednesday	Bakrid
11.	13-09-2018	Thursday	Varasiddhi Vinayaka Vrata
12.	21-09-2018	Friday	Last day of Moharam
13.	02-10-2018	Tuesday	Gandhi Jayanthi
14.	08-10-2018	Monday	Mahalaya Amavasye
15.	18-10-2018	Thursday	Maha Navami, Ayudhapooja
16.	19-10-2018	Friday	Vijayadashami
17.	24-10-2018	Wednesday	Maharshi Valmiki Jayanthi
18.	01-11-2018	Thursday	Kannada Rajyosthava
19.	06-11-2018	Tuesday	Naraka Chaturdashi
20.	08-11-2018	Thursday	Balipadyami, Deepavali
21.	21-11-2018	Wednesday	Id-Meelad
22.	26-11-2018	Monday	Kanakadasa Jayanthi
23.	25-12-2018	Tuesday	Christmas Day

This list does not include Chandramana Ugadi & Dr. Ambedkar Jayanthi on 18-03-2018 & 14-04-2018 falling on Sundays respectively.

If any of the Holidays for the festivals of Muslim fraternity notified above stand modified by notification of the Government of Karnataka such notification shall be automatically applicable.

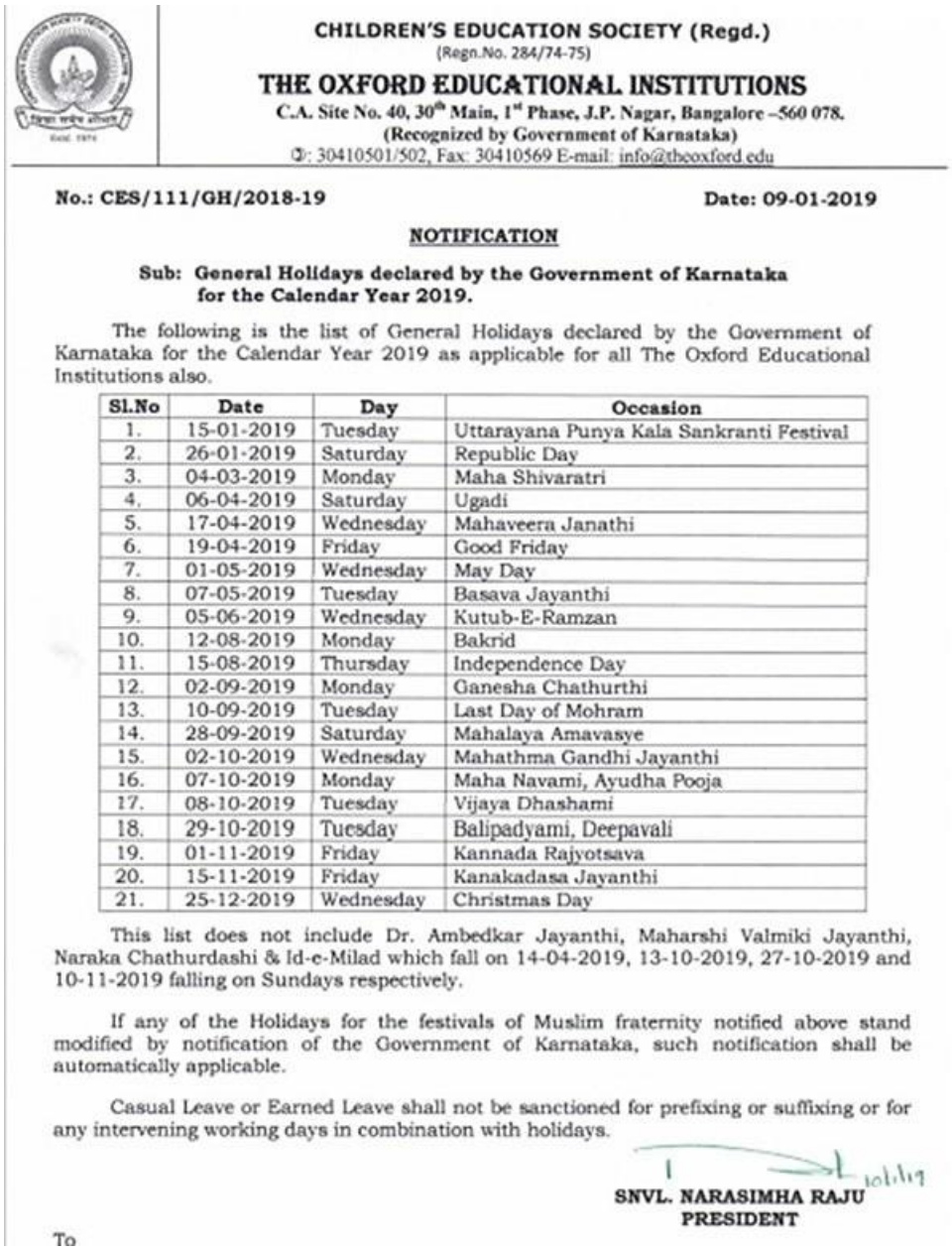
Casual Leave or Earned Leave shall not be sanctioned in combination with any holidays.

SNVL. NARASIMHA RAJU
PRESIDENT

To
All the Heads of The Oxford Educational Institutions.

Figure 3-5: List of Holidays-2018

The list of holidays for the year 2019 is shown in figure 3-6.



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(Recognized by Government of Karnataka)
✆: 30410501/502, Fax: 30410569 E-mail: info@theoxford.edu

No.: CES/111/GH/2018-19 **Date: 09-01-2019**

NOTIFICATION

Sub: General Holidays declared by the Government of Karnataka for the Calendar Year 2019.

The following is the list of General Holidays declared by the Government of Karnataka for the Calendar Year 2019 as applicable for all The Oxford Educational Institutions also.

Sl.No	Date	Day	Occasion
1.	15-01-2019	Tuesday	Uttarayana Punya Kala Sankranti Festival
2.	26-01-2019	Saturday	Republic Day
3.	04-03-2019	Monday	Maha Shivaratri
4.	06-04-2019	Saturday	Ugadi
5.	17-04-2019	Wednesday	Mahaveera Janathi
6.	19-04-2019	Friday	Good Friday
7.	01-05-2019	Wednesday	May Day
8.	07-05-2019	Tuesday	Basava Jayanthi
9.	05-06-2019	Wednesday	Kutub-E-Ramzan
10.	12-08-2019	Monday	Bakrid
11.	15-08-2019	Thursday	Independence Day
12.	02-09-2019	Monday	Ganesha Chathurthi
13.	10-09-2019	Tuesday	Last Day of Mohram
14.	28-09-2019	Saturday	Mahalaya Amavasye
15.	02-10-2019	Wednesday	Mahathma Gandhi Jayanthi
16.	07-10-2019	Monday	Maha Navami, Ayudha Pooja
17.	08-10-2019	Tuesday	Vijaya Dhashami
18.	29-10-2019	Tuesday	Balipadyami, Deepavali
19.	01-11-2019	Friday	Kannada Rajyotsava
20.	15-11-2019	Friday	Kanakadasa Jayanthi
21.	25-12-2019	Wednesday	Christmas Day

This list does not include Dr. Ambedkar Jayanthi, Maharshi Valmiki Jayanthi, Naraka Chathurdashi & Id-e-Milad which fall on 14-04-2019, 13-10-2019, 27-10-2019 and 10-11-2019 falling on Sundays respectively.

If any of the Holidays for the festivals of Muslim fraternity notified above stand modified by notification of the Government of Karnataka, such notification shall be automatically applicable.

Casual Leave or Earned Leave shall not be sanctioned for prefixing or suffixing or for any intervening working days in combination with holidays.

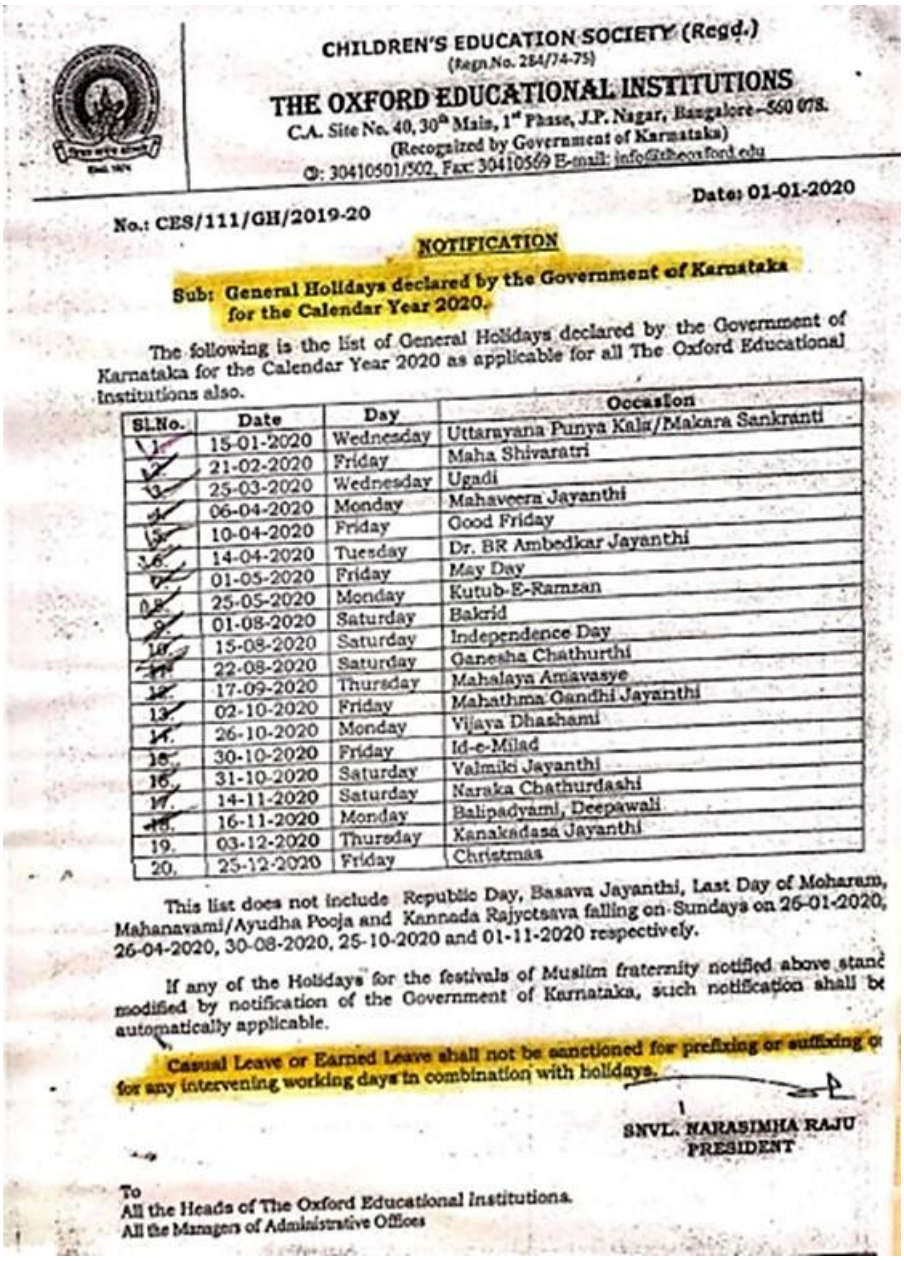
10.1.19

SNVL. NARASIMHA RAJU
PRESIDENT

To

Figure 3-6: List of Holidays-2019

The list of holidays for the year 2020 is shown in figure 3-7.



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Ph: 30410501/502, Fax: 30410569 E-mail: info@theoxford.edu

No.: CES/111/GH/2019-20

Date: 01-01-2020

NOTIFICATION

Sub: General Holidays declared by the Government of Karnataka for the Calendar Year 2020.

The following is the list of General Holidays declared by the Government of Karnataka for the Calendar Year 2020 as applicable for all The Oxford Educational Institutions also.

Sl.No.	Date	Day	Occasion
1.	15-01-2020	Wednesday	Uttarayana Punya Kala/Makara Sankranti
2.	21-02-2020	Friday	Maha Shivaratri
3.	25-03-2020	Wednesday	Ugadi
4.	06-04-2020	Monday	Mahaveera Jayanthi
5.	10-04-2020	Friday	Good Friday
6.	14-04-2020	Tuesday	Dr. BR Ambedkar Jayanthi
7.	01-05-2020	Friday	May Day
8.	25-05-2020	Monday	Kutub-E-Ramzan
9.	01-08-2020	Saturday	Bakrid
10.	15-08-2020	Saturday	Independence Day
11.	22-08-2020	Saturday	Ganesha Chathurthi
12.	17-09-2020	Thursday	Mahalaya Amavasye
13.	02-10-2020	Friday	Mahathma Gandhi Jayanthi
14.	26-10-2020	Monday	Vijaya Dhashami
15.	30-10-2020	Friday	Id-e-Milad
16.	31-10-2020	Saturday	Valmiki Jayanthi
17.	14-11-2020	Saturday	Naraka Chathurdashi
18.	16-11-2020	Monday	Balipadyami, Deepawali
19.	03-12-2020	Thursday	Kanakadasa Jayanthi
20.	25-12-2020	Friday	Christmas

This list does not include Republic Day, Basava Jayanthi, Last Day of Moharam, Mahanavami/Ayudha Pooja and Kannada Rajyotsava falling on Sundays on 26-01-2020, 26-04-2020, 30-08-2020, 25-10-2020 and 01-11-2020 respectively.

If any of the Holidays for the festivals of Muslim fraternity notified above stand modified by notification of the Government of Karnataka, such notification shall be automatically applicable.

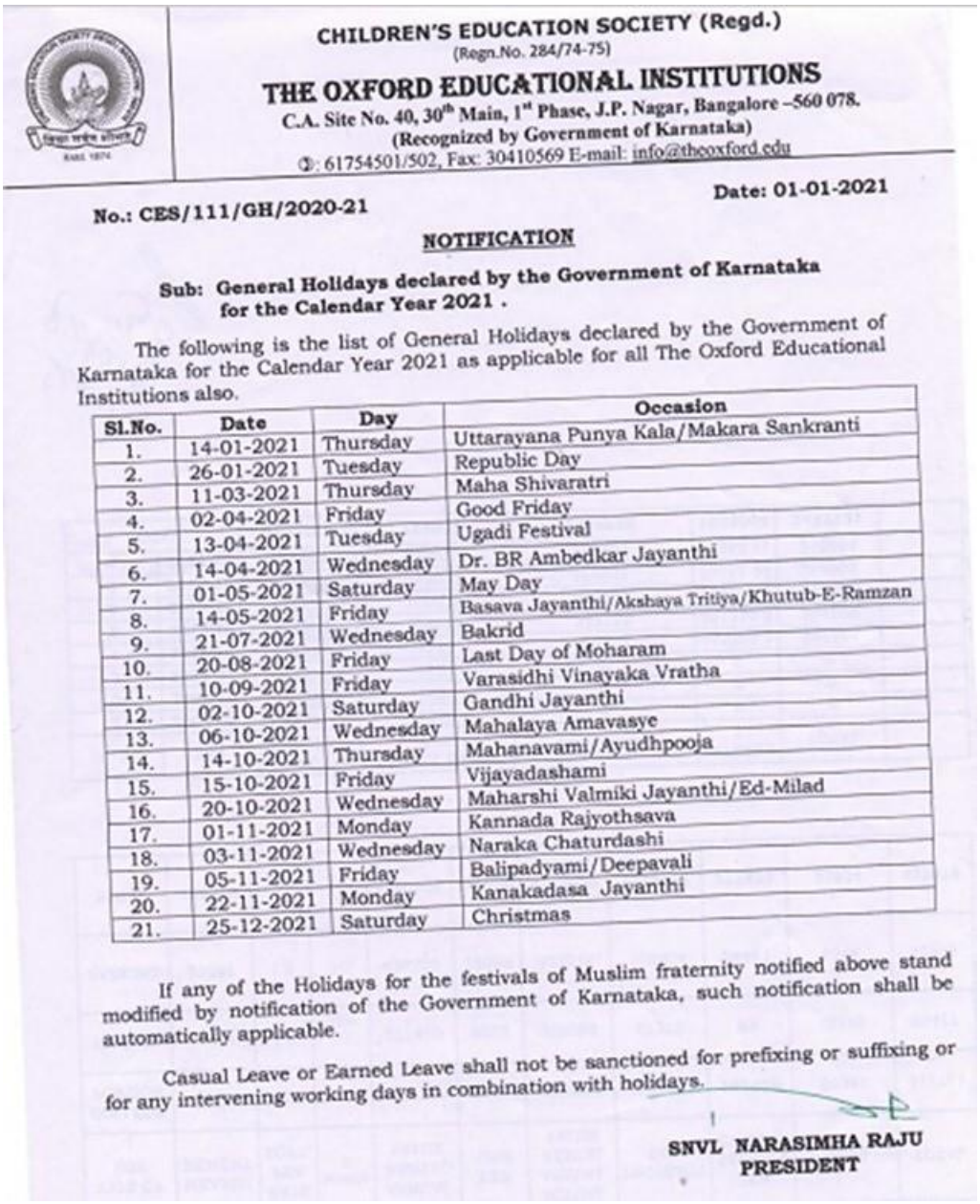
Casual Leave or Earned Leave shall not be sanctioned for prefixing or suffixing or for any intervening working days in combination with holidays.

SNVL. NARASIMHA RAJU
PRESIDENT

To
All the Heads of The Oxford Educational Institutions.
All the Managers of Administrative Offices

Figure 3-7: List of Holidays-2020

The list of holidays for the year 2021 is shown in figure 3-8.



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✆: 61754501/502, Fax: 30410569 E-mail: info@theoxford.edu

No.: CES/111/GH/2020-21

Date: 01-01-2021

NOTIFICATION

Sub: General Holidays declared by the Government of Karnataka for the Calendar Year 2021 .

The following is the list of General Holidays declared by the Government of Karnataka for the Calendar Year 2021 as applicable for all The Oxford Educational Institutions also.

Sl.No.	Date	Day	Occasion
1.	14-01-2021	Thursday	Uttarayana Punya Kala/Makara Sankranti
2.	26-01-2021	Tuesday	Republic Day
3.	11-03-2021	Thursday	Maha Shivaratri
4.	02-04-2021	Friday	Good Friday
5.	13-04-2021	Tuesday	Ugadi Festival
6.	14-04-2021	Wednesday	Dr. BR Ambedkar Jayanthi
7.	01-05-2021	Saturday	May Day
8.	14-05-2021	Friday	Basava Jayanthi/Akshaya Tritiya/Khutub-E-Ramzan
9.	21-07-2021	Wednesday	Bakrid
10.	20-08-2021	Friday	Last Day of Moharam
11.	10-09-2021	Friday	Varasidhi Vinayaka Vratha
12.	02-10-2021	Saturday	Gandhi Jayanthi
13.	06-10-2021	Wednesday	Mahalaya Amavasye
14.	14-10-2021	Thursday	Mahanavami/Ayudhpooja
15.	15-10-2021	Friday	Vijayadashami
16.	20-10-2021	Wednesday	Maharshi Valmiki Jayanthi/Ed-Milad
17.	01-11-2021	Monday	Kannada Rajyothsava
18.	03-11-2021	Wednesday	Naraka Chaturdashi
19.	05-11-2021	Friday	Balipadyami/Deepavali
20.	22-11-2021	Monday	Kanakadasa Jayanthi
21.	25-12-2021	Saturday	Christmas

If any of the Holidays for the festivals of Muslim fraternity notified above stand modified by notification of the Government of Karnataka, such notification shall be automatically applicable.

Casual Leave or Earned Leave shall not be sanctioned for prefixing or suffixing or for any intervening working days in combination with holidays.

SNVL NARASIMHA RAJU
PRESIDENT

Figure 3-8: List of Holidays-2021

3.2.6.2. Tentative Schedule of College

The tentative schedule of the college is 09.00 AM to 4:15 PM.

The library timing is 09:00 AM to 10:00 PM.

The details of the class sessions are given in table 3-2.

S. No.	Session	Timings
1	1st Hour	09:00 TO 9:55AM
2	2nd Hour	09:55 TO 10:50 AM
3	Short Break	10:50 TO 11:00 AM
4	3rd Hour	11:00 TO 11:55 AM
5	4th Hour	11:55 TO 12:50 PM
6	Lunch	12:50 TO 01:30 PM
7	5th Hour	1:30 TO 2:25 PM
9	6th Hour	2:25 TO 3:20 PM
10	7th Hour	3:20 TO 4:15 PM

Table 3-2: Tentative College Schedule

3.2.6.3. Staff and Students of College:

The number of staff including teaching, non-teaching, and house-keeping is given in the table 3-3. The number of students includes both boys and girls.

S. No.	Year	Teaching Staff	Non-Teaching staff	Total Staff	Total Students
1	2017	303	122	425	3572
2	2018	285	95	380	3044
3	2019	269	92	361	3124
4	2020	240	68	308	2728
5	2021	222	57	279	2722

Table 3-3: Number of staff and students

4. GREEN CAMPUS MANAGEMENT AUDIT

4.1. Facility Description

The Oxford College of Engineering maintain a green and clean campus, planting trees under the initiative of NSS are the strides towards the environment.

The students and faculty are encouraged to adopt cleanliness, making the campus garbage and plastic free zone. Tree plantation programs help in encouraging eco-friendly environment, which provides pure oxygen within the institute.

The maintenance team takes care of the up-keeping of the environment and ensures to keep the surroundings clean. They maintain all the plantations by employing the cleanliness and watering regularly.

There are more than 50 trees and well-maintained landscaping of lawns and plantations.

4.1.1. Landscaping with Trees and Plants

Landscaping of the college is worth seeing and reflects aesthetic sense. The institute has a canopy of trees and plants to make the environment pollution free to safeguard the health of all the inmates. The trees provide shade and beautiful ambience. Utmost care is taken to develop and maintain green landscaping by trained gardeners and supervisor. The construction and maintenance team constituted in the college looks after the development and maintenance of the greenery in the campus. Photos taken during the audit are shown in figures 4-1 to 4-20.

Figure 4-1: Trees in front of new block - Picture 1

Figure 4-2: Trees in front of new block - Picture 2

Figure 4-3: Trees in front of new block - Picture 3

Figure 4-4: Plantations around new block - Picture 1

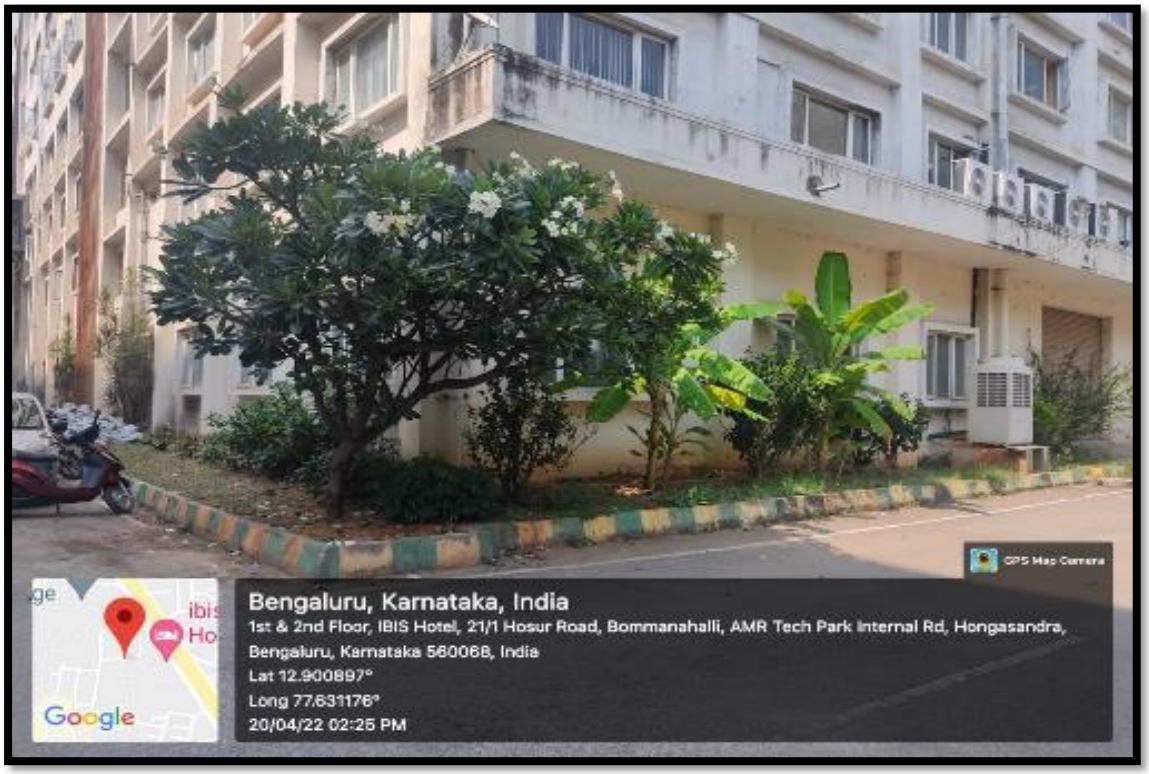


Figure 4-5: Plantations around new block - Picture 2

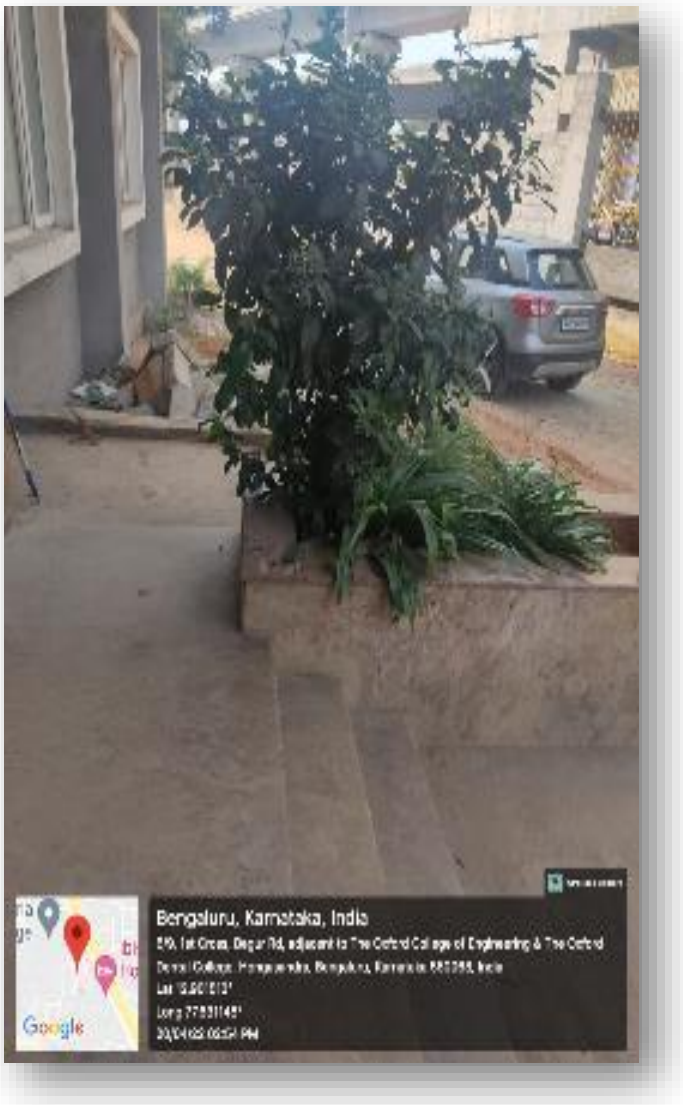


Figure 4-6: Plantations around new block - Picture 3

Figure 4-7: Plantations around new block - Picture 4

Figure 4-8: Trees near engineering old block - Picture 1

Figure 4-9: Trees near engineering old block - Picture 2

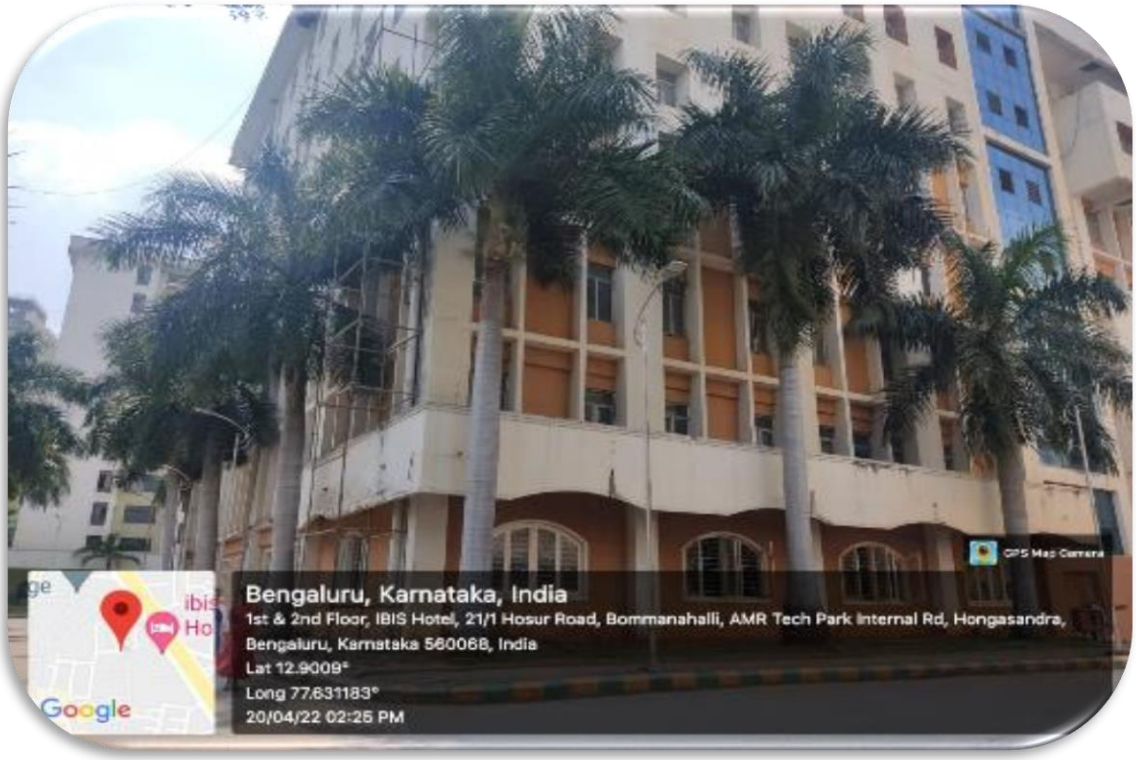


Figure 4-10: Trees near engineering old block - Picture 3

Figure 4-11: Plantations near STP collection tank - Picture 1

Figure 4-12: Plantations near STP area - Picture 2

Figure 4-13: Plantations near STP area - Picture 3

Figure 4-14: Plantations near STP area - Picture 4

Figure 4-15: Cafeteria Entrance

Figure 4-16: Trees near hostel block

Figure 4-17: Trees behind hostel block

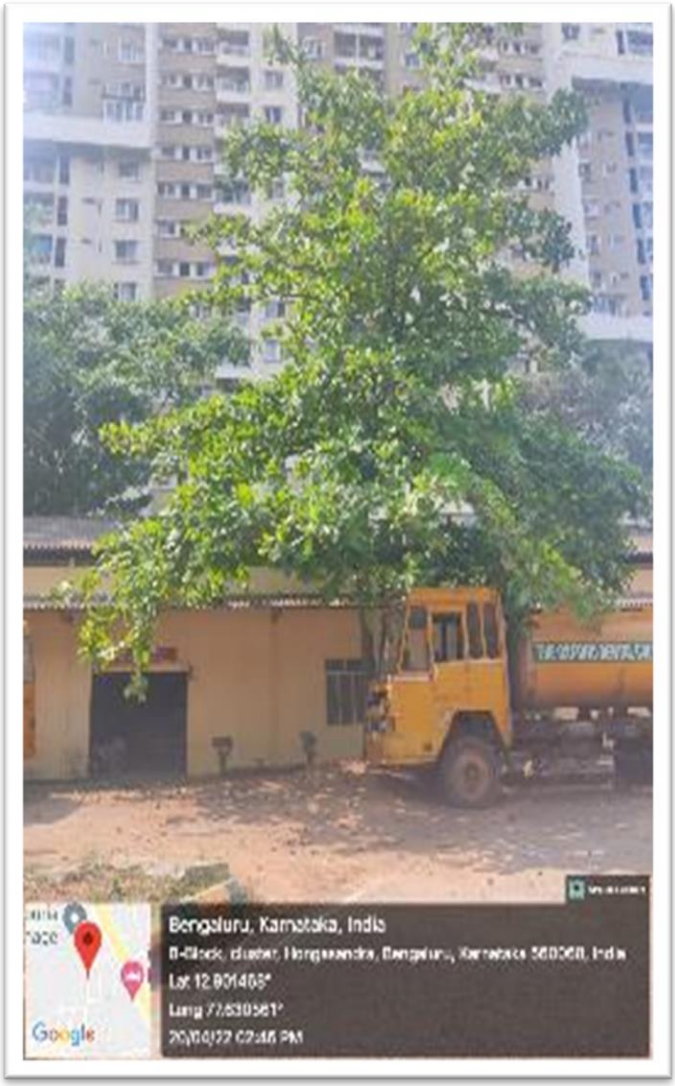


Figure 4-18: Tree near workshop area- Picture 1

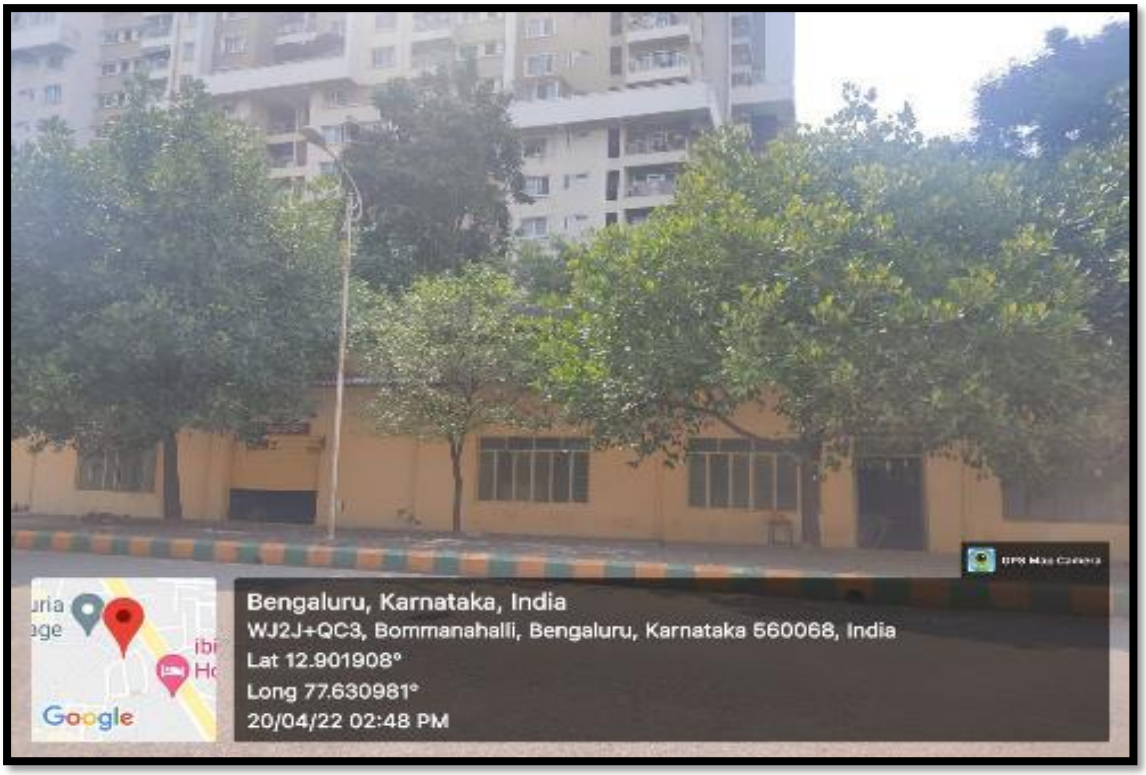


Figure 4-19: Tree near workshop area- Picture 2

Figure 4-20: Tree near workshop area- Picture 3

4.2. Best Practices Implemented for Green Campus Management

The maintenance staff members do periodic checks and maintain records for the same. Many initiatives are taken by the management to inculcate the eco-friendly culture among the student community. The green campus provides the facilities such as rain water harvesting, well grown trees, plantations and lawn all around the campus.

- Plastic free campus
- Green landscaping with trees, plants like vegetable, fruits and medicinal plants; lawns
- Paperless office: All communication regarding academics and administration are sent as e-mails and messages to faculty members and students that contributes paperless communication
- Apart from above, the maintenance of entire campus gardening is done regularly.

Environmental conscious administration, the management and the students of the college look after the environment carefully. Every year, during rainy season, tree plantation and carefully look after it. It's our own responsibility to preserve the work done on the campus related to the environment.

4.2.1. Purchase of gardening tools

To maintain the gardens, suitable gardening tools are required. Purchase of gardening tools are done whenever it is required.

The sample bill for purchase of gardening tools is shown in figure 4-21.

Figure 4-21: Sample bill -Purchase of gardening tools

4.2.2. Regular maintenance of greeneries

The greeneries within the campus are maintained properly with dedicated garden maintenance staff. They do proper maintenance like weeding, lawn care and watering etc., The sample image of garden maintenance is shown in figure 4-22.

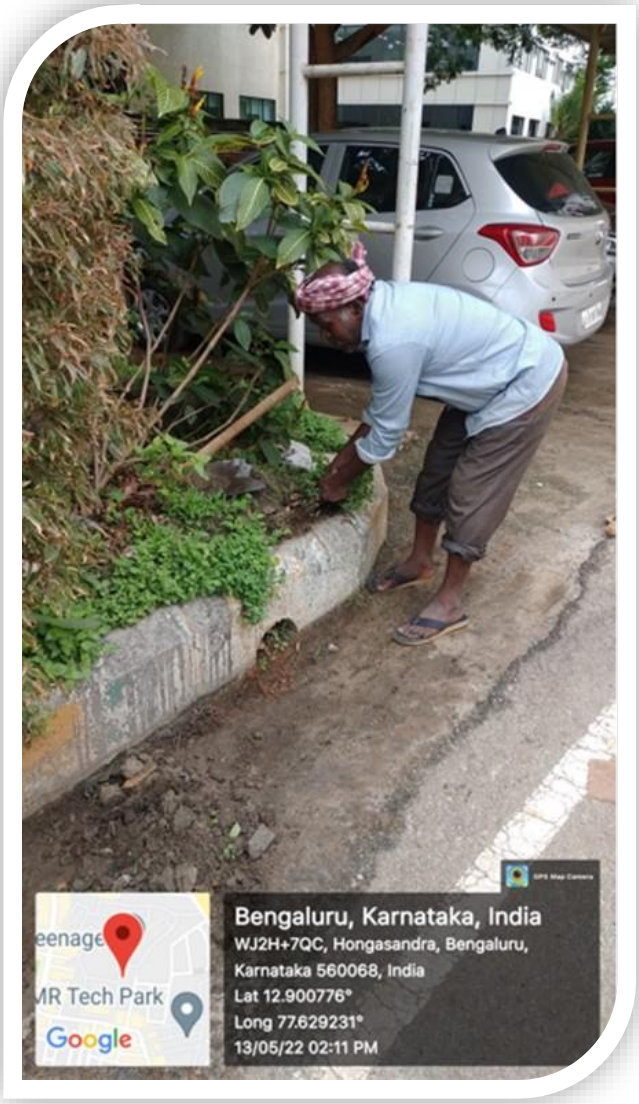


Figure 4-22: Garden maintenance activity

The sample image of payment made for gardening work during the year 2020 is shown in figure 4-23.

Figure 4-23: Sample payment voucher for gardening work - 2020

The sample image of payment made for gardening work during the year 2021 is shown in figure 4-24.

Figure 4-24: Sample payment voucher for gardening work - 2021

4.2.3. Dedicated watering system

The treated STP water is used for watering the trees and garden. For this purpose, dedicated pipeline is provided. Taps are provided at various locations to facilitate the watering of garden.

The tap near STP area for providing STP treated water to garden is shown in figure 4-25.

Figure 4-25: STP treated water tap for garden use- near STP area

The tap near engineering new block for providing STP treated water to garden is shown in figure 4-26.

Figure 4-26: STP treated water tap for garden use- near engineering new block

The tap near engineering old block for providing STP treated water to garden is shown in figure 4-27.

Figure 4-27: STP treated water tap for garden use- near engineering old block

4.2.4. Maintenance team

The college has a dedicated maintenance team for maintaining the greeneries. The perform maintenance activities such as cutting the grass, emptying bins, managing weed control, leaf raking, watering the greeneries etc.,

The list of gardeners is given in table 4-1.

S. No.	Name of the gardener
1	Mr. Savakayyal
2	Mr. Nagappa
3	Mr. Chennanarayannappa
4	Mr. Krishnappa

Table 4-1: List of gardeners

4.2.5. Awareness programs

Save the Earth by Plantation:

The Oxford College of Engineering, NSS students organized a program called 'Save the Earth by Plantation' on 10-10-2016. The topic discussed during the event is 'how to save the earth by green plantation'. Plantation were also made during the program.

The plantation activity during the event is shown in figure 4-28.

Figure 4-28: Save the Earth by Plantation - 2016

Tree Plantation under Green India - Clean India:

A Tree Plantation Drive under the Green India- Clean India was organized by NSS unit of The Oxford College of Engineering with MBA students in The Oxford college of Business management, HSR Layout, Bangalore on 04.01.2017. The drive was inaugurated by Shri SNVL Narasimha Raju Chairman and he elucidated the significance of a clean-surroundings to the students.

With a drive to create responsiveness among the students about the need of the green in the environment and the importance of trees in our nature, The program was organized. 110 Students with 15 faculty members and Principal planted saplings.

The image of tree plantation during the drive is shown in figure 4-29.

Figure 4-29: Tree plantation under Green India - Clean India -2017

The Special Camping Programme:

During the one-week special campaign programme by NSS students, the participants were assigned with task to clean the identified areas in the Thattanahalli village on 25.11.2018. NSS students with the help of Villagers, identified appropriate place for plantation of Herbal Drug plants and involved in the same. 50 NSS participants, 2 faculty members and few villagers have joined in this programme.

The sample image taken during plantation of herbal plants is shown in figure 4-30.

Figure 4-30: Plantation of Herbal Drug plants-2018

One Student One Tree -Plantation drive:

NSS Unit of The Oxford College of Engineering had conducted plantation drive in Begur Road as per the direction of Hon'ble HRD Minister Ramesh Pokriyal Nishank on **10th July 2019**. This program was launched a new campaign **"One Student One Tree"** in line with the Hon'ble Prime Minister Narendra Modi's idea of a green and healthy environment.

The Awareness Program was conducted in association with BrahmaKumaris Foundation by Ms B K Megha Deep, who was the speaker for the same. There were 100 students participated with 5 Faculty members in this event.

It was very informative Awareness session especially for the Students of our College. Director, Principal and the students were planted the saplings in our campus.

The sample image taken during the drive is shown in figure 4-31.

Figure 4-31: Plantation Drive-One Student One Tree-2019

Plantation of Trees:

An outreach program of "**Plantation of Trees**" was organized by Department of Electronics and Communication with the faculty coordinator Prof. Mohanthi K for 2nd semester students on **13th of July, 2021** at Ambalipura lake premises Bangalore.

The main aim of this program was to create an awareness of the importance of trees in our daily lives. The program successfully managed to bring the awareness of the effects of lack of tress and the importance of planting more trees. This program encouraged our students and the local residents to plant more trees in their locality and help balance the eco-system.

The invitation of the program is shown in figure 4-32.

Figure 4-32: Plantation of Trees - Invitation

The plantation of mango tree during the program is shown in figure 4-33.

Figure 4-33: Plantation of Mango tree - 2021

4.3. Recommendations on Green Campus Management

- Encouraging students to recommend creative ideas for making campus more greenery.
- Conducting competition among departments to promote student's ideas in sustainability initiatives.
- Indoor plantations and pot plantations in the corridors are recommended.

5. ANNEXURES

5.1. Data Collection Questionnaire

A questionnaire is a checklist used as the primary tool for the collection of data / information in a systematic manner that enables to perform the audit.

5.1.1. General information of the college:

General information of the college needs to be collected to get an overview of the campus for the walk-through purpose. It includes a set of questionnaires as given below.

1. Previous NAAC Grading's:

Previous NAAC Grading's of the college was collected from table 5-1.

S. No.	Phase	Grade	CGPA/Percentage	Year of Acc.	Acc. Period
1	I				
2	II				
3	III				

Table 5-1: NAAC grading's Table

2. Internal Quality Audit Team: 2020 – 2021

Table 5-2 depicts the format for the collection of Internal Quality Audit team.

S. No.	Name	Designation	Role
1			
2			
3			

Table 5-2: Internal Quality Audit team

3. General Information of the college

General information of the college includes an address of college and head office, contact person details, year of establishment etc., as given in table 5-3.

S. No.	Description	Details	
1.	Name of the College and address:		
1.a	Head office address :		
2.	Telephone/Fax No		
3.	Co-ordinating officer:	Name:	
		Mob:	
		Email:	
4.	Year of Establishment:		
5.	Hostel (Available/Not Available)		
6.	No. of Working days/year		
7.	Brief description of Campus		

Table 5-3: General information of the college

4. College Infrastructure

Infrastructure details of the college were gathered from table 5-4.

S. No.	Description	Details
1	Block Name	Class rooms
		Labs
		Staff rooms
		Wash rooms
2		
3		

Table 5-4: Detail Infrastructure of the college

5. Details of Student clubs
6. Details of cells that support students
7. Tentative Schedule of a working day:

a. No. of working days per year:
b. List of holidays:

8. Total area of the campus

9. Details of List of Departments and Courses (Faculty wise)

The total number of department, laboratories, conference hall, Libraries, Auditorium, and Cafeteria are obtained from table 5-5.

S. No.	Description	Details
1	Department	
2	Laboratories	
3	Conference Hall	
4	Libraries	
5	Auditorium	
6	Cafeteria	

Table 5-5: Details of the departments

10. Number of staff

Teaching, non-teaching, supporting staff with a male and female breakup is obtained from table 5-6

S. No.	Teaching Staff	Non-teaching Staff	Support Staff (Security, House Keeping)

	Male	Female	Male	Female	Male	Female

Table 5-6: Details of the Staff

11. Number of Students

Number of students is collected from table 5-7.

S. No.	Boys	Girls
1		

Table 5-7: Details of the Students

12. Additional infrastructure details have been collected from table 5-8.

S. No.	Description	Details	
1.	Number of blocks available for boys hostel	Nos.	
2.	Number of rooms available for boys hostel	Nos.	
3.	Number of blocks available for girls hostel	Nos.	
4.	Number of rooms available for girls hostel	Nos.	
5.	Whether Laundry is available in the hostel	Yes / No	
6.	If Yes List the Electrical Equipment in Laundry Section of the hostel (like Washing machine, Dry Cleaning Machine, Iron)		
7.	Whether gym/ indoor sports hall is available in hostel	Yes / No	
8.	Whether Solar PV based Power Generation is available in campus (academic or hostel block)	Yes / No	
9.	Whether lifts available in academic block	Yes / No	
10.	Whether Kitchen is available in the academic block	Yes / No	
11.	Whether any food counter (outside caterers) available in academic block	Yes / No	

12.	Whether any commercial shops available in academic block	Yes / No	
13.	Any more information or additional details of academic block you would like to share – kindly elaborate here		

Table 5-8: Details of the departments

5.1.2. Water Audit details:

1. General information

General information required for water management analysis is collected from table 5-9.

S. No.	Description	Details
1	Source of water	
2	Types of water	
3	No of Wells	
4	No of motors used	
5	No of bore wells	
6	Rating of the motors in HP	
7	Depth of each bore-well	
8	Water level of bore well	
9	Number of water tanks (overhead & underground tanks)	
10	Capacity of overhead tank	
11	Capacity of underground tank	
12	Quantity of water pumped every day	
13	Any water wastage of water /why?	
14	Water usage for gardening	
15	Waste water sources	
16	Use of waste water	
17	Faith of waste water from labs	
18	Whether waste water from labs mixed with ground water?	
19	Any treatment method available for lab water?	
20	Whether any green chemistry method practiced in labs?	
21	Total number of water coolers	
22	Whether Rain water harvesting system available?	
23	Whether Sewage Treatment Plant (STP) is available?	
24	List of equipment installed in STP (If S.No.23 is Yes)	
25	Whether Solar Hot Water System is available in the campus	

S. No.	Description	Details
26	Number of units and amount of water harvested	
27	Any leaky taps in the campus	
28	Amount of water lost per day	
29	Any water management plan used?	
30	Any water-saving techniques followed?	
31	Are there any signs reminding peoples to turn off the water?	
32	No. of water flow meters available	
33	Method of water consumption monitoring	
34	Breakup of daily water consumption	
35	Attach Month wise water bill for last 2 years	
36	Please attach recent water quality test reports for Bore well water, Drinking Water and STP processed water.	
37	What are the sources of hot water	
38	What are the usage areas of hot water	

Table 5-9: Water management details

2. STP information

STP details are collected from table 5-10

S. No.	Description	Details
1.	Number of STP plants installed	
2.	Capacity of STP	
3.	Technology of STP	
4.	Year of Installation	
5.	Schematic / Layout of STP	
6.	Water flow meters installed	
7.	Quantity of Sludge	
8.	Disposal of Sludge	

Table 5-10: Details of STP

3. RO Plant information

RO Plant details are obtained from table 5-11.

S. No.	Location	Quantity	Capacity
1.			
2.			

3.			

Table 5-11: Details of RO Plant

5.1.3. Energy consumption details:

1. Energy consumption details:

The energy consumption details required for the audit is collected, the brief format of the same is given in table 5-12.

S. No.	Type	Units		Value	Cost in Rs.
1	Electricity	kWh	2019		
			2020		
2	LPG	Cylinders			
3	Diesel	Litres (Month wise consumption for the last two years)			
4	Others resources (Please specify)				
5	Total connected load	kW			
6	Contract demand	kVA			
7	Maximum demand recorded	kVA			
8	Average power factor				
9	Energy charges	Rs./kWh			
10	Demand charges	Rs./kVA			
	*** Attach Electricity Bill Copy of last 2 years**				

Table 5-12: Details of Energy consumption

2. Solar Energy details:

The solar energy details required are collected from table 5-13.

S. No.	Building No./ Name	Solar water Heater			Solar PV System		
		Capacity	Working / Not working	Year of Installation	Capacity	Working / Not working	Year of Installation

Table 5-13: Details of Solar Energy

3. Solar Street lights details:

a. Quantity -
b. Capacity -
c. Year of Installation –

4. Electrical Equipment details:

Electrical Equipment like transformers DGs UPS Capacitor Bank, AC, Computers, water coolers, fans, exhaust fans are obtained from the table 5-14.

S. No.	Description	Details	
1.	Number of Transformers Installed	Nos.	
2.	Number of Electrical Panels / Electrical Panel Rooms	Nos.	
3.	Whether Diesel Generator Set Backup Power is Available	Yes / No	
4..	How many number of DG Sets available in the campus (If S.No.3 is Yes)	Nos.	
5.	Whether UPS is available for labs, computers and/or any equipment	Yes / No	
6.	Number of UPS installed with location and capacity (If S.No.5 is Yes)	Nos.	
7.	Whether Capacitor Banks is installed in the electrical panel rooms	Yes / No	
8..	Whether Air Conditioning Units have been installed in the campus	Yes / No	
9.	Type of AC units (split, cassette or packaged) available, capacity and installed location (If S.No.8 is Yes)	Nos.	
10.	Total number of computers available in the campus	Nos.	
11.	Type of computer monitors available (CRT, LCD, LED)	Nos.	
12.	Whether water coolers are installed in the academic blocks	Yes/No	

S. No.	Description	Details	
13.	Type of lamps (Fluorescent Tube Light, CFL, LED, Incandescent, Sodium / Mercury lamps, etc.,) installed in the campus	Nos.	
14.	Type of fans (ceiling, wall mount, standing, exhaust, etc.,) installed in the campus	Nos.	
15.	Whether exhaust fans are installed in hostel / kitchen.(If Yes, share the quantity and installed location)	Yes /No	
16.	Any other electrical equipment's in college buildings.		

Table 5-14: Details of Electrical Equipment

5. List of energy saving initiatives implemented
6. List of energy saving initiatives in plan for future

5.1.4. Waste management details:

Waste management includes the activities and actions required to manage waste from its inception to its final disposal. The various data/ information required for the assessment of waste management is as collected from the following set of questionnaires.

1. Basic information

Basic information for waste management is collected from table 5-15.

S. No.	Description	Yes/ No
1	Whether wet and dry garbage segregation is done inside the campus?	
2	Whether garbage is given to external agencies / municipal agencies?	

Table 5-15: Basic details of waste management

2. Types of Waste generated

Types of waste generated in the college are obtained from table 5-16.

S. No.	Description	Yes / No	Remarks
1	E-Waste (Computers, electrical and electronic parts)		
2	Hazardous / Chemical Waste		
3	Solid Waste (Damaged furniture, paper waste, paper plates)		
4	Dry Leaves		
5	Food Waste		
6	Waste Water (Washing, urinals, bathrooms)		
7	Glass Waste (Broken glass wares from the labs)		
8	Unused Materials		
9	Plastic Waste (Pen, Refill, Plastic water bottles and other plastic containers, wrappers etc.)		

Table 5-16: Types of waste generated

3. Segregation of waste

Segregation of waste information at different locations with quantity is gathered from table 5-17.

S. No.	Location	Bio-degradable	Non-Biodegradable	E-waste	Quantity, kgs/month
1	Office				
2	Labs				
3	Cafeteria / Kitchen				
4	College				

Table 5-17: Segregation of waste

4. Waste generation management

Waste generation management of the college was collected from table 5-18

S. No.	Description	Yes / No	Remarks
1	Composting / Vermicomposting		
2	Recycling		
3	Reusing		
4	Other ways		

Table 5-18: Waste Disposal methods

5.1.5. Green campus management details:

1. Total number of plants and trees

The total number of plantations, garden area, and many more are collected as per the set of questionnaires given in table 5-19

S. No	Description	Details
1	Total number of plant species identified	
2	Total number of plants on the campus	
3	Total number of Trees on the campus	
4	Garden area inside the college –	
5	Total number of medicinal plants /trees on the campus	
6	Total number of vegetables and fruits plantation in the campus	
7	Whether display boards are given to plants and trees for identification	

8	Does Institute celebrate World environment day?	
9	Does Institute celebrate World water day?	
10	Does Institute celebrate World ozone day?	
11	Does Institute celebrate World Earth day?	
12	Total number of aquatic water plants	

Table 5-19: List of plantation details

2. List of plants/ trees

List of plants/ trees with their scientific names obtained from table 5-20.

S. No.	Common/Local Name	Scientific name	No. of Trees/Plants

Table 5-20: List of plants/trees in campus

5.1.6. Carbon footprint management details:

The carbon emission from various activities such as transport, diesel generator usage, LPG consumption, and electricity consumption were collected, as per table 5-21.

S. No	Description	Details
1	Whether college provides transport facility for staff and students (Yes/No)	
2	Number (or Percentage) of staff using transport services provided by college	
3	Number (or Percentage) of students using transport services provided by college	
4	Number (or Percentage) of Staff using public transport	
5	Number (or Percentage) of Staff using Bike	
6	Number (or Percentage) of Staff using Car	
7	Number (or Percentage) of students using Public transport	
8	Number (or Percentage) of students using Car	
9	Number (or Percentage) of students using Bike	
10	Number (or Percentage) of students using Bicycles	
11	Average consumption of diesel per month	
12	Average electricity consumption per month	
13	Average LPG consumption per month	

Table 5-21: Details of Carbon footprint management

5.1.7. Photos required for Audit:

1. General Photos

In various sections, different types of photos are required to validate the existence of things, and hence they are collected from table 5-22.

S. No	Description	Details
1	Photos of student's NSS activities	
2	Photos of Safety policy	
3	Photos of the training program on the use of fire extinguishers	
4	Photos of environmental policies adopted by college	
5	Photos of MoUs for Waste management	

6	Photos of any other policies adopted by college		
7	Photos of water test report	Drinking Water	
		STP processed water	
		Bore-well water	
		Other water Sources (Like Tanker water and any other)	
8	Photos of use of Energy efficient devices like fan, bulbs etc.		
9	Photos of LCD/LED monitors used in Labs		
10	Photos of dry and wet waste collection bins		
11	Photos of celebrating World Environment Day		
12	Photos of celebrating World Water Day		
13	Photos of celebrating World Earth Day		
14	Photos of celebrating World Ozone Day		

Table 5-22: List of photos

QUALITY AUDIT REPORT

ON

ENERGY AUDIT

OF

THE OXFORD COLLEGE OF ENGINEERING

10TH MILESTONE, BOMMANAHALLI, HOSUR ROAD,

BANGALORE - 560 068

2016 - 17 TO 2020 - 21

ECO ENERGIME ENGINEERS LLP

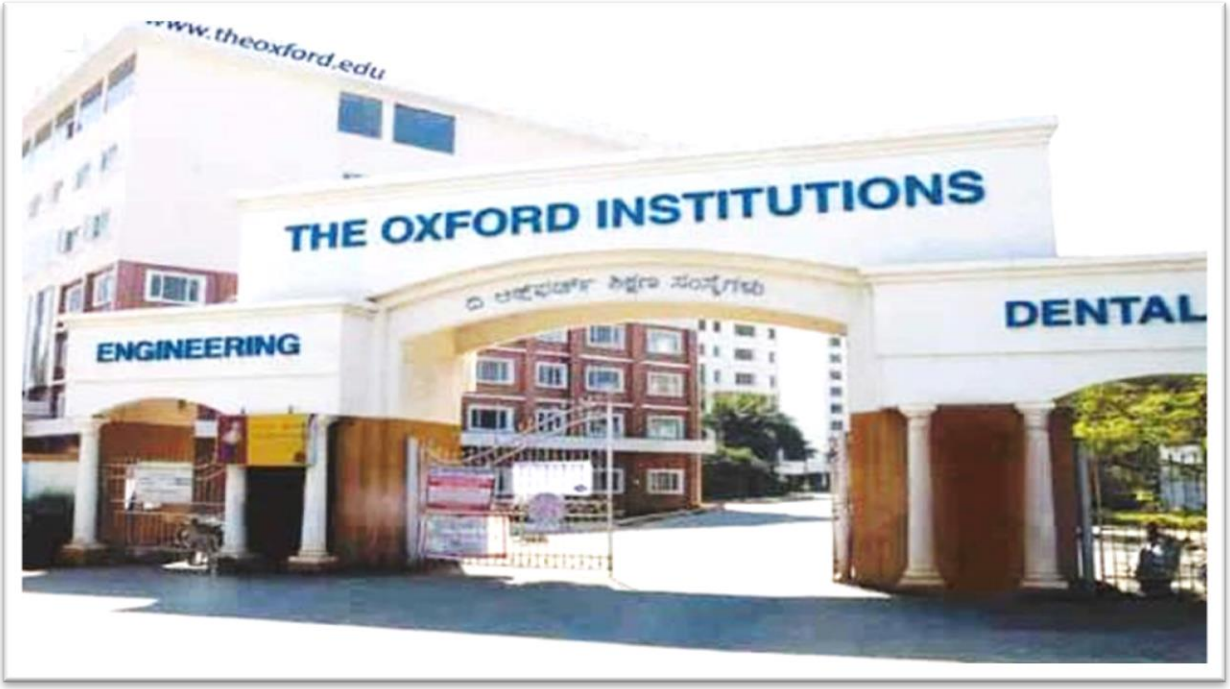
ENHANCING RESOURCE EFFICIENCY

QUALITY AUDIT REPORT

OF

'THE OXFORD COLLEGE OF ENGINEERING'

10TH MILESTONE, BOMMANAHALLI, HOSUR ROAD, BANGALORE - 560 068



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We are thankful to the management of **The Oxford College of Engineering, Bengaluru,** for the support, guidance and, giving us the opportunity to be involved in this very interesting and challenging assignment.

We would be happy to provide any further clarifications, if required, to facilitate the implementation of the recommendations.

We received full co-operation and support from the concerned personnel/ staff members of the college. We would like to thank:

Chairman – The Oxford Educational Institutions

The Oxford College of Engineering

And other Staff in personnel who have given full co-operation and support. They took a keen interest and gave valuable inputs during the course of study.

Certificate

of Completion

This is to certify that

The Oxford College of Engineering, Bommanahalli, Bengaluru

has successfully completed

Energy Audit

The study was conducted by

Eco Energime Engineers LLP, Bengaluru.

Start Date : 01.10.2020
End Date : 07.10.2020

Date Of Issue : 24.11.2020
Valid Till : 23.11.2021

Aparna R.

Aparna Reddy
Director
EEELLP

A.Govindaraj
Director
EEELLP

Smart Solutions for Sustainable Tomorrow

Issued by Eco Energime Engineers LLP, Bangalore.
www.eeellp.com

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Our special thanks are due to Principal & Team of colleagues for giving us necessary inputs to carry out this very vital exercise. We would like to thank all the head of the departments and staff members who were actively involved while collecting the data and conducting field measurements.

DISCLAIMER

The Audit Team has prepared this report for The Oxford College of Engineering, Bengaluru based on the input data submitted by the representatives of college complemented with the best judgment capacity of the expert team.

While all reasonable care has been taken in its preparation, details contained in this report have been compiled in good faith based on information gathered.

It is further informed that the recommendations are arrived following best judgments and no representation, warranty or undertaking, express or implied is made and no responsibility is accepted by Audit Team in this report or for any direct or consequential loss arising from any use of the information, statements or forecasts in the report.

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ABBREVIATION AND ACRONYMS

1.	A	:	Amperes
2.	AC	:	Air Conditioner
3.	APFC	:	Automatic Power Factor Controller
4.	AMF	:	Automatic Mains Failure
5.	BBMP	:	Bruhat Bengaluru Mahanagara Palike
6.	BESCOM	:	Bangalore Electricity Supply Company
7.	BWSSB	:	Bangalore Water Supply and Sewerage Board
8.	CC Camera	:	Closed Circuit Camera
9.	DG	:	Diesel Generators
10.	EE Fan	:	Energy Efficient Fan
11.	E-Waste	:	Electronic Waste
12.	FTL	:	Fluorescent Tube Light
13.	GHG	:	Green House Gas
14.	Hz	:	Hertz
15.	HP	:	Horse Power
16.	HT	:	High Tension
17.	I	:	Current
18.	ICT	:	Information and Communications Technology
19.	IQAC	:	Internal Quality Assurance Cell
20.	ISO	:	International Organization for Standardization
21.	kgs	:	Kilograms
22.	kL	:	Kilo Liters
23.	kV	:	kilo volt
24.	kVA	:	kilo volt ampere
25.	kVAr	:	Reactive kilo volt ampere
26.	kW	:	Kilo Watt
27.	kWh	:	kilo Watt hour
28.	kWp	:	kilo Watt peak
29.	LCD	:	Liquid Crystal Display
30.	LED	:	Light Emitting Diode
31.	LT	:	Low Tension
32.	mA	:	Milli Amperes
33.	MoU	:	Memorandum of Understanding
34.	NA	:	Not Applicable
35.	NAAC	:	National Assessment and Accreditation Council
36.	NSS	:	National Service Scheme
37.	OHT	:	Over Head Tank
38.	Prim/Sec	:	Primary/Secondary
39.	PF	:	Power factor
40.	Ph.D.	:	Doctor of Philosophy

41.	PV	:	Photo Voltaic
42.	RCC	:	Reinforced Cement Concrete
43.	RO	:	Reverse Osmosis
44.	RR. No.	:	Revenue Register Number.
45.	Sq. Ft.	:	Square Feet
46.	Sq.m.	:	Square Meter
47.	SRTPV	:	Solar Roof Top Photo Voltaic
48.	TL	:	Tube Light
49.	TR	:	Ton of Refrigeration
50.	TV	:	Television
51.	V	:	Volts
52.	W	:	Watts
53.	Wi-Fi	:	Wireless Fidelity
54.	Wp	:	Watt peak
55.	#	:	Number

1. INTRODUCTION

The Oxford College of Engineering was started in the year 2000, is one of the most prestigious institutions in Bengaluru that provides quality teaching and training in professional UG courses in 10 streams of Engineering in, Computer Science, AIML, Electronics and Communication, Electrical and Electronics, Mechanical, Civil, Bio-Technology, Mechatronics & Automobile. College also offers 10 Postgraduate programs in Technology (M. Tech), Computer Application (MCA) and Business Administration (MBA), and 11 Research centers recognized by VTU to offer Ph.D. programs. College is affiliated with the Visvesvaraya Technological University (VTU) and approved by the All-India Council for Technical Education (AICTE). The college also has been accredited by the NBA, and IAO quality-assessed organizations. The Institute name is also included in the NIRF & AICTE CII Survey of Industry Linked Technical Institute- 2020. Institution is categorized in Band promising in ARIIA ranking in the year 2021. The college is set in a sprawling 11.5 acres campus in the prestigious IT corridor, ideal for education in a serene environment with over 85,000 square meters of built-up area spread over 2 blocks, with enormous investment for academic purposes. The college has well equipped with state-of-the-art infrastructure facilities to carry out various real-time projects, research, and consultancy activities in recent technologies. All the Departments have undertaken many research/consultancy projects funded both by multinationals and government agencies. The college has a good number of research publications in various reputed journals and patents. College has a good number of R&D projects sponsored by AICTE, VGST, VTU, IEEE, ICMR BRNS, NIF, NRB(DRDO) & BIRAC. It has a history of excellent placement track record in various multinational companies' offers with high salary packages.

VISION

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

MISSION

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

QUALITY POLICY

To equip the students with highest standard of education, knowledge and ethics. To prepare them to meet the challenges of life with full confidence. Aim at all round development of the personality to be useful citizens.

Campus Area and Built-up area

The area of the campus (built up and total) area is given in table 1-1.

S. No.	Description	Units	Details
1	Engineering Campus total area	Acres	11.5
2	Built up area	Sq. mt.	85,000

Table 1-1: College Area

Committee and Cells

The Oxford College of Engineering (TOCE) has various functional committees and cells. They are listed below:

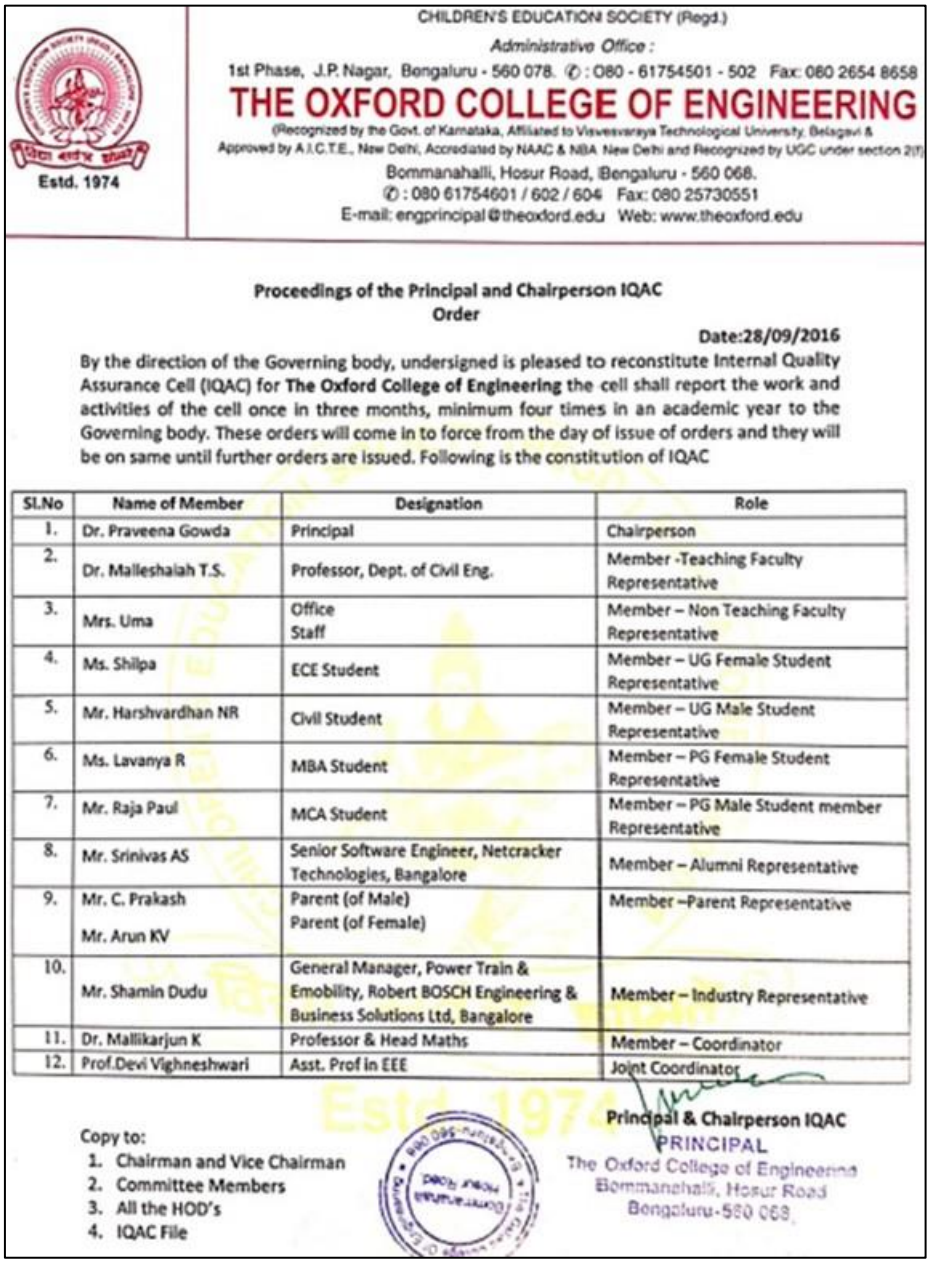
- VTU/AICTE Committee
- Planning & Accreditation Committee
- Library Committee
- Research and Development Committee
- Training & Placement Committee
- Faculty Development Committee
- Purchase & Budget Committee
- College Magazine/Calendar /Newsletter Committee
- Professional Societies / Chapters
- Cultural Association
- Alumni Association

- Sports Committee
- NSS
- Students Grievances Redressal Committee
- Discipline Committee
- Women's Grievance Redressal Committee
- Anti-sexual Harassment Committee
- Entrepreneurship & Incubation cell
- Anti-Ragging Committee
- Website, Server & Internet Committee
- Public Relation Committee
- Hostel & Canteen Committee
- Prevention of Caste Based Discrimination Cell
- College Internal Complaints Committee
- Internal Task Force Team - COVID 19 Coordination Committee
- Internal Quality Assurance Cell (IQAC)
- Exam Cell
- Disability Recourse Centre
- IPR Cell
- IA Answer Scripts Evaluation Review Committee
- IA Question Paper Scrutiny Committee

Internal Quality Assurance Cell (IQAC)

The college management constitutes the Internal Quality Assurance Cell including Principal, teaching faculty, non-teaching faculty, UG students (Male & Female), PG students (Male & Female), alumni, parent and industry representatives every year.

The list of Internal Quality Assurance Cell members for the academic year 2016-2017 is shown in figure 1-1.



CHILDREN'S EDUCATION SOCIETY (Regd.)

Administrative Office :

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THE OXFORD COLLEGE OF ENGINEERING

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✆ : 080 61754601 / 602 / 604 Fax: 080 25730551

E-mail: engprincipal@theoxford.edu Web: www.theoxford.edu

Proceedings of the Principal and Chairperson IQAC

Order

Date:28/09/2016

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1.	Dr. Praveena Gowda	Principal	Chairperson
2.	Dr. Malleshaiah T.S.	Professor, Dept. of Civil Eng.	Member -Teaching Faculty Representative
3.	Mrs. Uma	Office Staff	Member – Non Teaching Faculty Representative
4.	Ms. Shilpa	ECE Student	Member – UG Female Student Representative
5.	Mr. Harshvardhan NR	Civil Student	Member – UG Male Student Representative
6.	Ms. Lavanya R	MBA Student	Member – PG Female Student Representative
7.	Mr. Raja Paul	MCA Student	Member – PG Male Student member Representative
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11.	Dr. Mallikarjun K	Professor & Head Maths	Member – Coordinator
12.	Prof.Devi Vighneshwari	Asst. Prof in EEE	Joint Coordinator

Principal & Chairperson IQAC

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The Oxford College of Engineering

Bommanahalli, Hosur Road

Bengaluru-560 068

Copy to:

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2. Committee Members
3. All the HOD's
4. IQAC File

Figure 1-1: List of IQAC members 2016-2017

The list of Internal Quality Assurance Cell members for the academic year 2017-2018 is shown in figure 1-2.

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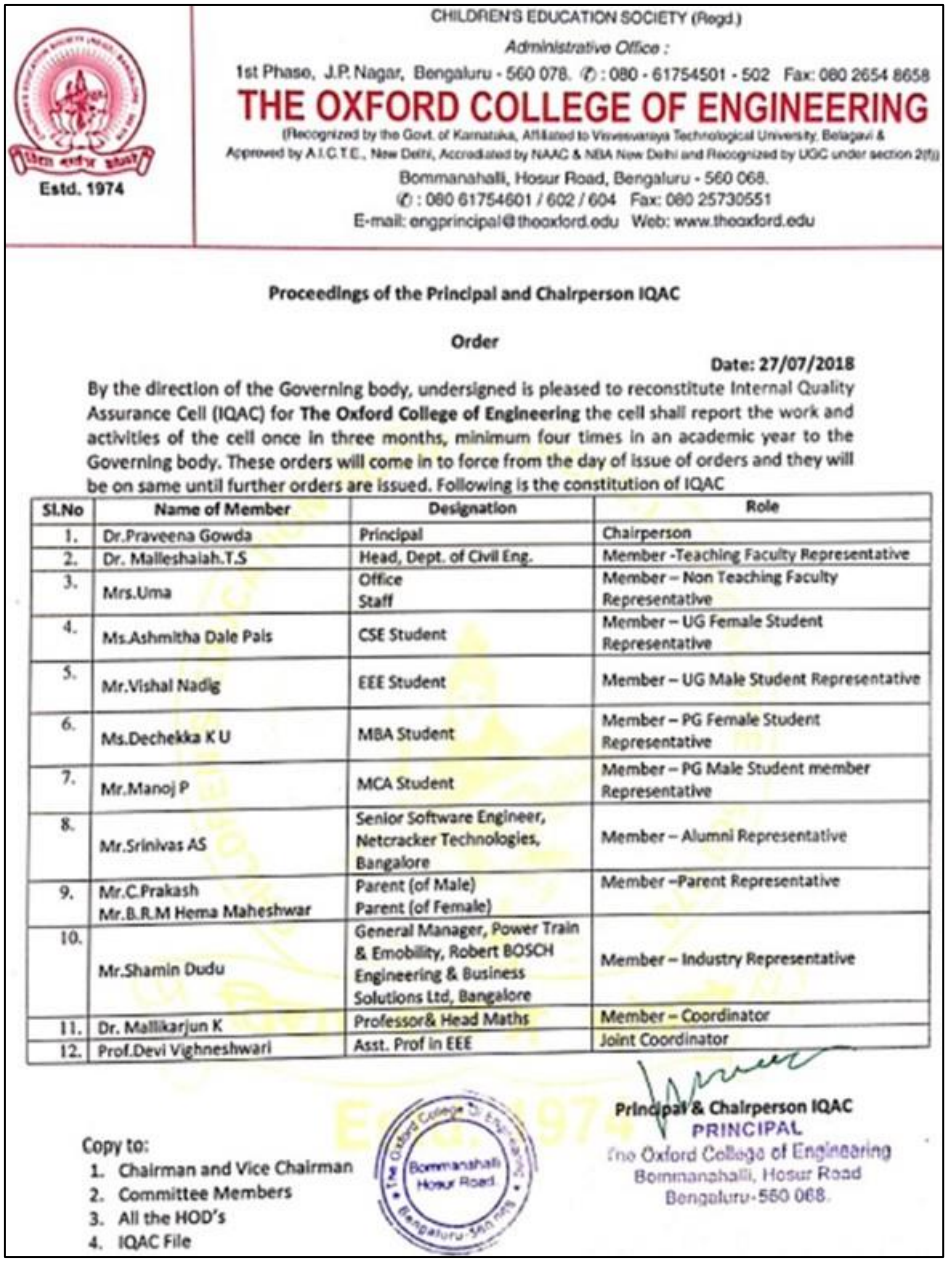
Figure 1-2: List of IQAC members 2017-2018

The list of Internal Quality Assurance Cell members for the academic year 2018-2019 is shown in figure 1-3.



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5.	Mr.Vishal Nadig	EEE Student	Member – UG Male Student Representative
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Figure 1-3: List of IQAC members 2018-2019

The list of Internal Quality Assurance Cell members for the academic year 2019-2020 is shown in figure 1-4.

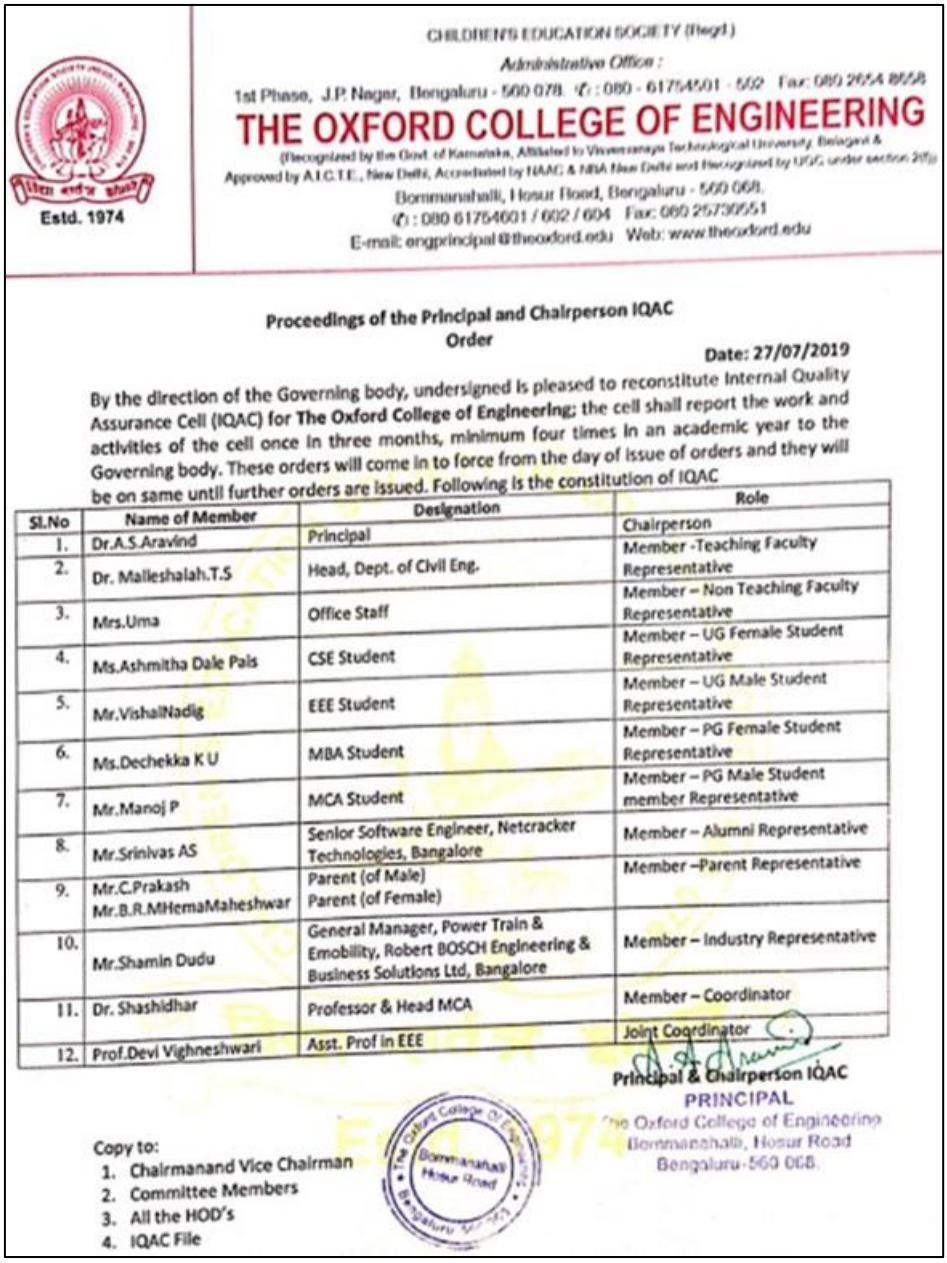

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Figure 1-4: List of IQAC members 2019-2020

The list of Internal Quality Assurance Cell members for the academic year 2020-2021 is shown in figure 1-5.

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The Oxford College of Engineering Bommanahalli Hosur Road

Principal & Chairperson IQAC

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Figure 1-5: List of IQAC members 2020-2021

Overview of Quality Audit:

Quality Audit helps college / facility to:

- Understand the usage of electricity, water and other natural resources
- Identify opportunities to conserve various natural resources
- Identify various technological improvements
- Evaluate the techno-commercial of identified conservative measures
- Create awareness among the students and staff
- Disseminate the commitment of management towards saving nature
- Develop a culture among students, staff and management to be socially responsible

2. PRE – AUDIT PHASE

A Pre-audit meeting is a prerequisite for the audit, it helps to meet and discuss about the schedule and documents required during the audit. The pre-audit meeting was conducted at The Oxford College of Engineering. During the meeting, introduction of team members, scope and objectives of the audit were discussed.

Management Commitment

The Management of the college has shown great commitment towards Quality Audit during the pre-audit meeting. They were ready to encourage all green activities. It is decided to promote all activities that are environment friendly such as awareness programmes on the environment, campus farming, planting more trees on the campus etc., after the Quality Auditing.

College administration is vital to the process of realizing campus sustainability, and college policy is an essential instrument for any substantial change in the campus environment.

Scope and Goals of Quality Auditing

A clean and healthy environment aids effective learning and provides conducive learning environment. There are various efforts around the world to address environmental education issues. Quality auditing is one among them for educational institutions.

Once a baseline is established, the data can serve as a point of departure for further action in campus greening. Existing data will allow the college to compare its programs and operations with those of peer institutions, identify areas in need of improvement, and prioritize the implementation of future projects.

This data will also provide a basis for calculating the economic benefits of resource conservation projects, by establishing the current rates of resource use and their associated costs. This audit initiative focused initially on educating colleges and universities through workshops, guidebooks, fact sheets and ensuring compliance through inspections and self-audits.

3. ON-SITE AUDIT PHASE

3.1. Scope / Target Areas of Quality Auditing

3.1.1. Water Audit

Water Audit addresses water consumption, water sources, appliances and fixtures. Aquifer depletion and water contamination are taking place at unprecedented rates. It is therefore essential that any environmentally responsible institution should examine its water use practices.

3.1.2. Energy Audit

Energy Audit addresses energy consumption, energy sources, energy monitoring, lighting, appliances, and vehicles. Energy use is clearly an important aspect of campus sustainability.

3.1.3. Waste Management Audit

Waste Audit addresses waste production and disposal, plastic waste, paper waste, food waste, and recycling. Municipal solid waste has a number of adverse environmental impacts, most of which are well known and not in need of elaboration.

3.1.4. Green Campus Management Audit

Green campus initiatives are becoming an integral part of modern day's university systems. Green campus Audit helps in maintaining the air and water clean. It regulates the climatic conditions and provides a healthy and comfortable environment for living.

3.1.5. Environment Footprint Audit

Environment Footprint Audit addresses the usage of fossil fuels (coal, diesel, petrol and gas). The mode of commute to and from college each day has an impact on the environment through the emission of greenhouse gases into the atmosphere by the burning of fossil fuels.

3.2. Audit Methodology and Approach

The methodology and approach adopted for the study involve various steps that include:

- Review of Document and records
- Review of Policies
- Review of MoU
- Review of various measures implemented
- Site Walkthrough
- Data Collection
- Interviews

3.2.1. Review of Document and Records

The various documents and records such as:

- Electricity bills
- Water bills
- Equipment registers
- List of appliances
- Internal Quality Audit document
- Purchase document
- Cash payment receipts
- Equipment service report
- Maintenance and service payment receipts

were reviewed and, relevant data and inputs required for analysis have been collected.

3.2.2. Review of Policies

College has various policies that include safety policy and Anti-ragging policy.

A. Safety Policy:

All the students, teaching staff, non-teaching staff, maintenance and house-keeping staff have been given training to use fire extinguishers in emergency situations of fire and explosion. Fire hydrant system is available at the campus. Also, fire extinguishing cylinders have been installed in each floor and in laboratory areas. Fire order statements and use of fire extinguisher has been posted at each block. Fire alarm is also installed at the premises. Photos of fire order and fire alarm are shown in figure 3-1 and 3-2.

Figure 3-1: Fire order displayed at college premises

Figure 3-2: Fire alarm panel at engineering old block

B. Anti-Ragging policy:

Ragging in all its forms shall be totally banned in the entire institution, including its departments, constituent units, all its premises (academic, hostel, sports, canteen, etc.) whether located within the campus or outside and in all means of transportation of students whether public or private. **'Say No to Ragging'** poster is placed in each block of the campus and a sample photo is as shown in the figure 3-3.

Figure 3-3: Anti-ragging poster

3.2.3. Review of various measures implemented

During the Quality Audit study, it was observed the college has taken various initiatives in conserving natural resources that include:

- Internal Quality Assurance Cell including Staff, Students, Alumni, parents and industrial members.
- Installation of Solar Roof Top Photo Voltaic (SRTPV) system for power generation.
- Wheeling to grid is done.
- Installation of LED fixtures to reduce electricity consumption
- Installation of LCD/LED monitors for all the desktops to conserve electricity
- Switching OFF lights and fans whenever not in use to save electricity
- Installation of RO plant to provide purified drinking water.
- Dual water piping system for washrooms and toilets, to use STP treated water for flushing
- Sewage treatment and using the treated final water for toilet flushing, gardening and cleaning purposes
- Rain water harvesting system is available in the campus.
- Regular testing of STP treated water quality parameters
- Dedicated watering system for greeneries.
- The use of sign boards in all the wash rooms were observed, to create awareness for water conservation
- Installation of waste segregation bins at all the rooms to separate the dry and wet waste
- Maintenance of logbooks and registers is done properly.
- Training is conducted on regular basis regarding usage of fire extinguisher, conservation of resources such as electricity, water, food and green campus.
- Maintenance team is available for electrical, plumbing, waste management and green campus management.

3.2.4. Site walk through

Site walk through was conducted with staff members, students and audit team members. Staff and students have shown very keen interest in the data collection process and methods to be followed in field data collection. The staff and students have given inputs and suggestions for resource conservation as well.

College Infrastructure

The Oxford College of Engineering campus has various blocks and departments. Each floor has state of the art class rooms, staff rooms, laboratories, libraries and many more. Details of infrastructure are as follows:

- Inhouse hostel for boys and girls
- Bank facility
- 24 hrs. atm in the campus
- Solar plant
- Rain water harvesting
- RO water facility
- Lifts & ramps
- Cafeteria
- Gymnasium
- Cricket stadium / basketball court / badminton court
- Wi-Fi facility in the campus
- CCTV security
- Telephone and fax facility
- Photocopying facility
- The oxford enterprises (stationery)
- Library

- Digital library
- Extended library hours
- Hospital facility
- Free dental treatment
- First aid, medical and counseling facility
- Scholarships
- Group insurance
- Placements
- Placements training
- English language coaching
- Add-on courses
- Cloud based ERP for students
- Transport
- Parking facility
- Cultural activities center
- Incubation Centre for research activity
- Staff room
- Smart class rooms
- Conference room
- Student common room
- Green campus

3.2.5. Inventory Collection

To understand the types of appliances used, inventory collection was carried out by the audit team members. The various types of appliances used are lights, fans, computers, projectors, printers, scanners etc., The consolidated list of inventories is given in table 3-1.

S. No.	Dept	Florescent Tube Light		LED		CFL	Fan		Computer		Exhaust Fans	Scanners	Printers	Xerox Machine	CC Camera	TV Screen	Projector	AC	Refridgerator
		40 W	MOR (36W)	18W Tube	12 W		Ceiling Fan	Wall mount Fan	LED /LCD Monito	CRT Monitors									
1	AUTO ENGG	64	0	12	0	0	26	6	5	0	0	1	2	0	0	0	1	0	
2	BT	86	0	0	0	0	42	0	10	9	2	2	2	2	8	0	1	2	4
3	Chemistry	0	0	17	0	0	12	0	0	0	0	0	0	0	0	0	0	0	
4	CSE	52	0	141	0	0	59	13	3	218	0	0	0	4	0	12	0	5	1
5	Civil	52	0	16	0	0	56	4	30	0	0	1	3	0	0	0	0	0	
6	ECE	81	0	0	0	0	44	11	48	0	3	0	4	0	7	0	3	1	
7	EEE	48	2	0	6	0	54	2	41	0	0	0	2	0	7	0	1	0	0
8	ISE	34	0	77	0	0	29	5	128	0	0	0	2	0	0	0	1	0	
9	Library	0	45	0	0	0	53	0	30	0	0	1	1	0	0	0	0	0	
10	Maths	16	0	0	0	0	14	1	5	0	0	0	7	0	0	0	0	0	
11	MBA	39	0	0	0	96	42	0	16	0	0	0	2	0	0	0	3	3	
12	MCA	51	0	0	0	0	31	0	242	0	0	0	2	0	3	0	0	9	
13	MECH	89	0	0	0	0	59	0	84	0	2	0	2	0	5	2	3	0	
14	MTE	24	0	0	0	0	19	0	3	0	0	0	1	0	4	0	1	0	
15	PHYSICS	39	0	0	0	0	27	1	2	0	0	0	1	0	6	0	0	0	
Total (College)		675	47	263	6	96	567	43	647	227	7	5	31	6	40	14	14	20	5
Total(Hostel)		413	0	71	0	0	431	0	1	0	0	0	1	0	0	0	0	0	0
Total (Overall)		1088	47	334	6	96	998	43	648	227	7	5	32	6	40	14	14	20	5

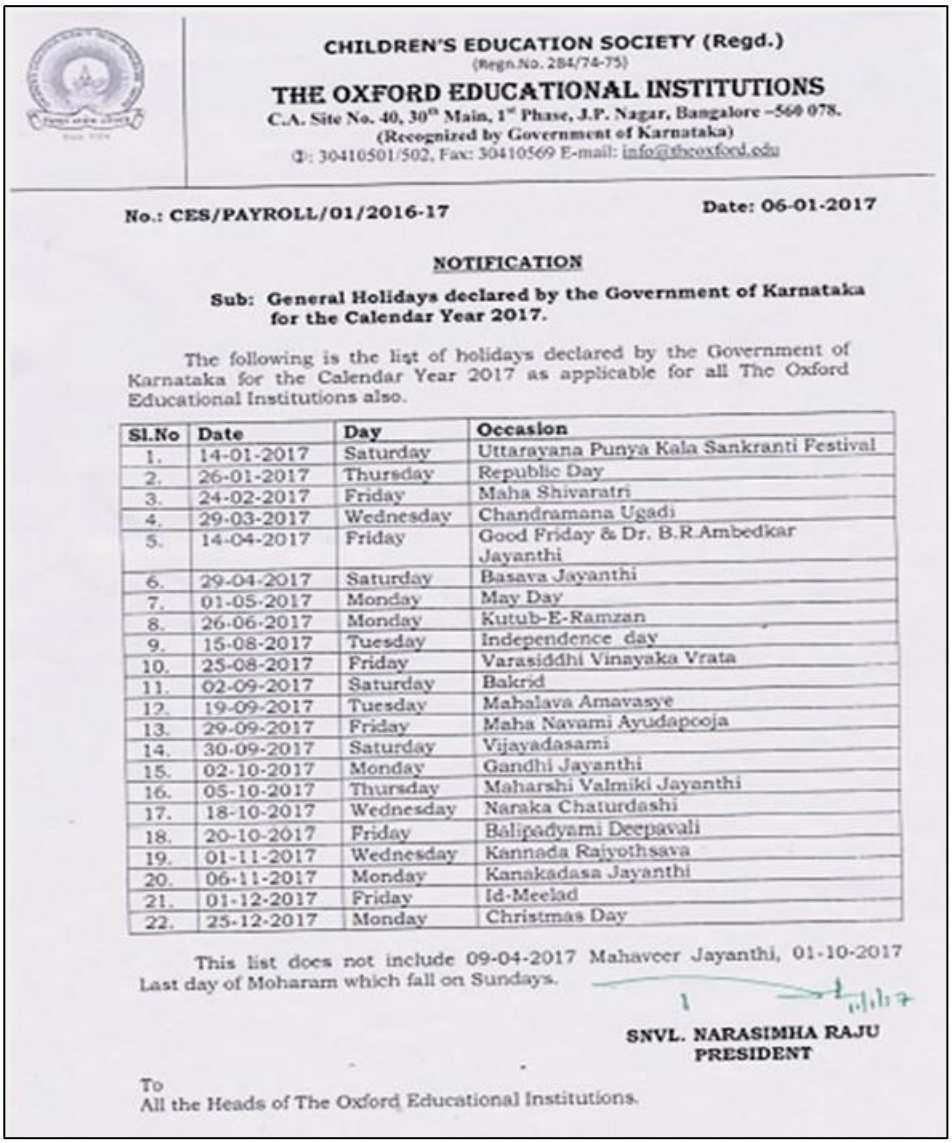
Table 3-1: Consolidated list of inventories

3.2.6. Interviews

To collect the various data, information and operating patterns, interviews were conducted with college staff (Principal, teaching staff, non-teaching staff) and students. The consolidated information from the interviews is given in the following sub-sections.

3.2.6.1. List of Holidays:

The lists of holidays were collected during the study and the same is given below. The list of holidays for the year 2017 is shown in figure 3-4.



CHILDREN'S EDUCATION SOCIETY (Regd.)
(Regn.No. 284/74-75)
THE OXFORD EDUCATIONAL INSTITUTIONS
C.A. Site No. 40, 30th Main, 1st Phase, J.P. Nagar, Bangalore –560 078.
(Recognized by Government of Karnataka)
✆: 30410501/502, Fax: 30410569 E-mail: info@theoxford.edu

No.: CES/PAYROLL/01/2016-17 Date: 06-01-2017

NOTIFICATION

Sub: General Holidays declared by the Government of Karnataka for the Calendar Year 2017.

The following is the list of holidays declared by the Government of Karnataka for the Calendar Year 2017 as applicable for all The Oxford Educational Institutions also.

Sl.No	Date	Day	Occasion
1.	14-01-2017	Saturday	Uttarayana Punya Kala Sankranti Festival
2.	26-01-2017	Thursday	Republic Day
3.	24-02-2017	Friday	Maha Shivaratri
4.	29-03-2017	Wednesday	Chandramana Ugadi
5.	14-04-2017	Friday	Good Friday & Dr. B.R.Ambedkar Jayanthi
6.	29-04-2017	Saturday	Basava Jayanthi
7.	01-05-2017	Monday	May Day
8.	26-06-2017	Monday	Kutub-E-Ramzan
9.	15-08-2017	Tuesday	Independence day
10.	25-08-2017	Friday	Varasiddhi Vinayaka Vrata
11.	02-09-2017	Saturday	Bakrid
12.	19-09-2017	Tuesday	Mahalaya Amavasye
13.	29-09-2017	Friday	Maha Navami Ayudapooja
14.	30-09-2017	Saturday	Vijayadasami
15.	02-10-2017	Monday	Gandhi Jayanthi
16.	05-10-2017	Thursday	Maharshi Valmiki Jayanthi
17.	18-10-2017	Wednesday	Naraka Chaturdashi
18.	20-10-2017	Friday	Balipadyami Deepavali
19.	01-11-2017	Wednesday	Kannada Rajyothsava
20.	06-11-2017	Monday	Kanakadasa Jayanthi
21.	01-12-2017	Friday	Id-Meelad
22.	25-12-2017	Monday	Christmas Day

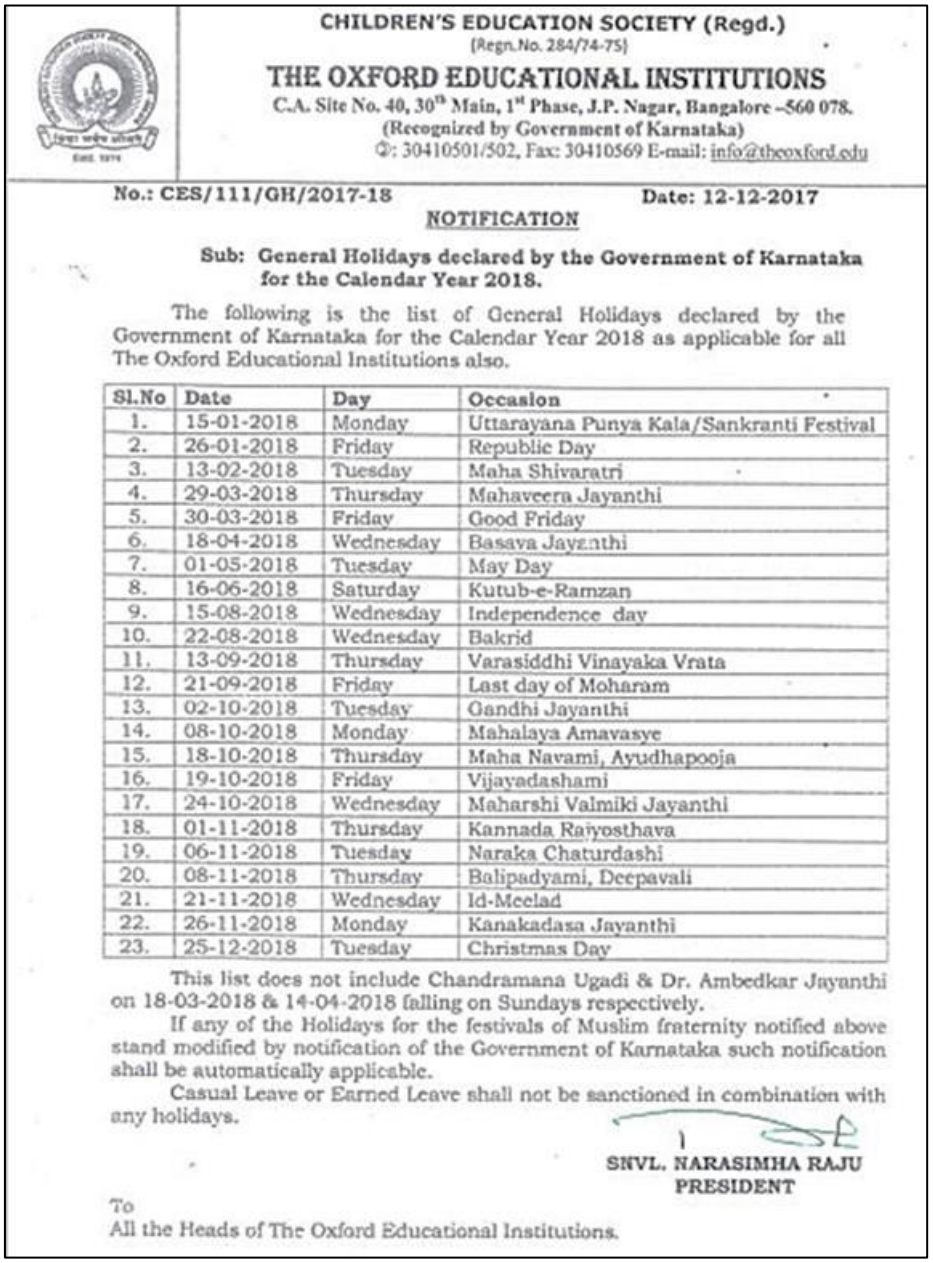
This list does not include 09-04-2017 Mahaveer Jayanthi, 01-10-2017 Last day of Moharam which fall on Sundays.

SNVL. NARASIMHA RAJU
PRESIDENT

To
All the Heads of The Oxford Educational Institutions.

Figure 3-4: List of Holidays-2017

The list of holidays for the year 2018 is shown in figure 3-5.



CHILDREN'S EDUCATION SOCIETY (Regd.)
(Regn.No. 284/74-75)

THE OXFORD EDUCATIONAL INSTITUTIONS
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(Recognized by Government of Karnataka)
✆: 30410501/502, Fax: 30410569 E-mail: info@theoxford.edu

No.: CES/111/GH/2017-18 Date: 12-12-2017

NOTIFICATION

Sub: General Holidays declared by the Government of Karnataka for the Calendar Year 2018.

The following is the list of General Holidays declared by the Government of Karnataka for the Calendar Year 2018 as applicable for all The Oxford Educational Institutions also.

Sl.No	Date	Day	Occasion
1.	15-01-2018	Monday	Uttarayana Punya Kala/Sankranti Festival
2.	26-01-2018	Friday	Republic Day
3.	13-02-2018	Tuesday	Maha Shivaratri
4.	29-03-2018	Thursday	Mahaveera Jayanthi
5.	30-03-2018	Friday	Good Friday
6.	18-04-2018	Wednesday	Basava Jayanthi
7.	01-05-2018	Tuesday	May Day
8.	16-06-2018	Saturday	Kutub-e-Ramzan
9.	15-08-2018	Wednesday	Independence day
10.	22-08-2018	Wednesday	Bakrid
11.	13-09-2018	Thursday	Varasiddhi Vinayaka Vrata
12.	21-09-2018	Friday	Last day of Moharam
13.	02-10-2018	Tuesday	Gandhi Jayanthi
14.	08-10-2018	Monday	Mahalaya Amavasye
15.	18-10-2018	Thursday	Maha Navami, Ayudhapooja
16.	19-10-2018	Friday	Vijayadashami
17.	24-10-2018	Wednesday	Maharshi Valmiki Jayanthi
18.	01-11-2018	Thursday	Kannada Rajyosthava
19.	06-11-2018	Tuesday	Naraka Chaturdashi
20.	08-11-2018	Thursday	Balipadyami, Deepavali
21.	21-11-2018	Wednesday	Id-Meelad
22.	26-11-2018	Monday	Kanakadasa Jayanthi
23.	25-12-2018	Tuesday	Christmas Day

This list does not include Chandramana Ugadi & Dr. Ambedkar Jayanthi on 18-03-2018 & 14-04-2018 falling on Sundays respectively.

If any of the Holidays for the festivals of Muslim fraternity notified above stand modified by notification of the Government of Karnataka such notification shall be automatically applicable.

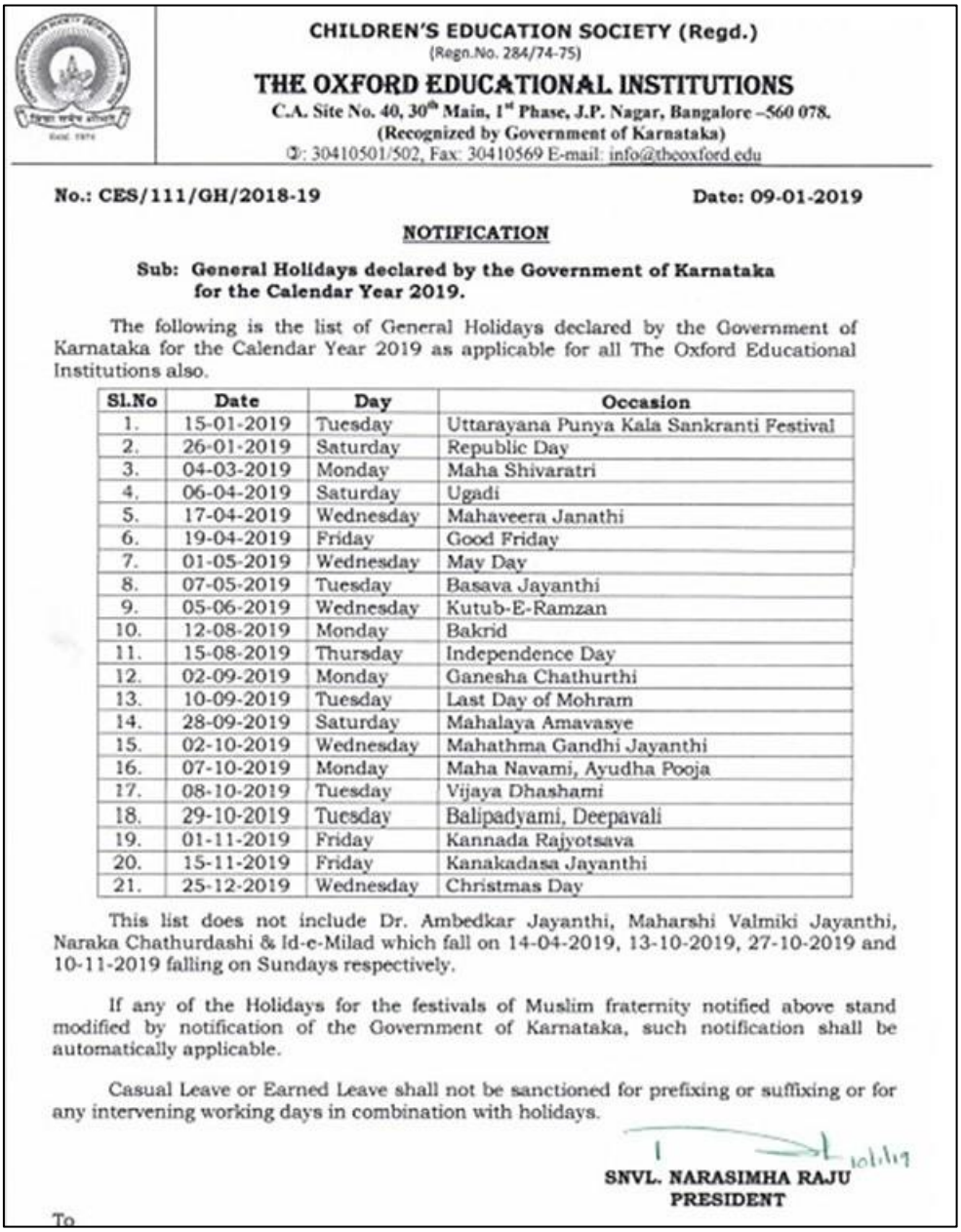
Casual Leave or Earned Leave shall not be sanctioned in combination with any holidays.

SNVL. NARASIMHA RAJU
PRESIDENT

To
All the Heads of The Oxford Educational Institutions.

Figure 3-5: List of Holidays-2018

The list of holidays for the year 2019 is shown in figure 3-6.



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No.: CES/111/GH/2018-19 **Date: 09-01-2019**

NOTIFICATION

Sub: General Holidays declared by the Government of Karnataka for the Calendar Year 2019.

The following is the list of General Holidays declared by the Government of Karnataka for the Calendar Year 2019 as applicable for all The Oxford Educational Institutions also.

Sl.No	Date	Day	Occasion
1.	15-01-2019	Tuesday	Uttarayana Punya Kala Sankranti Festival
2.	26-01-2019	Saturday	Republic Day
3.	04-03-2019	Monday	Maha Shivaratri
4.	06-04-2019	Saturday	Ugadi
5.	17-04-2019	Wednesday	Mahaveera Janathi
6.	19-04-2019	Friday	Good Friday
7.	01-05-2019	Wednesday	May Day
8.	07-05-2019	Tuesday	Basava Jayanthi
9.	05-06-2019	Wednesday	Kutub-E-Ramzan
10.	12-08-2019	Monday	Bakrid
11.	15-08-2019	Thursday	Independence Day
12.	02-09-2019	Monday	Ganesha Chathurthi
13.	10-09-2019	Tuesday	Last Day of Mohram
14.	28-09-2019	Saturday	Mahalaya Amavasye
15.	02-10-2019	Wednesday	Mahathma Gandhi Jayanthi
16.	07-10-2019	Monday	Maha Navami, Ayudha Pooja
17.	08-10-2019	Tuesday	Vijaya Dhashami
18.	29-10-2019	Tuesday	Balipadyami, Deepavali
19.	01-11-2019	Friday	Kannada Rajyotsava
20.	15-11-2019	Friday	Kanakadasa Jayanthi
21.	25-12-2019	Wednesday	Christmas Day

This list does not include Dr. Ambedkar Jayanthi, Maharshi Valmiki Jayanthi, Naraka Chathurdashi & Id-e-Milad which fall on 14-04-2019, 13-10-2019, 27-10-2019 and 10-11-2019 falling on Sundays respectively.

If any of the Holidays for the festivals of Muslim fraternity notified above stand modified by notification of the Government of Karnataka, such notification shall be automatically applicable.

Casual Leave or Earned Leave shall not be sanctioned for prefixing or suffixing or for any intervening working days in combination with holidays.

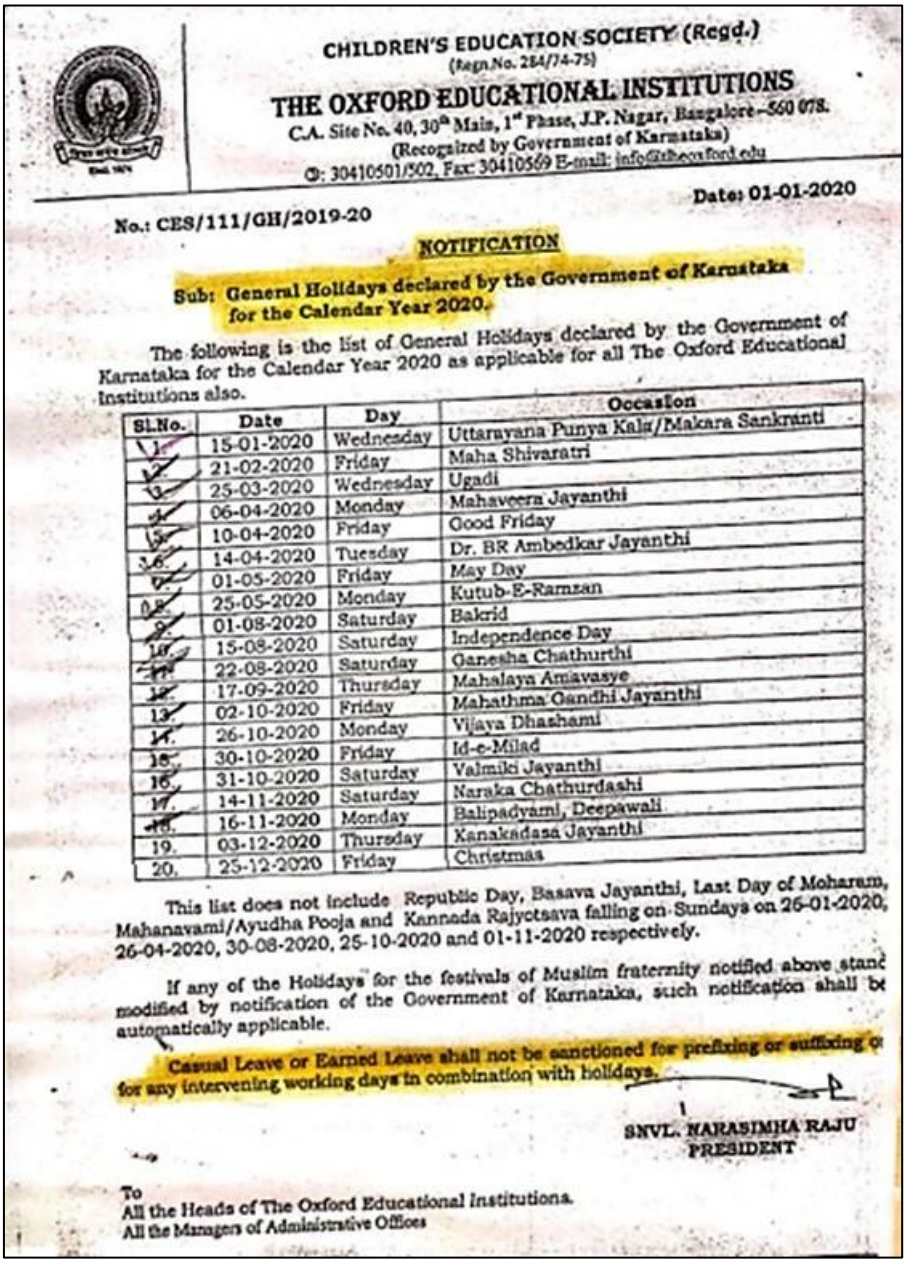
10/1/19

SNVL. NARASIMHA RAJU
PRESIDENT

To

Figure 3-6: List of Holidays-2019

The list of holidays for the year 2020 is shown in figure 3-7.



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☎: 30410501/502, Fax: 30410569 E-mail: info@theoxford.edu

No.: CES/111/GH/2019-20

Date: 01-01-2020

NOTIFICATION

Sub: General Holidays declared by the Government of Karnataka for the Calendar Year 2020.

The following is the list of General Holidays declared by the Government of Karnataka for the Calendar Year 2020 as applicable for all The Oxford Educational Institutions also.

Sl.No.	Date	Day	Occasion
1.	15-01-2020	Wednesday	Uttarayana Punya Kala/Makara Sankranti
2.	21-02-2020	Friday	Maha Shivaratri
3.	25-03-2020	Wednesday	Ugadi
4.	06-04-2020	Monday	Mahaveera Jayanthi
5.	10-04-2020	Friday	Good Friday
6.	14-04-2020	Tuesday	Dr. BR Ambedkar Jayanthi
7.	01-05-2020	Friday	May Day
8.	25-05-2020	Monday	Kutub-E-Ramzan
9.	01-08-2020	Saturday	Bakrid
10.	15-08-2020	Saturday	Independence Day
11.	22-08-2020	Saturday	Ganesha Chathurthi
12.	17-09-2020	Thursday	Mahalaya Amavasye
13.	02-10-2020	Friday	Mahathma Gandhi Jayanthi
14.	26-10-2020	Monday	Vijaya Dhashami
15.	30-10-2020	Friday	Id-e-Milad
16.	31-10-2020	Saturday	Valmiki Jayanthi
17.	14-11-2020	Saturday	Naraka Chathurdashi
18.	16-11-2020	Monday	Balipadyami, Deepawali
19.	03-12-2020	Thursday	Kanakadasa Jayanthi
20.	25-12-2020	Friday	Christmas

This list does not include Republic Day, Basava Jayanthi, Last Day of Moharam, Mahanavami/Ayudha Pooja and Kannada Rajyotsava falling on Sundays on 26-01-2020, 26-04-2020, 30-08-2020, 25-10-2020 and 01-11-2020 respectively.

If any of the Holidays for the festivals of Muslim fraternity notified above stand modified by notification of the Government of Karnataka, such notification shall be automatically applicable.

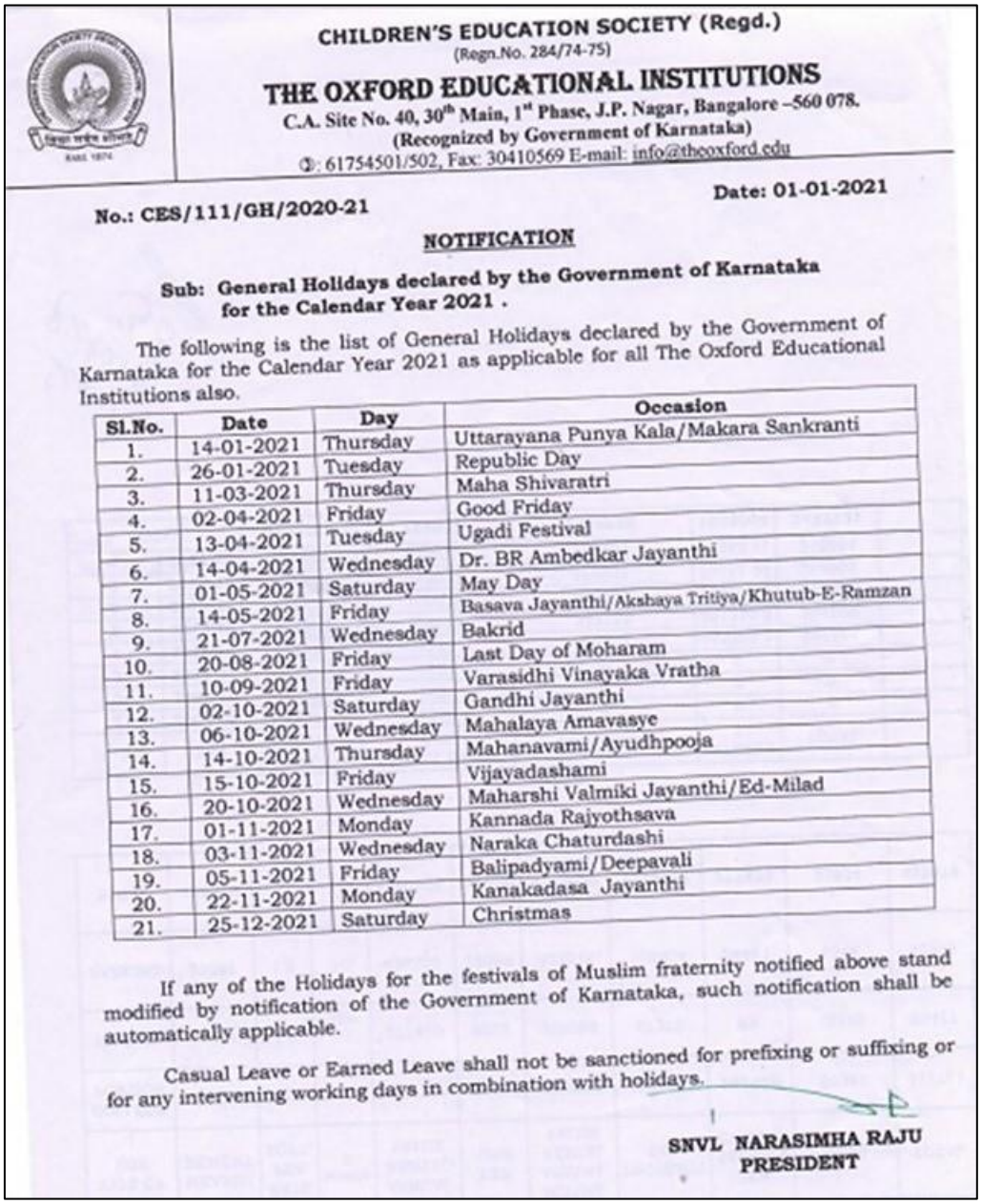
Casual Leave or Earned Leave shall not be sanctioned for prefixing or suffixing or for any intervening working days in combination with holidays.

SNVL. NARASIMHA RAJU
PRESIDENT

To
All the Heads of The Oxford Educational Institutions.
All the Managers of Administrative Offices

Figure 3-7: List of Holidays-2020

The list of holidays for the year 2021 is shown in figure 3-8.



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No.: CES/111/GH/2020-21 Date: 01-01-2021

NOTIFICATION

Sub: General Holidays declared by the Government of Karnataka for the Calendar Year 2021 .

The following is the list of General Holidays declared by the Government of Karnataka for the Calendar Year 2021 as applicable for all The Oxford Educational Institutions also.

Sl.No.	Date	Day	Occasion
1.	14-01-2021	Thursday	Uttarayana Punya Kala/Makara Sankranti
2.	26-01-2021	Tuesday	Republic Day
3.	11-03-2021	Thursday	Maha Shivaratri
4.	02-04-2021	Friday	Good Friday
5.	13-04-2021	Tuesday	Ugadi Festival
6.	14-04-2021	Wednesday	Dr. BR Ambedkar Jayanthi
7.	01-05-2021	Saturday	May Day
8.	14-05-2021	Friday	Basava Jayanthi/Akshaya Tritiya/Khutub-E-Ramzan
9.	21-07-2021	Wednesday	Bakrid
10.	20-08-2021	Friday	Last Day of Moharam
11.	10-09-2021	Friday	Varasidhi Vinayaka Vratha
12.	02-10-2021	Saturday	Gandhi Jayanthi
13.	06-10-2021	Wednesday	Mahalaya Amavasye
14.	14-10-2021	Thursday	Mahanavami/Ayudhpooja
15.	15-10-2021	Friday	Vijayadashami
16.	20-10-2021	Wednesday	Maharshi Valmiki Jayanthi/Ed-Milad
17.	01-11-2021	Monday	Kannada Rajyothsava
18.	03-11-2021	Wednesday	Naraka Chaturdashi
19.	05-11-2021	Friday	Balipadyami/Deepavali
20.	22-11-2021	Monday	Kanakadasa Jayanthi
21.	25-12-2021	Saturday	Christmas

If any of the Holidays for the festivals of Muslim fraternity notified above stand modified by notification of the Government of Karnataka, such notification shall be automatically applicable.

Casual Leave or Earned Leave shall not be sanctioned for prefixing or suffixing or for any intervening working days in combination with holidays.

SNVL NARASIMHA RAJU
PRESIDENT

Figure 3-8: List of Holidays-2021

3.2.6.2. Tentative Schedule of College

The tentative schedule of the college is 09.00 AM to 4:15 PM.

The library timing is 09:00 AM to 10:00 PM.

The details of the class sessions are given in table 3-2.

S. No.	Session	Timings
1	1st Hour	09:00 TO 9:55AM
2	2nd Hour	09:55 TO 10:50 AM
3	Short Break	10:50 TO 11:00 AM
4	3rd Hour	11:00 TO 11:55 AM
5	4th Hour	11:55 TO 12:50 PM
6	Lunch	12:50 TO 01:30 PM
7	5th Hour	1:30 TO 2:25 PM
9	6th Hour	2:25 TO 3:20 PM
10	7th Hour	3:20 TO 4:15 PM

Table 3-2: Tentative College Schedule

3.2.6.3. Staff and Students of College:

The number of staff including teaching, non-teaching, and house-keeping is given in the table 3-3. The number of students includes both boys and girls.

S. No.	Year	Teaching Staff	Non-Teaching staff	Total Staff	Total Students
1	2017	303	122	425	3572
2	2018	285	95	380	3044
3	2019	269	92	361	3124
4	2020	240	68	308	2728
5	2021	222	57	279	2722

Table 3-3: Number of staff and students

4. ENERGY AUDIT

4.1. Facility Description

The Oxford College of Engineering (TOCE) campus receives power supply from the state electricity board (BESCOM – Bangalore Electricity Supply Company Limited) at HT 11 kV. The TOCE has availed power supply, with connection - RR. No 5450996261 (S8HT60) with 1HT2C2 tariff.

Incoming power supply from BESCOM is received at the transformer yard located inside the college premises. The 11 kV rated HT power supply is stepped down to LT 433V, by 500 kVA rated transformers. Two numbers of 500 kVA rated each transformer units, have been installed in transformer yard to meet the power supply for the entire campus.

Transformer units installed inside college premises are shown in the figure 4.1.

Figure 4-1: Transformer units installed in the campus

The name plate details of transformer are given in table 4-1.

S. No.	Description	Units	Transformer # 1	Transformer # 2
1	Rated Capacity	kVA	500	500
2	Rated Voltage Prim/Sec	kV	11/0.433	11/0.433
3	Rated Current Prim/Sec	A	26.24/666.66	26.24/666.66
4	Type of Cooling	-	ONAN	ONAN
5	Frequency	Hz	50	50
6	Impedance	-	4.86%	4.86%
7	Phase	-	3	3

Table 4-1: Name plate details of transformer

The LT power supply from the transformer is taken to the main electrical panels, located inside the power house room near the transformer yard.

From the power house main electrical panels, power supply is catered to engineering new block, engineering old block, girl's hostel block and Dental college. From the main panels of the individual block/ building, power supply is distributed to various floors/sections of the block/ building.

The main electrical panel-1 located in power house room is shown in figure 4.2.

Figure 4-2: Power house room - Main electrical panel 1

The main electrical panel-2 located in power house room is shown in figure 4.3.

Figure 4-3: Power house room - Main electrical panel 2

The electrical distribution panel at engineering new block is shown in figure 4.4.

Figure 4-4: Electrical distribution panel - Engineering new block

The electrical distribution panel-1 at engineering old block is shown in figure 4.5.

Figure 4-5: Electrical distribution panel 1 - Engineering old block

The electrical distribution panel-2 at engineering old block is shown in figure 4.6.

Figure 4-6: Electrical distribution panel 1 - Engineering old block

The electrical distribution panel at girl's hostel block is shown in figure 4.7.

Figure 4-7: Electrical distribution panel - Girl's hostel block

APFC Panel:

APFC (Automatic Power Factor Controller) panels are installed at the power house room. One number of 60 kVAr rated and one number of 150 kVAr rated, capacitor banks have been installed for power factor improvement.

The APFC panels installed at power house room are shown in figure 4.8.

Figure 4-8: APFC panels at power house room

DG Set:

Three number of DG (Diesel Generator) sets are used as backup power supply, during power failure from the grid. DG set #1 and DG set #2 are 250 kVA rated capacity each. DG set #3 is 500 kVA rated capacity.

DG set #1 caters power supply to girl's hostel block and dental college block. Whereas, DG set #2 acting as stand-by.

DG set #3 caters power supply to engineering new block and engineering old block. The image of DG set 1 installed at the power house room is shown in the figure 4.9.

Figure 4-9: DG set 1 - 250 kVA

The image of DG set 2 installed at the power house room is shown in the figure 4.10.

Figure 4-10: DG set 2 - 250 kVA

The image of DG set 3 installed near transformer yard is shown in the figure 4.11.

Figure 4-11: DG set 3 - 500 kVA

The name plate specifications of the DG sets are shown in the table 4.2.

S. No.	Description	Unit	DG # 1	DG # 2	DG # 3
1	Rated Capacity	kVA	250	250	500
2	Rated voltage	Volts	415	415	415
3	Rated current	Ampere	348	348	695.6
4	Frequency	Hz	50	50	50
5	Power factor	-	0.80	0.80	0.8
6	Rated Demand	kVA	250	250	500
7	Rated Power	kW	200	200	400
8	Make	-	Powerica	Powerica	Powerica

Table 4-2: DG set specifications

DG Changeover:

The changeover between BESCOM power and DG power supply is done automatically. For changeover, three AMF (Automatic Mains Failure) panels are availbale in power house room.

The AMF panel 1 is shown in figure 4.12.

Figure 4-12: AMF panel - 1

The AMF panel 2 is shown in figure 4.13.

Figure 4-13: AMF panel - 2

The AMF panel 3 is shown in figure 4.14.

Figure 4-14: AMF panel - 3

UPS System:

UPS is available in the campus to give the backup power supply for all the critical loads like computer labs, server rooms etc. List of UPS system with its rated capacity is given in the table 4.3.

S. No.	Block name	UPS make	Capacity	UPS-Serial No.	Loading department	Date of Installation
1	New building 2nd floor	Numeric	40 kVA	XII 110400125	Architecture & new building	1/11/2011
2		Numeric	40 kVA	XII 110400127		1/12/2011
3	Old building 3rd floor	Numeric	15 kVA	3068	CAED lav(CV)	1/3/2000
4		Numeric	40 kVA	130910965	2nd CSE Ground floor Account section	1/9/2013
5		Numeric	40 kVA	130808402	ISE lab	1/8/2013
6		Numeric	40 kVA	VI 050300099	Server room CSE lab	1/3/2005
7	Old building 4th floor	Numeric	12.5 kVA	11130201068	ECE lab	1/2/2013
8		Numeric	12.5 kVA	11130201065	ECE lab	1/2/2013
9		ACS	5 kVA	13FCL028	ECE R&D	1/10/2013
10	Old building 5th floor	ACS	25 kVA	710IN008	CAD/CAM	1/7/2010
11		ACS	25 kVA	6G0N085	SCRAP	1/7/2010
12	Engg. Lab 2nd floor	ACS	10 kVA	7B0N007	Language lab & main library	-

Table 4-3: Details of UPS

4.1.1. Tariff Structure

The sanctioned contract demand of the campus is 490 kVA at specified voltage of 11 kV. Electricity supply from BESCOM is billed under 1HT2C2 schedule of tariffs. The tariff includes demand charges of Rs. 210 per kVA, and energy charges of Rs.7.85 per kWh.

The kVA demand charges @ Rs. 210/kVA of maximum demand recorded during the month or 85% of the contract demand, whichever is higher.

4.1.2. Electricity Consumption Data

Details of electricity consumption for the last five years have been collected and salient features of electrical energy details are given in table 4.4.

S. No.	Description	Unit	Details
1	Contract Demand	kVA	490
2	Demand Charges	Rs./kVA	210
3	Maximum Demand Recorded during last five years	kVA	398
4	Average Monthly Energy Consumption during last five years	kWh	60259.36
5	Average System Power Factor		0.92
6	Average Energy Charges considered for savings calculations	Rs./ kWh	9.18

Table 4-4: Electricity Bill Parameters

4.1.3. Load Share

The main electricity supply received to the power house, is distributed to the various blocks of the campus. Details of electrical load share of the campus are given in table 4.5. The percentage share of the various blocks is given in figure 4.15.

S. No.	Description	Unit	Details
1	Engineering College	kW	54.7
2	Hostel	kW	42.1
3	Dental College	kW	29.6
4	Canteen	kW	10.3
5	Utilities	kW	33.2
	Total load	kW	169.9

Table 4-5: Electrical Load Breakup of the campus

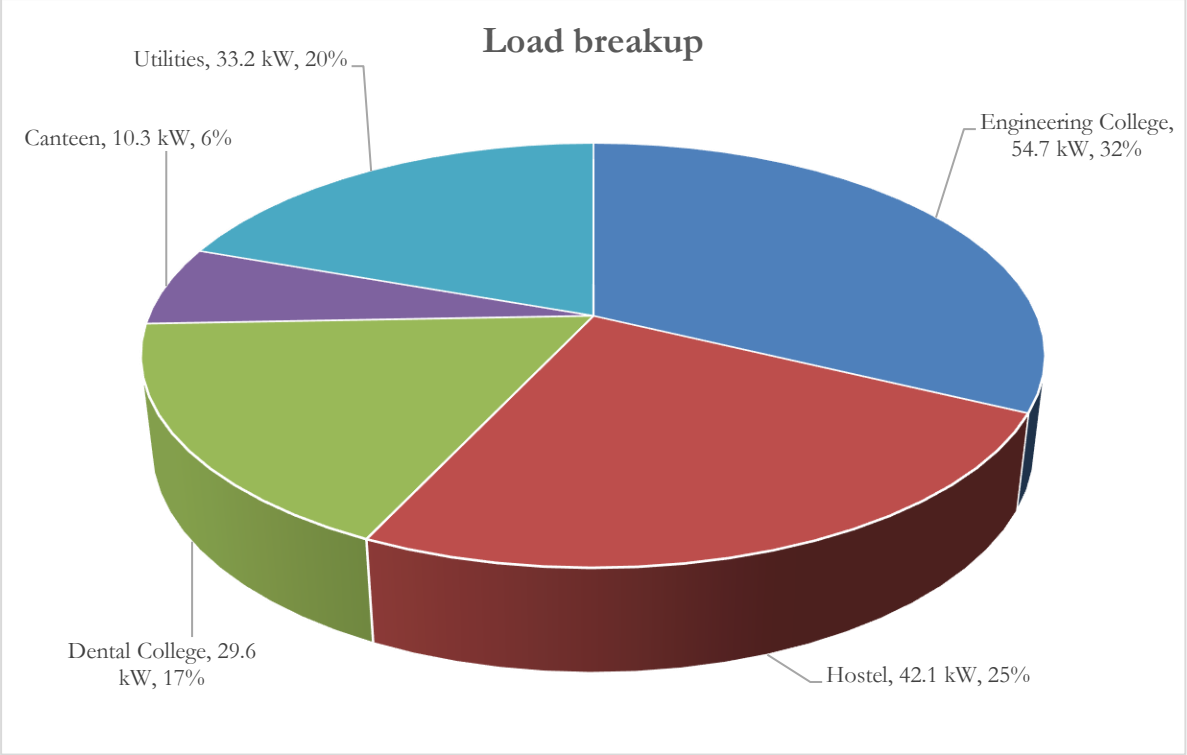


Figure 4-15: Load break-up of the campus

Figure 4.16 indicates the month wise recorded maximum demand and month wise energy consumption of the college campus during the year 2016-2017 (Apr 2016 to Mar 2017).

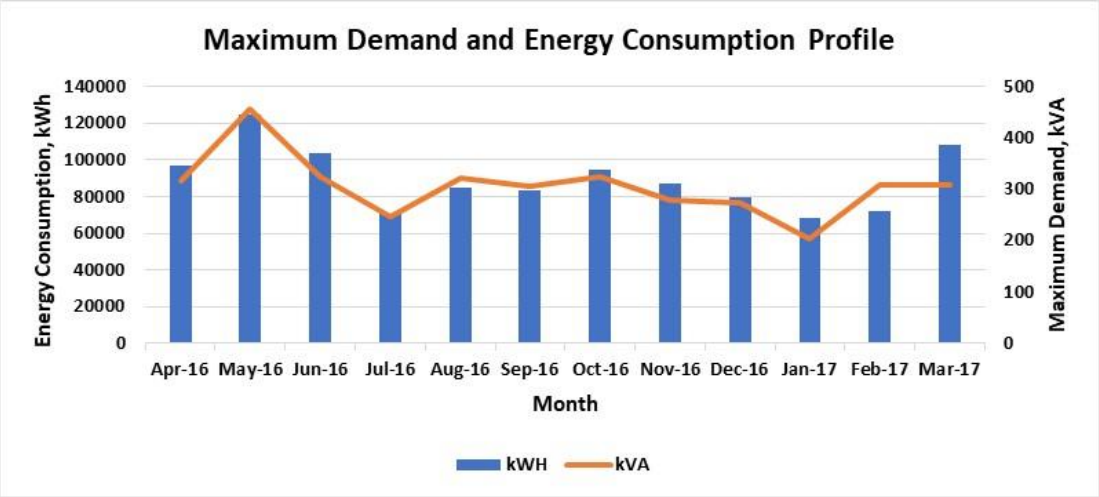


Figure 4-16: Month wise Recorded Maximum Demand and Energy Consumption-2016-2017

Figure 4.17 indicates the month wise recorded maximum demand and month wise energy consumption of the college campus during the year 2017-2018 (Apr 2017 to Mar 2018).

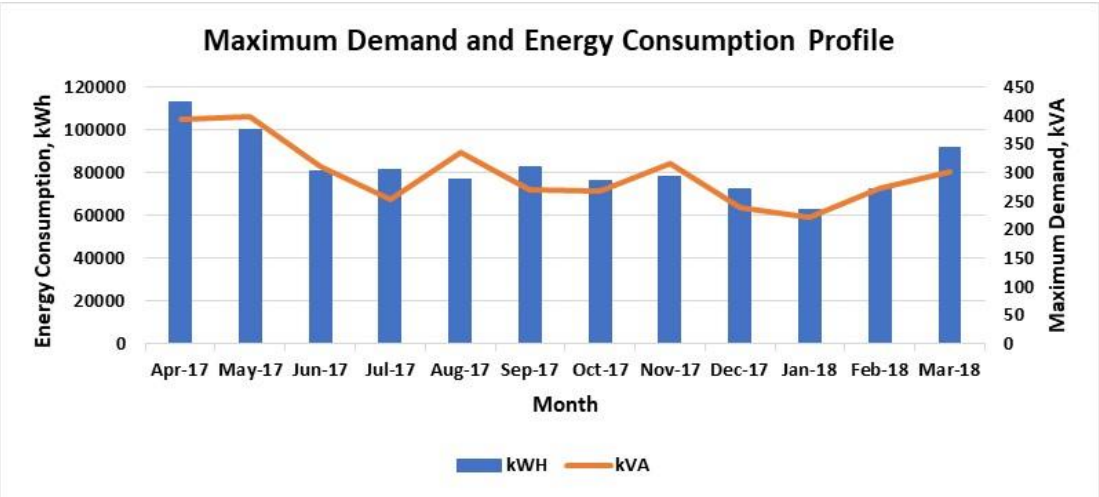


Figure 4-17: Month wise Recorded Maximum Demand and Energy Consumption-2017-2018

Figure 4.18 indicates the month wise recorded maximum demand and month wise energy consumption of the college campus during the year 2018-2019 (Apr 2018 to Mar 2019).

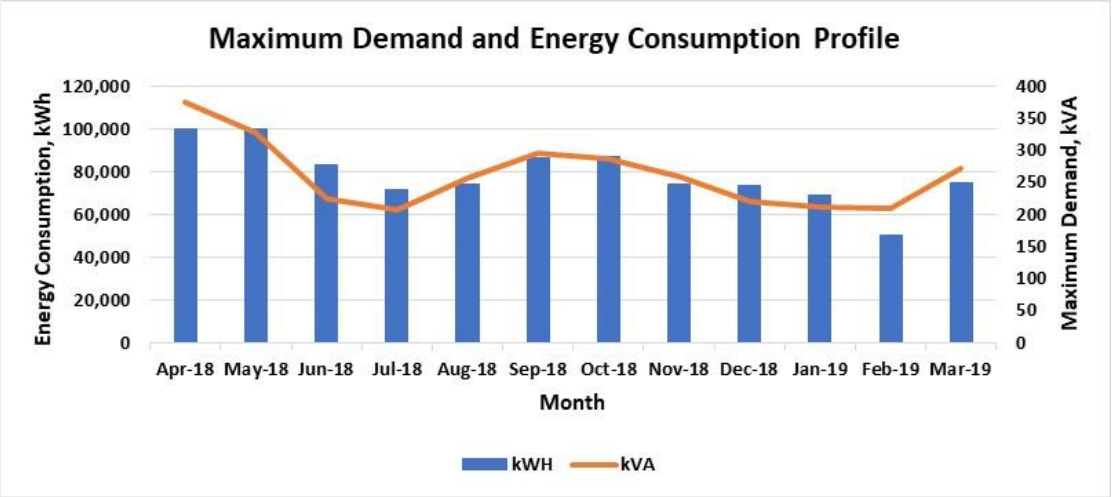


Figure 4-18: Month wise Recorded Maximum Demand and Energy Consumption-2018-2019

Figure 4.19 indicates the month wise recorded maximum demand and month wise energy consumption of the college campus during the year 2019-2020 (Apr 2019 to Mar 2020).

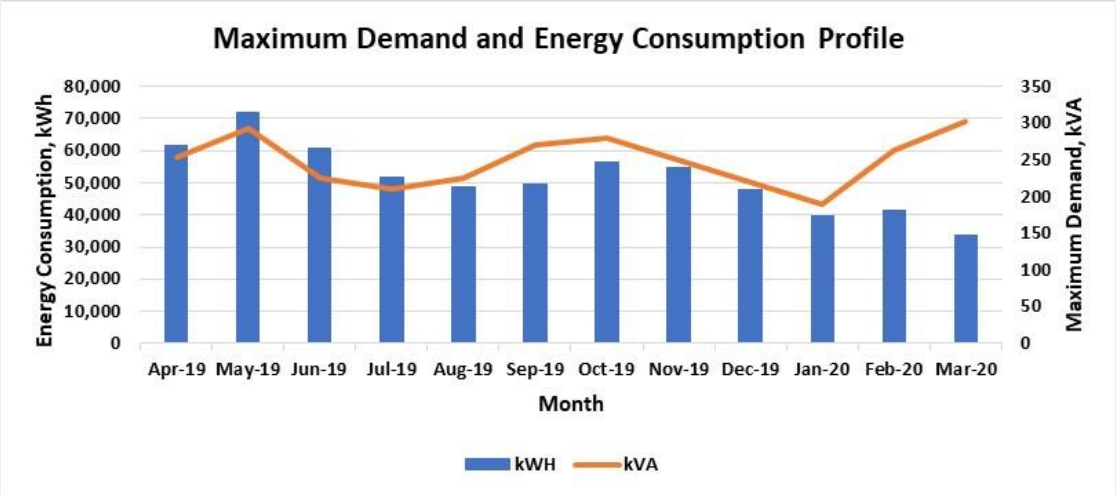


Figure 4-19: Month wise Recorded Maximum Demand and Energy Consumption-2019-2020

Figure 4.20 indicates the month wise recorded maximum demand and month wise energy consumption of the college campus during the year 2020-2021 (Apr 2020 to Mar 2021).

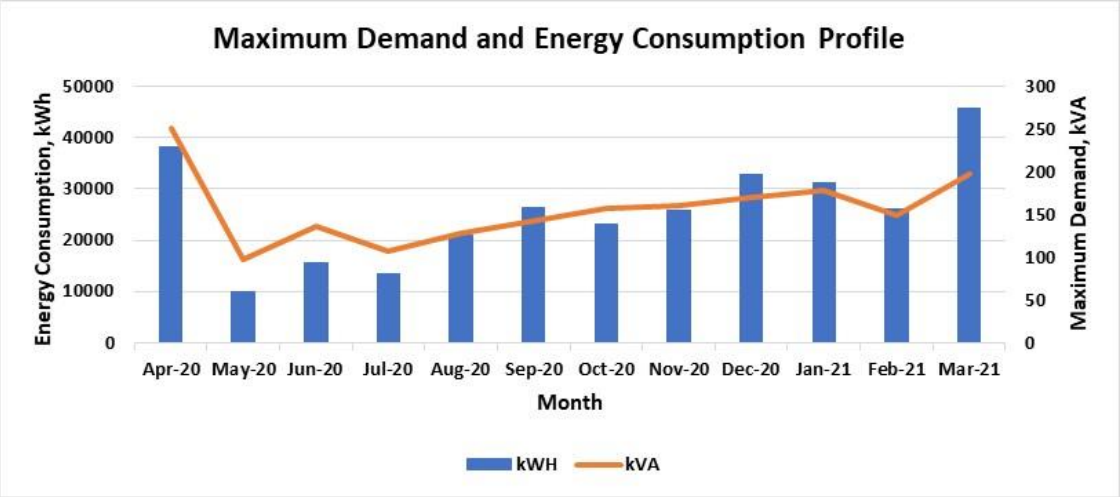


Figure 4-20: Month wise Recorded Maximum Demand and Energy Consumption-2020-2021

4.2. SRTPV (Solar Roof Top Photo-Voltaic) system

SRTPV system was installed at the terrace of engineering new block and is of **202.48 kWp** rated capacity. The SRTPV is On-grid system, installed and maintained by Amplus Solar Power Private Limited. Totally, there are 616 solar modules and 4 inverters are installed at terrace. The SRTPV system is installed during February 2019.

The details of Solar PV modules and inverters are given in table 4.6.

S. No.	Description	Solar PV module	Inverter
1	Make	Trina Solar	SMA
2	Type	Multi crystalline	SMA-Solid Q 50
3	Capacity	202 kWp	50 kW - 3ϕ
4	Quantity	325 Wp -165 Modules 330 Wp -456 Modules Total: 616 Modules	4 No.s

Table 4-6: Details of Solar PV modules and Inverters

The commissioning report of SRTPV system is shown in figure 4.21 and 4.22.

Figure 4-21: Commissioning report of SRTPV system-Page 1

Figure 4-22: Commissioning report of SRTPV system -Page 2

The SRTPV modules installed at terrace of the engineering new block is shown in figure 4.23.

Figure 4-23: SRTPV system- Engineering new block terrace

Inverters at terrace of engineering new block are shown in figure 4.24.

Figure 4-24: Inverters at terrace of engineering new block

SRTPV metering panels installed at ground floor of engineering new block are shown in figure 4.25.

Figure 4-25: SRTPV metering panel

The solar power generated is utilized for the entire campus. The excess power generated from SRTPV system is wheeled to the electricity board grid.

Figure 4.26 indicates the month wise energy consumption of the college campus from SRTPV system during the year 2019.

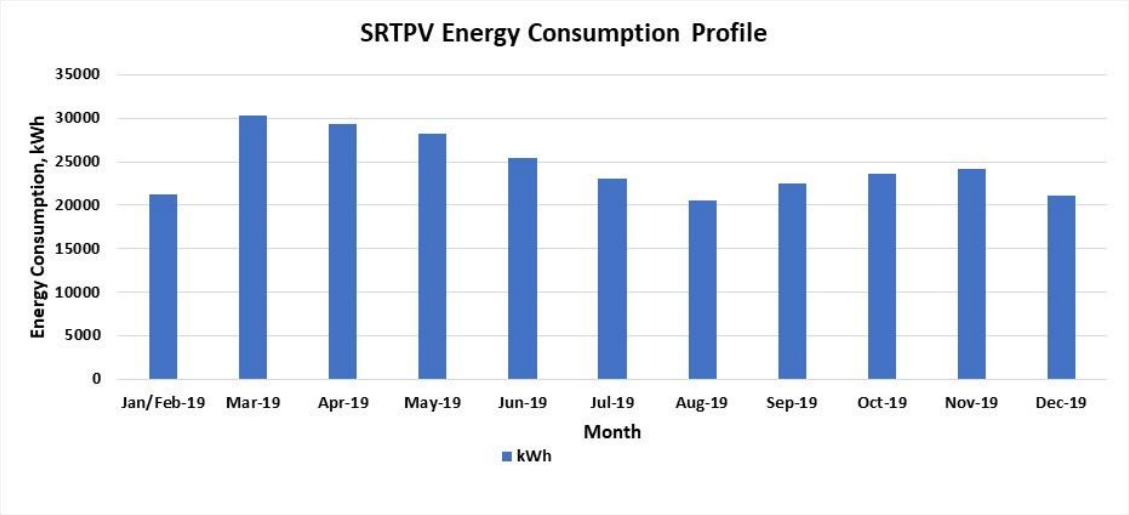


Figure 4-26: Month wise Energy Consumption from SRTPV system-2019

Figure 4.27 indicates the month wise energy consumption of the college campus from SRTPV system during the year 2020.

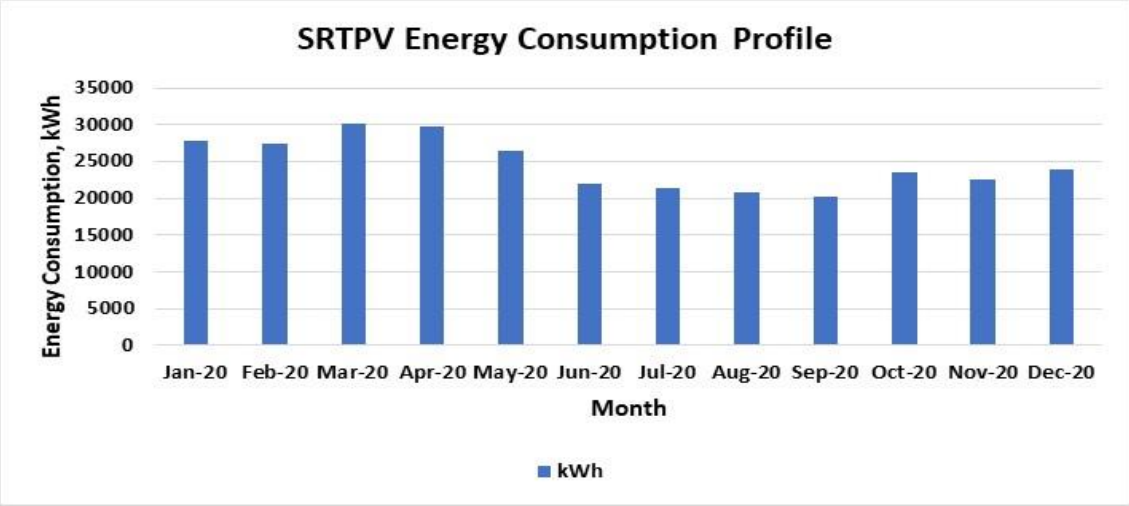


Figure 4-27: Month wise Energy Consumption from SRTPV system-2020

Figure 4.28 indicates the month wise energy consumption of the college campus from SRTPV system during the year 2021.

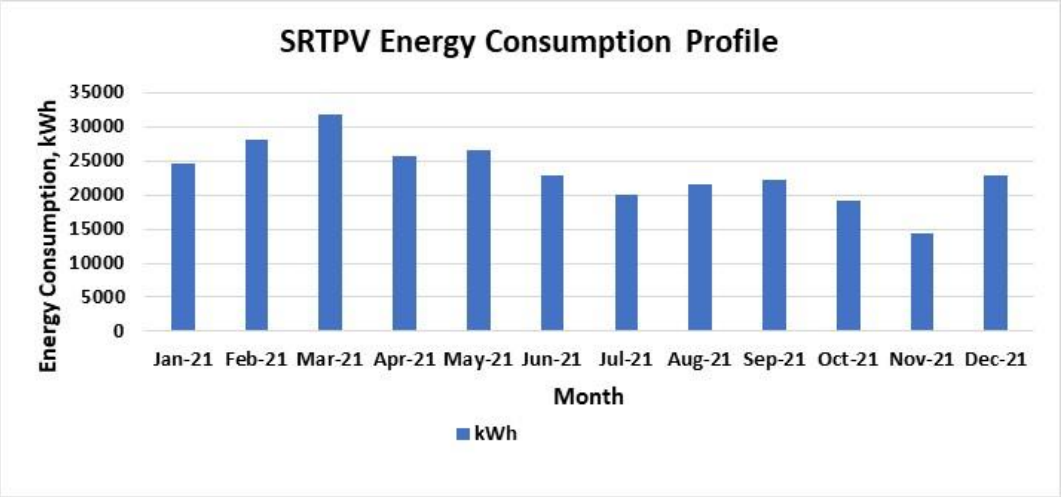
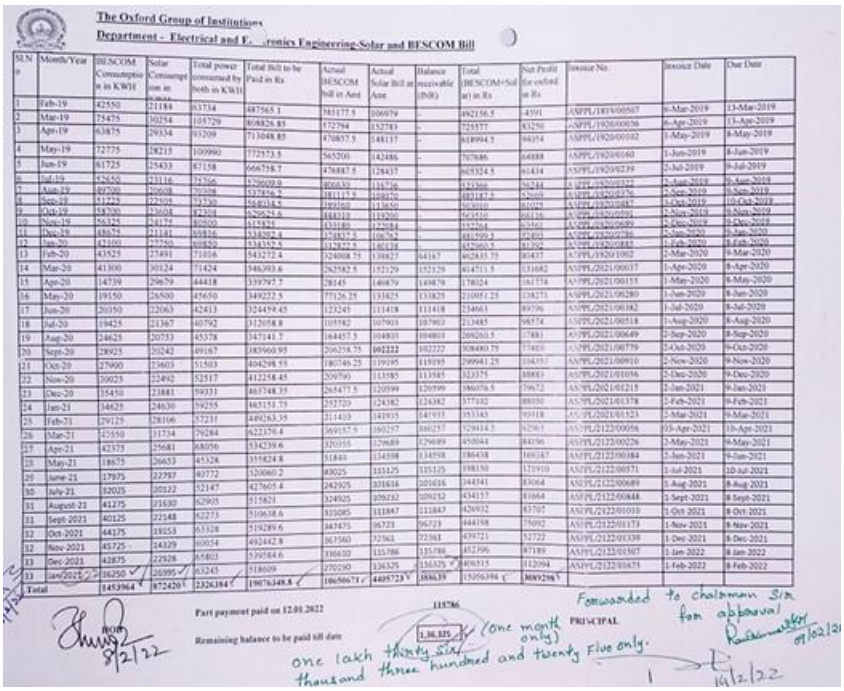


Figure 4-28: Month wise Energy Consumption from SRTPV system-2021

Energy generation and net profit due to the SRTPV system is estimated and the same is given in the figure 4.29.


The Oxford Group of Institutions

Department - Electrical and E...ronics Engineering-Solar and BESCOM Bill

SLN o	Month/Year	BESCOM Consumptio n in KWH	Solar Consumpt ion in KWH	Total power consumed by both in KWH	Total Bill to be Paid in Rs	Actual BESCOM bill in Amt	Actual Solar Bill in Amt	Balance receivable (INR)	Total (BESCOM+Sol ar) in Rs	Net Profit for evfrol in Rs	Invoice No.	Invoice Date	Due Date
1	Feb-19	42550	21184	63734	487565.1	385177.5	106979	-	492156.5	4591	ASPPL/1819/00507	6-Mar-2019	13-Mar-2019
2	Mar-19	75475	30254	105729	808826.85	572794	152783	-	725577	83250	ASPPL/1920/00036	6-Apr-2019	13-Apr-2019
3	Apr-19	63875	29334	93209	713048.85	470857.5	148137	-	618994.5	94054	ASPPL/1920/00102	1-May-2019	8-May-2019
4	May-19	72775	28215	100990	772573.5	565200	142486	-	707686	64888	ASPPL/1920/0160	1-Jun-2019	8-Jun-2019
5	Jun-19	61725	25433	87158	666758.7	476887.5	128457	-	605324.5	61434	ASPPL/1920/0239	2-Jul-2019	9-Jul-2019
6	Jul-19	52650	23116	75766	579609.9	406830	126536	-	533366	50244	ASPPL/1920/0322	2-Aug-2019	9-Aug-2019
7	Aug-19	69700	20608	90308	537856.2	381117.5	108870	-	489987.5	47869	ASPPL/1920/0376	2-Sep-2019	9-Sep-2019
8	Sep-19	51775	22405	73780	564184.5	392500	113850	-	506350	41092	ASPPL/1920/0447	1-Oct-2019	10-Oct-2019
9	Oct-19	58300	23608	82304	629255.6	444210	119200	-	563510	56136	ASPPL/1920/0501	1-Nov-2019	8-Nov-2019
10	Nov-19	56375	24179	80500	615824	433180	122584	-	555764	63463	ASPPL/1920/0639	2-Dec-2019	9-Dec-2019
11	Dec-19	48675	21181	69856	534092.4	378817.5	106762.5	-	485580.5	52402	ASPPL/2021/0286	2-Jan-2020	9-Jan-2020
12	Jan-20	42100	27750	69850	534357.5	372822.5	146638	-	519460.5	54356	ASPPL/1920/0883	1-Feb-2020	8-Feb-2020
13	Feb-20	43525	27491	71016	543272.4	324008.75	138827	64167	462835.75	80437	ASPPL/1920/1002	2-Mar-2020	9-Mar-2020
14	Mar-20	41300	30124	71424	546393.6	262582.5	152129	152129	414711.5	131682	ASPPL/2021/00037	1-Apr-2020	8-Apr-2020
15	Apr-20	14739	29679	44418	339797.7	28145	140879	140879	169024	161774	ASPPL/2021/00155	1-May-2020	8-May-2020
16	May-20	19150	26500	45650	349222.5	77126.25	133825	133825	210951.25	138271	ASPPL/2021/00280	1-Jun-2020	8-Jun-2020
17	Jun-20	20350	22063	42413	324459.45	123245	111418	111418	234663	89796	ASPPL/2021/00382	1-Jul-2020	8-Jul-2020
18	Jul-20	19425	21367	40792	312058.8	105582	107903	107903	213485	98574	ASPPL/2021/00518	1-Aug-2020	8-Aug-2020
19	Aug-20	24625	20753	45378	347141.7	164457.5	104803	104803	269260.5	57881	ASPPL/2021/00649	2-Sep-2020	9-Sep-2020
20	Sept-20	28925	20242	49167	383960.95	206258.75	102222	102222	308480.75	77481	ASPPL/2021/00779	2-Oct-2020	9-Oct-2020
21	Oct-20	27900	23603	51503	404298.55	180746.25	119195	119195	299941.25	104357	ASPPL/2021/00910	2-Nov-2020	9-Nov-2020
22	Nov-20	30025	22492	52517	412258.45	209790	113585	113585	323375	88883	ASPPL/2021/01036	2-Dec-2020	9-Dec-2020
23	Dec-20	35450	23881	59331	463748.35	265477.5	120599	120599	386076.5	77672	ASPPL/2021/01215	2-Jan-2021	9-Jan-2021
24	Jan-21	34625	24630	59255	463155.75	252720	124382	124382	377102	86050	ASPPL/2021/01378	2-Feb-2021	9-Feb-2021
25	Feb-21	29125	28106	57231	449263.35	211410	141935	141935	353345	95918	ASPPL/2021/01523	2-Mar-2021	9-Mar-2021
26	Mar-21	21550	31734	79284	622170.4	169357.5	160257	160257	329614.5	92565	ASPPL/2122/00056	03-Apr-2021	10-Apr-2021
27	Apr-21	42375	25681	68056	534239.6	320355	129689	129689	450044	84196	ASPPL/2122/00226	2-May-2021	9-May-2021
28	May-21	18675	26653	45328	355824.8	51840	134598	134598	186438	169287	ASPPL/2122/00384	2-Jun-2021	9-Jun-2021
29	June-21	17975	22797	40772	320060.2	83025	135125	135125	218150	121910	ASPPL/2122/00571	2-Jul-2021	10-Jul-2021
30	July-21	32025	20122	52147	427605.4	242905	101616	101616	344541	83064	ASPPL/2122/00689	2-Aug-2021	8-Aug-2021
31	August-21	41275	21430	62705	515821	324925	109232	109232	434157	81664	ASPPL/2122/00848	2-Sept-2021	8-Sept-2021
32	Sept-2021	40125	22148	62273	510638.6	315085	111847	111847	426932	83705	ASPPL/2122/01010	2-Oct-2021	8-Oct-2021
33	Oct-2021	44175	19253	63328	519289.6	347475	96723	96723	444198	75092	ASPPL/2122/01173	1-Nov-2021	8-Nov-2021
34	Nov-2021	45725	14329	60054	492442.8	367560	32361	32361	439721	52722	ASPPL/2122/01339	1-Dec-2021	8-Dec-2021
35	Dec-2021	42875	22928	65803	539584.6	339030	335786	335786	452396	87189	ASPPL/2122/01507	1-Jan-2022	8-Jan-2022
36	Jan/2022	36250	26995	63245	518609	270290	336325	336325	606615	112094	ASPPL/2122/01675	1-Feb-2022	8-Feb-2022
37	Total	1453964	8724203	2326384	19076348.8	10650671	4405723	3836339	15056394	8019298			

Part payment paid on 12.01.2022

Remaining balance to be paid till date

111786

1,36,325/- (one month only)

PRINCIPAL

Forwarded to chairman Sir for approval

one lakh thirty Six thousand three hundred and twenty Five only.

Figure 4-29: Net profit due to the SRTPV system

4.3. Inventory Details - Electrical Appliances

To understand the types of appliances used, inventory collection was carried out by the audit team members. The various types of appliances used are lights, fans, computers, projectors, printers, scanners etc., During the study, inventory list from each department was collected and the same is given in table 4-7.

S. No.	Dept	Florescent Tube Light		LED		CFL	Fan		Computer		Exhaust Fans	Scanners	Printers	Xerox Machine	CC Camera	TV Screen	Projector	AC	Refridgerator
		40 W	MOR (36W)	18W Tube	12 W		Ceiling Fan	Wall mount Fan	LED /LCD Monito	CRT Monitors									
1	AUTO ENGG	64	0	12	0	0	26	6	5	0	0	1	2	0	0	0	1	0	
2	BT	86	0	0	0	0	42	0	10	9	2	2	2	2	8	0	1	2	4
3	Chemistry	0	0	17	0	0	12	0	0	0	0	0	0	0	0	0	0	0	
4	CSE	52	0	141	0	0	59	13	3	218	0	0	0	4	0	12	0	5	1
5	Civil	52	0	16	0	0	56	4	30	0	0	1	3	0	0	0	0	0	
6	ECE	81	0	0	0	0	44	11	48	0	3	0	4	0	7	0	3	1	
7	EEE	48	2	0	6	0	54	2	41	0	0	0	2	0	7	0	1	0	0
8	ISE	34	0	77	0	0	29	5	128	0	0	0	2	0	0	0	1	0	
9	Library	0	45	0	0	0	53	0	30	0	0	1	1	0	0	0	0	0	
10	Maths	16	0	0	0	0	14	1	5	0	0	0	7	0	0	0	0	0	
11	MBA	39	0	0	0	96	42	0	16	0	0	0	2	0	0	0	3	3	
12	MCA	51	0	0	0	0	31	0	242	0	0	0	2	0	3	0	0	9	
13	MECH	89	0	0	0	0	59	0	84	0	2	0	2	0	5	2	3	0	
14	MTE	24	0	0	0	0	19	0	3	0	0	0	1	0	4	0	1	0	
15	PHYSICS	39	0	0	0	0	27	1	2	0	0	0	1	0	6	0	0	0	
Total (College)		675	47	263	6	96	567	43	647	227	7	5	31	6	40	14	14	20	5
Total(Hostel)		413	0	71	0	0	431	0	1	0	0	0	1	0	0	0	0	0	0
Total (Overall)		1088	47	334	6	96	998	43	648	227	7	5	32	6	40	14	14	20	5

Table 4-7: Consolidated list of inventories

4.4. Best Practices Implemented for Energy Conservation

During the study, observations were carried out on the usage of the inventories in the college building premises. In the intension of saving the electricity, various measures have been adopted in the college. After completion of class hours – fans, lights, computers and AC units are found to be turned OFF. This practice is followed across the college premises (class rooms, labs, staff rooms, office rooms and library).

4.4.1. Day-light Integration

During the audit phase classrooms, Staff-rooms, computer lab, seminar hall, UPS & batteries room and library areas were surveyed for illumination levels and fresh air-circulation. It was observed most of the rooms are well ventilated and day-light integrated; sample photos of daylight integration are shown in figure 4.30 and 4.31.

Figure 4-30: Day-light integration at Class room

Figure 4-31: Day-light integration at laboratory

The images of daylight integration at college premises are shown in figure 4.32 and 4.33.

Figure 4-32: Day-light integration at engineering old block

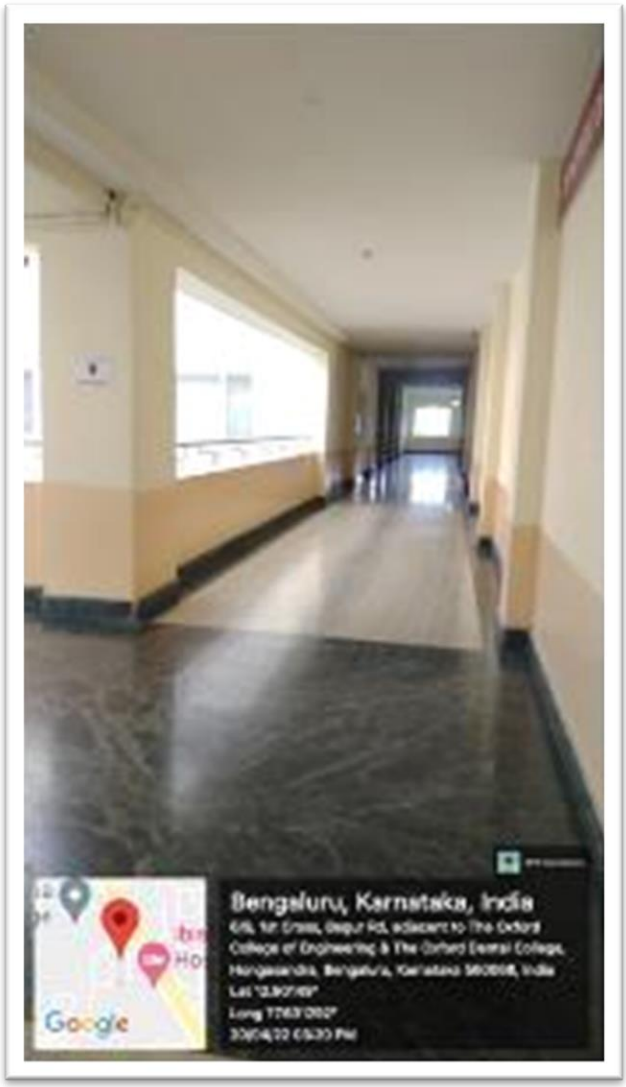


Figure 4-33: Day-light integration at engineering new block

4.4.2. Installation of LED lights

Many of the FTL in all the blocks of the campus are replaced with LED lights. LED tube lights are used in the class rooms, staff-rooms, corridors, hostel, dining area, street lighting and in labs. Sample photo of LED lamp used in the some of the locations of the college area are shown in figure 4.34 and 4.35.

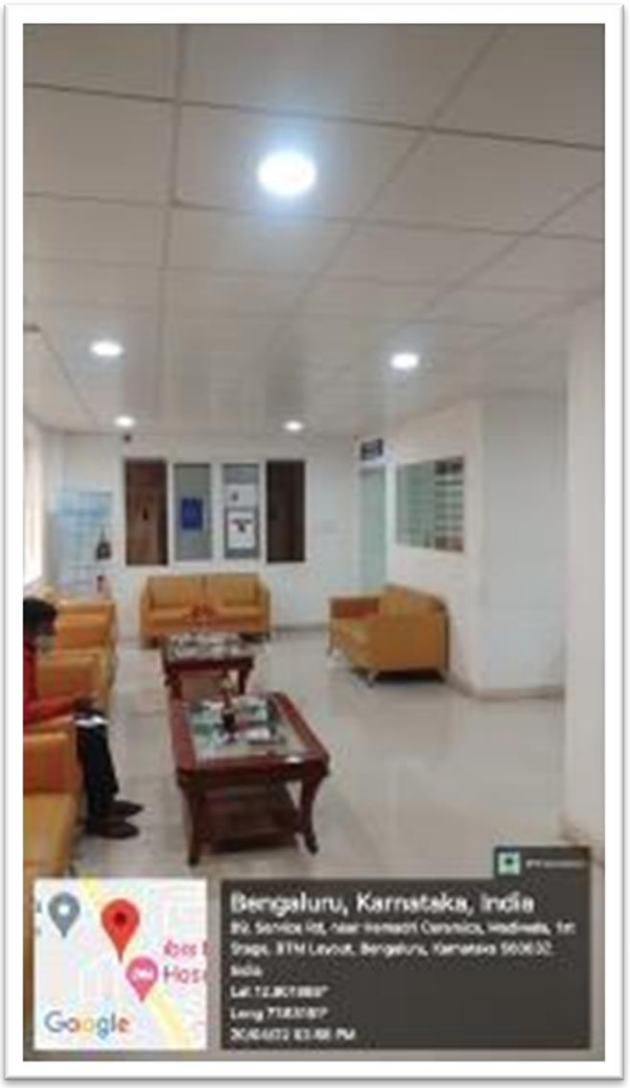


Figure 4-34: Use of LED lights at engineering new block -office area

Figure 4-35: Use of LED lights at engineering new block - at labs

The sample bill copy of LED tube light purchase is shown in figure 4.36.

Figure 4-36: LED tube light - Sample purchase bill

4.4.3. Installation of LED street lights

In college premises, LED street lights are installed all around the campus. The image of LED street light fixture is shown in figure 4.37.

Figure 4-37: Use of LED street lights

The sample bill copy of LED street light is shown in figure 4.38.

Figure 4-38: LED street light - Purchase bill

The cost savings due to existing LED street lights are given in table 4.8.

S. No.	Description	Unit	Values
1	Rated Wattage of LED street light installed	W	75
2	Quantity of LED street lights installed	Nos	64
3	Rated wattage if conventional fixtures used	W	100
4	Savings due to installation of one LED street light	W	25
5	Total savings (considering all LED street lights)	kW	1.6
6	Working hours per day	hours	12
7	No. of working days per year	days	365
8	Annual electricity savings	kWh	7008
9	Average electricity cost	Rs./kWh	9.18
10	Annual cost savings achieved per year	Rs. lakh/year	0.64
11	CO_2 mitigations per year	Tons/year	5.96

Table 4-8: Annual cost savings by installation of LED street lights

The cost savings due to existing 1x20 W LED fixtures are given in table 4.9.

S. No.	Description	Unit	Values
1	Rated Wattage of LED lamps installed	W	20
2	Quantity of LED lamps installed	Nos	263
3	Rated wattage of lamps used earlier	W	40
4	Savings per lamp by installation of LED lamps	W	20
5	Total savings	kW	5.26
6	Working hours per day	hours	9
7	No. of working days per year	days	250
8	Annual electricity savings	kWh	11835
9	Average electricity cost	Rs./kWh	9.18
10	Annual cost savings achieved per year	Rs. lakh/year	1.09
11	CO_2 mitigations per year	Tons/year	10.06

Table 4-9: Annual cost savings due to existing LED fixtures

4.4.4. Installation of Solar Water Heater

Solar water heaters are installed at terrace of girl's hostel for to provide hot water supply. Three solar water heaters with capacity of 3 kL each is available. Sample photo of solar water heaters used in the hostel are shown in figure 4.39.

Figure 4-39: Girl's hostel – Solar Water Heater system

The cost savings by installation of solar water heaters of the campus are given in table 4.10.

S. No.	Description	Unit	Values
1	Solar water heater installed	L	9000
2	Total amount of heat produced	kCal/hr	270000
3	Electricity equivalent	kWh	314
4	No. of working days per year	days	250
5	Annual electricity savings	kWh	78488
6	Average electricity cost	Rs./kWh	9.18
7	Annual cost savings achieved per year	Rs. lakh/year	7.21
8	CO_2 mitigations per year	Tons/year	66.72

Table 4-10: Annual cost savings by solar water heater

4.4.5. Usage of LED/LCD monitors

LCD monitors are used for all the desktop computers in office, staff rooms and in labs. Sample photos of the LCD monitors used in labs are as shown in the figure 4.40.

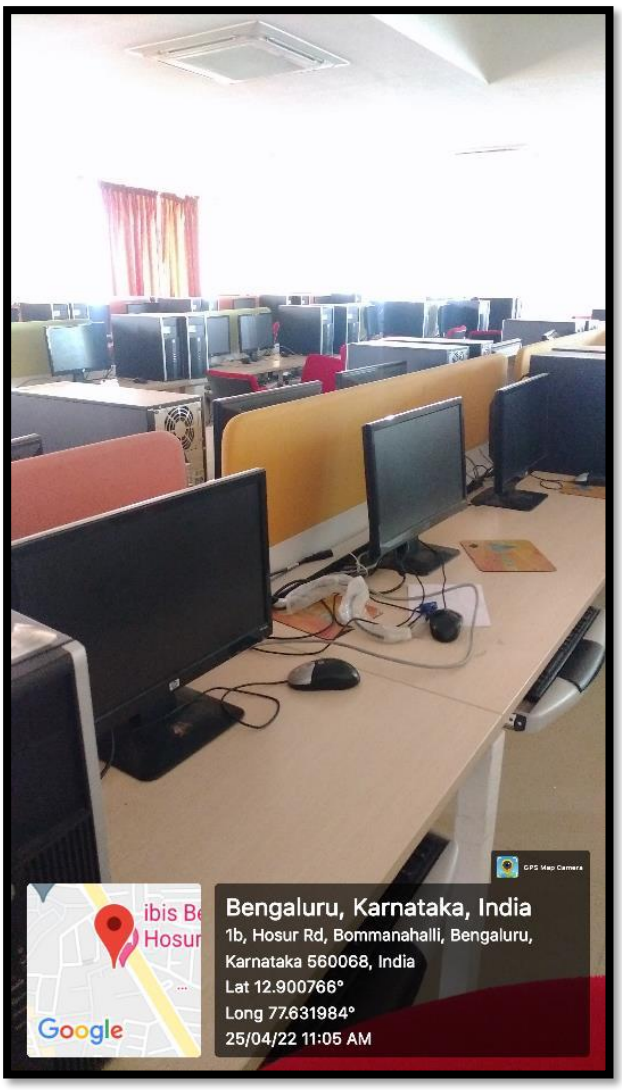


Figure 4-40: Use of LED/LCD monitors in the computer labs

4.4.6. Maintenance of logbooks and registers

The logbooks for DG diesel data and DG operating hours, lift maintenance activity registers are maintained properly.

Diesel log book for DG sets:

The sample image diesel log book for the year 2017 is shown in figure 4.41.

Figure 4-41: Diesel log book of DG sets - 2017

The sample image diesel log book for the year 2018 is shown in figure 4.42.

Figure 4-42: Diesel log book of DG sets - 2018

The sample image diesel log book for the year 2019 is shown in figure 4.43.

Figure 4-43: Diesel log book of DG sets - 2019

The sample image diesel log book for the year 2020 is shown in figure 4.44.

Figure 4-44: Diesel log book of DG sets - 2020

The sample image diesel log book for the year 2021 is shown in figure 4.45.

Figure 4-45: Diesel log book of DG sets - 2021

DG operating hours register:

The sample image of DG operating hour registers for the year 2017 is shown in figure 4.46.

Figure 4-46: DG operating hours Register-2017

The sample image of DG operating hour registers for the year 2018 is shown in figure 4.47.

Figure 4-47: DG operating hours Register-2018

The sample image of DG operating hour registers for the year 2019 is shown in figure 4.48.

Figure 4-48: DG operating hours Register-2019

The sample image of DG operating hour registers for the year 2020 is shown in figure 4.49.

Figure 4-49: DG operating hours Register-2020

The sample image of DG operating hour registers for the year 2021 is shown in figure 4.50.

Figure 4-50: DG operating hours Register-2021

DG maintenance:

The DG sets are well maintained and monitored regularly. If any fault occurs in DG sets, then immediate attention is given and it is rectified.

The sample image of DG maintenance activity bill for the year 2017 is shown in figure 4.51.

Figure 4-51: DG maintenance activity bill - 2017

The sample image of DG maintenance activity bill for the year 2018 is shown in figure 4.52.

Figure 4-52: DG maintenance activity bill - 2018

The sample image of DG maintenance activity bill for the year 2019 is shown in figure 4.53.

Figure 4-53: DG maintenance activity bill - 2019

The sample image of 500 kVA DG field service report for the year 2021 is shown in figure 4.54.

Figure 4-54: 500 kVA DG- Field service report - 2021

The sample image of 250 kVA DG field service report for the year 2021 is shown in figure 4.55.

Figure 4-55: 250 kVA DG- Field service report - 2021

Lift Maintenance activity register:

Lift maintenance activity register is available. All complaints and rectification work related to lift maintenance is entered in this register.

The sample image of lift maintenance register for the year 2019 is shown in figure 4.56.

Figure 4-56: Lift maintenance activity register -2019

The sample image of lift maintenance register for the year 2020 is shown in figure 4.57.

Figure 4-57: Lift maintenance activity register -2020

The sample image of lift maintenance register for the year 2021 is shown in figure 4.58.

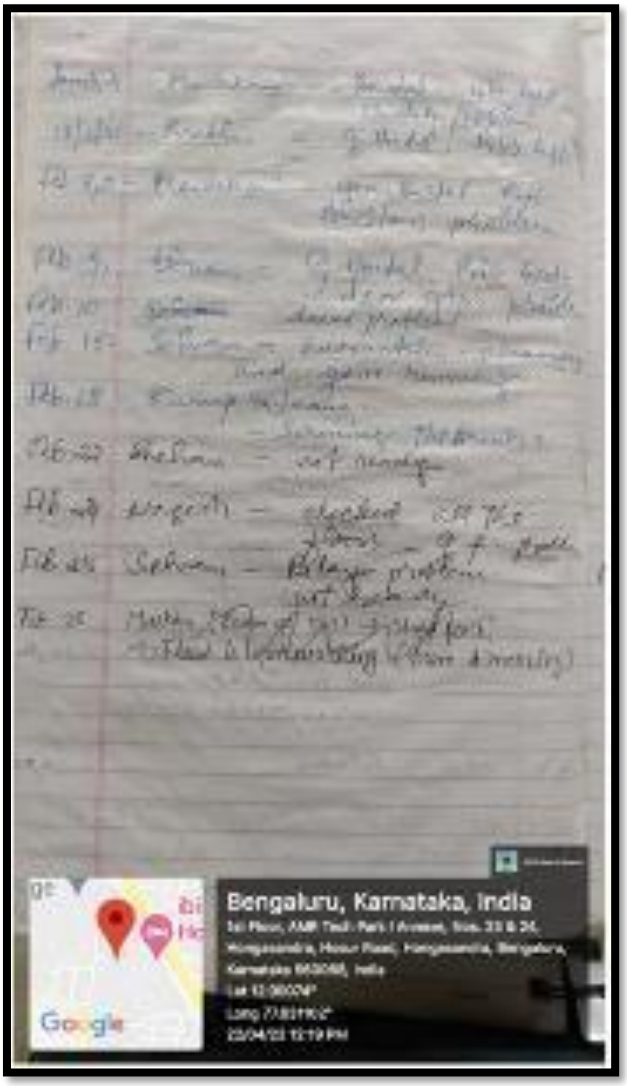


Figure 4-58: Lift maintenance activity register -2021

The sample image of engineering new block lift repair bill is shown in figure 4.59.

Figure 4-59: Engineering new block- Lift repair bill

4.4.7. Maintenance Team

The college has a separate electrical maintenance team. The team performs regular monitoring of the electrical distribution system which involves general monitoring of the system, identifying and rectifying of faults, and provide safe condition and operation of entire electrical distribution systems.

The list of electrical maintenance team members is given in table 4-11.

S. No.	Name	Designation
1	Mr. Narayana Raju	Electrician
2	Mr. Bilal Ahmed	Electrician
3	Mr. Manjunath	Electrician

Table 4-11: Electrical maintenance team

4.4.8. Awareness Programs

Awareness in Energy Conservation:

The Department of EEE in association with NSS unit of The Oxford College of Engineering organized a campaign 'Awareness on Energy Conservation'. Awareness posters, videos and notices regarding how to reduce energy consumption and electricity bills were explained to all the public in the Hongasandra, Begur Road.

The invitation for the campaign is shown in figure 4.60.

Figure 4-60: Awareness on Energy Conservation campaign - Invitation

Students indulged during the campaign is shown in figure 4.61.

Figure 4-61: Students during the campaign

4.5. Recommendations for Energy Audit

4.5.1. Replacement of conventional 1x40W FTL lamps with energy efficient 1x20W LED lamps

Background

From the inventory data; collected during study it is observed conventional FTL lighting fixtures are used in the campus. The power consumed by FTL in comparison with LED fixtures is 50% higher. Replacing the existing FTL with LED will result in energy savings.

Recommendation

It is recommended to replace the existing 1x40W FTL lamps with 1x20W LED tube lights.

Energy Savings

Engineering New & old block:

The energy savings and investment cost for replacement of FTL with LED fixtures and its payback period are given in table 4-12. The total number of 1x40W FTL fixtures is 675.

S. No.	Description	Unit	Values
1	Total no. of 1x40W FTL	No.s	675
2	Power consumption by 1x40W FTL	kW	27
3	% of savings if all FTL replaced by LED fixtures	%	50
4	% of savings in kW if replaced by LED fixtures (Considering all fixtures)	kW	13.5
5	%of Lights found to be ON during working hours	%	50
6	Energy savings for fixtures in ON condition (4 x 5%)	kW	6.75
7	Total working hours per day	hours	9.0
8	Annual savings (6 x **7** x **250days**)	kWh/Annum	15187.5
9	Average energy cost per kWh	Rs./kWh	9.18
10	Annual cost savings	Rs. lakh	1.4
11	Cost of LED per fixture	Rs.	350.0
12	Total Investment cost for 675 LED fixtures	Rs.lakh	2.4
13	Simple payback period (12 / 10)	Years	1.69
14	CO_2 mitigations per year	Tons/year	12.91

Table 4-12: FTL to LED replacement cost and payback period calculations - Engineering new & old block

Hostel block

The energy savings and investment cost for replacement of FTL with LED fixtures and its payback period are given in table 4-13. The total number of 1x40W FTL fixtures is 413.

S. No.	Description	Unit	Values
1	Total no. of 1x40W FTL	No.s	413
2	Power consumption by 1x40W FTL	kW	16.52
3	% of savings if all FTL replaced by LED fixtures	%	50
4	% of savings in kW if replaced by LED fixtures (Considering all fixtures)	kW	8.26
5	%of Lights found to be ON during working hours	%	70
6	Energy savings for fixtures in ON condition (4 x 5%)	kW	5.78
7	Total working hours per day	hours	8
8	Annual savings (6 x **7** x **250days**)	kWh/Annum	11564
9	Average energy cost per kWh	Rs./kWh	9.18
10	Annual cost savings	Rs. lakh	1.1
11	Cost of LED per fixture	Rs.	350
12	Total Investment cost for 675 LED fixtures	Rs.lakh	1.4
13	Simple payback period (12 / 10)	Years	1.4
14	CO_2 mitigations per year	Tons/year	9.83

Table 4-13: FTL to LED replacement cost and payback period calculations- Hostel block

4.5.2. Replacement of conventional fans with energy efficient fans

Background

1x65W conventional fans have been used in almost all the rooms of the college. Replacing the 1x65W conventional fans with 1x35W energy efficient fans will result in energy savings.

Recommendation

It is recommended to replace 65 W fans with 35 W EE fans, as procurement practice. Whenever the existing fans fails, while procuring 35W EE fans shall be procured.

Energy Savings

Engineering new block and old block:

The energy savings and investment cost for replacement of 65 W fans with 35 W EE fans and its payback period are given in table 4-14. Total number of 1x65W fans used accounts to around 567 numbers.

S. No.	Description	Unit	Details
1	Total no. of 1x65W Fans	No	567
2	Power consumption by 1x65W Fans (All fans)	kW	36.86
3	% of savings per fan if replaced by EE fan	%	45
4	% of savings in kW if all fans replaced by EE fans	kW	16.585
5	%of fans found to be ON during working hours	%	50
6	Energy savings for fans in ON condition (4 x 5%)	kW	8.29
7	Total working hours per day	hours	12.0
8	Annual savings (6 x **7** x **250days**)	kWh/Annum	24877.1
9	Average energy cost per kWh	Rs./kWh	9.82
10	Annual cost savings	Rs. lakh	2.4
11	Cost of fan	Rs.	2500.0
12	Total Investment cost for replacing all fans	Rs. lakh	14.2
13	Simple payback period (12 / 10)	Years	5.80

Table 4-14: EE Fans replacement and payback period calculations

Hostel block

The energy savings and investment cost for replacement of 65 W fans with 35 W EE fans and its payback period are given in table 4-15. Total number of 1x65W fans used accounts to around 431 numbers.

S. No.	Description	Unit	Details
1	Total no. of 1x65W Fans	No	431
2	Power consumption by 1x65W Fans (All fans)	kW	28.02
3	% of savings per fan if replaced by EE fan	%	45
4	% of savings in kW if all fans replaced by EE fans	kW	12.607
5	%of fans found to be ON during working hours	%	50
6	Energy savings for fans in ON condition (4 x 5%)	kW	6.30
7	Total working hours per day	hours	12.0
8	Annual savings (6 x **7** x **250days**)	kWh/Annum	18910.1
9	Average energy cost per kWh	Rs./kWh	9.82
10	Annual cost savings	Rs. lakh	1.9
11	Cost of fan	Rs.	2500.0
12	Total Investment cost for replacing all fans	Rs. lakh	10.8
13	Simple payback period (12 / 10)	Years	5.80

Table 4-15: EE Fans replacement and payback period calculations-Hostel block

4.5.3. Awareness posters on energy conservation

To create more awareness on energy conservation, Posters stating 'Switch off lights, Fans & appliances when not in use' or 'Use electricity wisely' or 'Once the Electricity is used -It cannot be regained' etc., need to be placed on the walls at all the appropriate places.

5. ANNEXURES

5.1. Data Collection Questionnaire

A questionnaire is a checklist used as the primary tool for the collection of data / information in a systematic manner that enables to perform the audit.

5.1.1. General information of the college:

General information of the college needs to be collected to get an overview of the campus for the walk-through purpose. It includes a set of questionnaires as given below.

1. Previous NAAC Grading's:

Previous NAAC Grading's of the college was collected from table 5-1.

S. No.	Phase	Grade	CGPA/Percentage	Year of Acc.	Acc. Period
1	I				
2	II				
3	III				

Table 5-1: NAAC grading's Table

2. Internal Quality Audit Team: 2020 – 2021

Table 5-2 depicts the format for the collection of Internal Quality Audit team.

S. No.	Name	Designation	Role
1			
2			
3			

Table 5-2: Internal Quality Audit team

3. General Information of the college

General information of the college includes an address of college and head office, contact person details, year of establishment etc., as given in table 5-3.

S. No.	Description	Details	
1.	Name of the College and address:		
1.a	Head office address :		
2.	Telephone/Fax No		
3.	Co-ordinating officer:	Name:	
		Mob:	
		Email:	
4.	Year of Establishment:		
5.	Hostel (Available/Not Available)		
6.	No. of Working days/year		
7.	Brief description of Campus		

Table 5-3: General information of the college

4. College Infrastructure

Infrastructure details of the college were gathered from table 5-4.

S. No.	Description	Details
1	Block Name	Class rooms
		Labs
		Staff rooms
		Wash rooms
2		
3		

Table 5-4: Detail Infrastructure of the college

5. Details of Student clubs
6. Details of cells that support students
7. Tentative Schedule of a working day:

a. No. of working days per year:
b. List of holidays:

8. Total area of the campus

9. Details of List of Departments and Courses (Faculty wise)

The total number of department, laboratories, conference hall, Libraries, Auditorium, and Cafeteria are obtained from table 5-5.

S. No.	Description	Details
1	Department	
2	Laboratories	
3	Conference Hall	
4	Libraries	
5	Auditorium	
6	Cafeteria	

Table 5-5: Details of the departments

10. Number of staff

Teaching, non-teaching, supporting staff with a male and female breakup is obtained from table 5-6

S. No.	Teaching Staff	Non-teaching Staff	Support Staff (Security, House Keeping)

	Male	Female	Male	Female	Male	Female

Table 5-6: Details of the Staff

11. Number of Students

Number of students is collected from table 5-7.

S. No.	Boys	Girls
1		

Table 5-7: Details of the Students

12. Additional infrastructure details have been collected from table 5-8.

S. No.	Description	Details	
1.	Number of blocks available for boys hostel	Nos.	
2.	Number of rooms available for boys hostel	Nos.	
3.	Number of blocks available for girls hostel	Nos.	
4.	Number of rooms available for girls hostel	Nos.	
5.	Whether Laundry is available in the hostel	Yes / No	
6.	If Yes List the Electrical Equipment in Laundry Section of the hostel (like Washing machine, Dry Cleaning Machine, Iron)		
7.	Whether gym/ indoor sports hall is available in hostel	Yes / No	
8.	Whether Solar PV based Power Generation is available in campus (academic or hostel block)	Yes / No	
9.	Whether lifts available in academic block	Yes / No	
10.	Whether Kitchen is available in the academic block	Yes / No	
11.	Whether any food counter (outside caterers) available in academic block	Yes / No	

12.	Whether any commercial shops available in academic block	Yes / No	
13.	Any more information or additional details of academic block you would like to share – kindly elaborate here		

Table 5-8: Details of the departments

5.1.2. Water Audit details:

1. General information

General information required for water management analysis is collected from table 5-9.

S. No.	Description	Details
1	Source of water	
2	Types of water	
3	No of Wells	
4	No of motors used	
5	No of bore wells	
6	Rating of the motors in HP	
7	Depth of each bore-well	
8	Water level of bore well	
9	Number of water tanks (overhead & underground tanks)	
10	Capacity of overhead tank	
11	Capacity of underground tank	
12	Quantity of water pumped every day	
13	Any water wastage of water /why?	
14	Water usage for gardening	
15	Waste water sources	
16	Use of waste water	
17	Faith of waste water from labs	
18	Whether waste water from labs mixed with ground water?	
19	Any treatment method available for lab water?	
20	Whether any green chemistry method practiced in labs?	
21	Total number of water coolers	
22	Whether Rain water harvesting system available?	
23	Whether Sewage Treatment Plant (STP) is available?	
24	List of equipment installed in STP (If S.No.23 is Yes)	
25	Whether Solar Hot Water System is available in the campus	

S. No.	Description	Details
26	Number of units and amount of water harvested	
27	Any leaky taps in the campus	
28	Amount of water lost per day	
29	Any water management plan used?	
30	Any water-saving techniques followed?	
31	Are there any signs reminding peoples to turn off the water?	
32	No. of water flow meters available	
33	Method of water consumption monitoring	
34	Breakup of daily water consumption	
35	Attach Month wise water bill for last 2 years	
36	Please attach recent water quality test reports for Bore well water, Drinking Water and STP processed water.	
37	What are the sources of hot water	
38	What are the usage areas of hot water	

Table 5-9: Water management details

2. STP information

STP details are collected from table 5-10

S. No.	Description	Details
1.	Number of STP plants installed	
2.	Capacity of STP	
3.	Technology of STP	
4.	Year of Installation	
5.	Schematic / Layout of STP	
6.	Water flow meters installed	
7.	Quantity of Sludge	
8.	Disposal of Sludge	

Table 5-10: Details of STP

3. RO Plant information

RO Plant details are obtained from table 5-11.

S. No.	Location	Quantity	Capacity
1.			
2.			

3.			

Table 5-11: Details of RO Plant

5.1.3. Energy consumption details:

1. Energy consumption details:

The energy consumption details required for the audit is collected, the brief format of the same is given in table 5-12.

S. No.	Type	Units		Value	Cost in Rs.
1	Electricity	kWh	2019		
			2020		
2	LPG	Cylinders			
3	Diesel	Litres (Month wise consumption for the last two years)			
4	Others resources (Please specify)				
5	Total connected load	kW			
6	Contract demand	kVA			
7	Maximum demand recorded	kVA			
8	Average power factor				
9	Energy charges	Rs./kWh			
10	Demand charges	Rs./kVA			
	*** Attach Electricity Bill Copy of last 2 years**				

Table 5-12: Details of Energy consumption

2. Solar Energy details:

The solar energy details required are collected from table 5-13.

S. No.	Building No./ Name	Solar water Heater			Solar PV System		
		Capacity	Working / Not working	Year of Installation	Capacity	Working / Not working	Year of Installation

Table 5-13: Details of Solar Energy

3. Solar Street lights details:

a. Quantity -
b. Capacity -
c. Year of Installation –

4. Electrical Equipment details:

Electrical Equipment like transformers DGs UPS Capacitor Bank, AC, Computers, water coolers, fans, exhaust fans are obtained from the table 5-14.

S. No.	Description	Details	
1.	Number of Transformers Installed	Nos.	
2.	Number of Electrical Panels / Electrical Panel Rooms	Nos.	
3.	Whether Diesel Generator Set Backup Power is Available	Yes / No	
4..	How many number of DG Sets available in the campus (If S.No.3 is Yes)	Nos.	
5.	Whether UPS is available for labs, computers and/or any equipment	Yes / No	
6.	Number of UPS installed with location and capacity (If S.No.5 is Yes)	Nos.	
7.	Whether Capacitor Banks is installed in the electrical panel rooms	Yes / No	
8..	Whether Air Conditioning Units have been installed in the campus	Yes / No	
9.	Type of AC units (split, cassette or packaged) available, capacity and installed location (If S.No.8 is Yes)	Nos.	
10.	Total number of computers available in the campus	Nos.	
11.	Type of computer monitors available (CRT, LCD, LED)	Nos.	
12.	Whether water coolers are installed in the academic blocks	Yes/No	

S. No.	Description	Details	
13.	Type of lamps (Fluorescent Tube Light, CFL, LED, Incandescent, Sodium / Mercury lamps, etc.,) installed in the campus	Nos.	
14.	Type of fans (ceiling, wall mount, standing, exhaust, etc.,) installed in the campus	Nos.	
15.	Whether exhaust fans are installed in hostel / kitchen.(If Yes, share the quantity and installed location)	Yes /No	
16.	Any other electrical equipment's in college buildings.		

Table 5-14: Details of Electrical Equipment

5. List of energy saving initiatives implemented
6. List of energy saving initiatives in plan for future

5.1.4. Waste management details:

Waste management includes the activities and actions required to manage waste from its inception to its final disposal. The various data/ information required for the assessment of waste management is as collected from the following set of questionnaires.

1. Basic information

Basic information for waste management is collected from table 5-15.

S. No.	Description	Yes/ No
1	Whether wet and dry garbage segregation is done inside the campus?	
2	Whether garbage is given to external agencies / municipal agencies?	

Table 5-15: Basic details of waste management

2. Types of Waste generated

Types of waste generated in the college are obtained from table 5-16.

S. No.	Description	Yes / No	Remarks
1	E-Waste (Computers, electrical and electronic parts)		
2	Hazardous / Chemical Waste		
3	Solid Waste (Damaged furniture, paper waste, paper plates)		
4	Dry Leaves		
5	Food Waste		
6	Waste Water (Washing, urinals, bathrooms)		
7	Glass Waste (Broken glass wares from the labs)		
8	Unused Materials		
9	Plastic Waste (Pen, Refill, Plastic water bottles and other plastic containers, wrappers etc.)		

Table 5-16: Types of waste generated

3. Segregation of waste

Segregation of waste information at different locations with quantity is gathered from table 5-17.

S. No.	Location	Bio-degradable	Non-Biodegradable	E-waste	Quantity, kgs/month
1	Office				
2	Labs				
3	Cafeteria / Kitchen				
4	College				

Table 5-17: Segregation of waste

4. Waste generation management

Waste generation management of the college was collected from table 5-18

S. No.	Description	Yes / No	Remarks
1	Composting / Vermicomposting		
2	Recycling		
3	Reusing		
4	Other ways		

Table 5-18: Waste Disposal methods

5.1.5. Green campus management details:

1. Total number of plants and trees

The total number of plantations, garden area, and many more are collected as per the set of questionnaires given in table 5-19

S. No	Description	Details
1	Total number of plant species identified	
2	Total number of plants on the campus	
3	Total number of Trees on the campus	
4	Garden area inside the college –	
5	Total number of medicinal plants /trees on the campus	
6	Total number of vegetables and fruits plantation in the campus	
7	Whether display boards are given to plants and trees for identification	

8	Does Institute celebrate World environment day?	
9	Does Institute celebrate World water day?	
10	Does Institute celebrate World ozone day?	
11	Does Institute celebrate World Earth day?	
12	Total number of aquatic water plants	

Table 5-19: List of plantation details

2. List of plants/ trees

List of plants/ trees with their scientific names obtained from table 5-20.

S. No.	Common/Local Name	Scientific name	No. of Trees/Plants

Table 5-20: List of plants/trees in campus

5.1.6. Carbon footprint management details:

The carbon emission from various activities such as transport, diesel generator usage, LPG consumption, and electricity consumption were collected, as per table 5-21.

S. No	Description	Details
1	Whether college provides transport facility for staff and students (Yes/No)	
2	Number (or Percentage) of staff using transport services provided by college	
3	Number (or Percentage) of students using transport services provided by college	
4	Number (or Percentage) of Staff using public transport	
5	Number (or Percentage) of Staff using Bike	
6	Number (or Percentage) of Staff using Car	
7	Number (or Percentage) of students using Public transport	
8	Number (or Percentage) of students using Car	
9	Number (or Percentage) of students using Bike	
10	Number (or Percentage) of students using Bicycles	
11	Average consumption of diesel per month	
12	Average electricity consumption per month	
13	Average LPG consumption per month	

Table 5-21: Details of Carbon footprint management

5.1.7. Photos required for Audit:

1. General Photos

In various sections, different types of photos are required to validate the existence of things, and hence they are collected from table 5-22.

S. No	Description	Details
1	Photos of student's NSS activities	
2	Photos of Safety policy	
3	Photos of the training program on the use of fire extinguishers	
4	Photos of environmental policies adopted by college	
5	Photos of MoUs for Waste management	

6	Photos of any other policies adopted by college		
7	Photos of water test report	Drinking Water	
		STP processed water	
		Bore-well water	
		Other water Sources (Like Tanker water and any other)	
8	Photos of use of Energy efficient devices like fan, bulbs etc.		
9	Photos of LCD/LED monitors used in Labs		
10	Photos of dry and wet waste collection bins		
11	Photos of celebrating World Environment Day		
12	Photos of celebrating World Water Day		
13	Photos of celebrating World Earth Day		
14	Photos of celebrating World Ozone Day		

Table 5-22: List of photos

QUALITY AUDIT REPORT

ON

ENVIRONMENT AUDIT

OF

THE OXFORD COLLEGE OF ENGINEERING

10TH MILESTONE, BOMMANAHALLI, HOSUR ROAD,

BANGALORE - 560 068

ECO ENERGIME ENGINEERS LLP

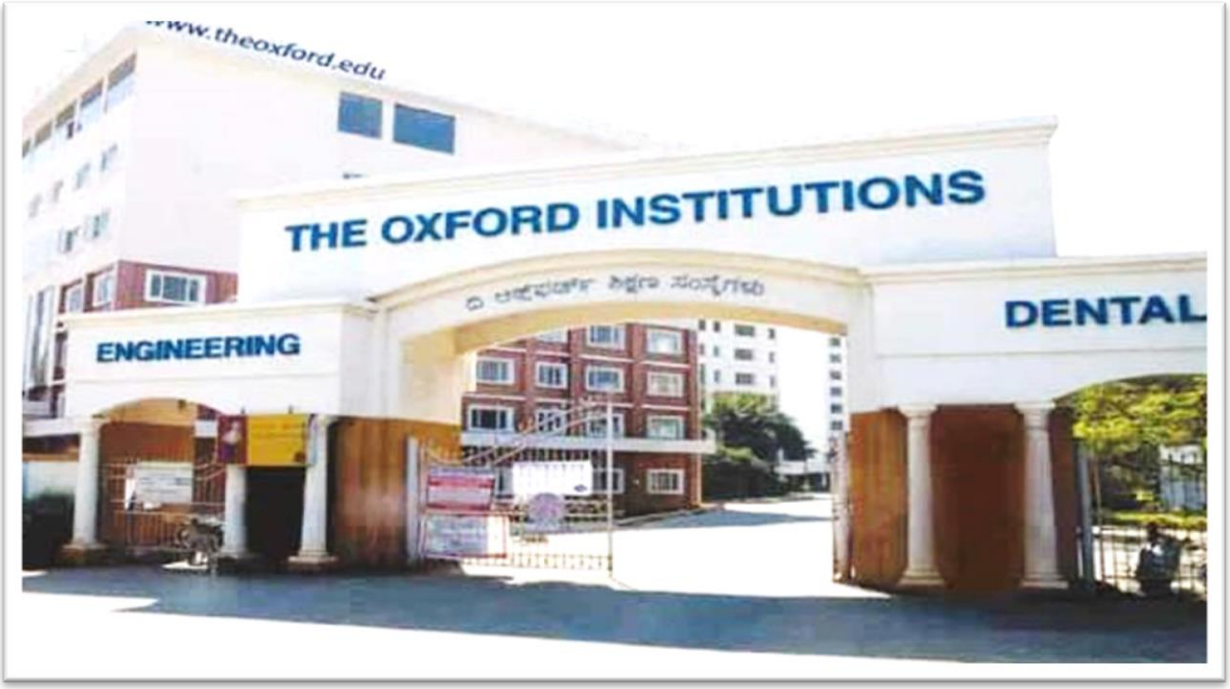
ENHANCING RESOURCE EFFICIENCY

QUALITY AUDIT REPORT

OF

'THE OXFORD COLLEGE OF ENGINEERING'

10TH MILESTONE, BOMMANAHALLI, HOSUR ROAD, BANGALORE - 560 068



For More Information

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ACKNOWLEDGEMENTS

We are thankful to the management of **The Oxford College of Engineering, Bengaluru,** for the support, guidance and, giving us the opportunity to be involved in this very interesting and challenging assignment.

We would be happy to provide any further clarifications, if required, to facilitate the implementation of the recommendations.

We received full co-operation and support from the concerned personnel/ staff members of the college. We would like to thank:

Chairman – The Oxford Educational Institutions

The Oxford College of Engineering

And other Staff in personnel who have given full co-operation and support. They took a keen interest and gave valuable inputs during the course of study.

Certificate

of Completion

This is to certify that

The Oxford College of Engineering, Bommanahalli, Bengaluru

has successfully completed

Environment Audit
(aspects of carbon footprint)

The study was conducted by
Eco Energime Engineers LLP, Bengaluru.

Start Date : 11.11.2020
End Date : 14.11.2020

Date Of Issue : 24.11.2020
Valid Till : 23.11.2021

Aparna R.

Aparna Reddy
Director
EEELLP

A.Govindaraj
Director
EEELLP

Smart Solutions for Sustainable Tomorrow

Issued by Eco Energime Engineers LLP, Bangalore.
www.eeellp.com

EEELLP ACKNOWLEDGEMENT

EEELLP team thanks the management of **The Oxford College of Engineering, Bengaluru** for assigning this interesting work to us. We appreciate the co-operation extended to our team during the entire process.

Our special thanks are due to Principal & Team of colleagues for giving us necessary inputs to carry out this very vital exercise. We would like to thank all the head of the departments and staff members who were actively involved while collecting the data and conducting field measurements.

DISCLAIMER

The Audit Team has prepared this report for The Oxford College of Engineering, Bengaluru based on the input data submitted by the representatives of college complemented with the best judgment capacity of the expert team.

While all reasonable care has been taken in its preparation, details contained in this report have been compiled in good faith based on information gathered.

It is further informed that the recommendations are arrived following best judgments and no representation, warranty or undertaking, express or implied is made and no responsibility is accepted by Audit Team in this report or for any direct or consequential loss arising from any use of the information, statements or forecasts in the report

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ABBREVIATION AND ACRONYMS

1.	A	:	Amperes
2.	AC	:	Air Conditioner
3.	APFC	:	Automatic Power Factor Controller
4.	AMF	:	Automatic Mains Failure
5.	BBMP	:	Bruhat Bengaluru Mahanagara Palike
6.	BESCOM	:	Bangalore Electricity Supply Company
7.	BWSSB	:	Bangalore Water Supply and Sewerage Board
8.	CC Camera	:	Closed Circuit Camera
9.	DG	:	Diesel Generators
10.	EE Fan	:	Energy Efficient Fan
11.	E-Waste	:	Electronic Waste
12.	FTL	:	Fluorescent Tube Light
13.	GHG	:	Green House Gas
14.	Hz	:	Hertz
15.	HP	:	Horse Power
16.	HT	:	High Tension
17.	I	:	Current
18.	ICT	:	Information and Communications Technology
19.	IQAC	:	Internal Quality Assurance Cell
20.	ISO	:	International Organization for Standardization
21.	kgs	:	Kilograms
22.	kL	:	Kilo Liters
23.	kV	:	kilo volt
24.	kVA	:	kilo volt ampere
25.	kVAr	:	Reactive kilo volt ampere
26.	kW	:	Kilo Watt
27.	kWh	:	kilo Watt hour
28.	kWp	:	kilo Watt peak
29.	LCD	:	Liquid Crystal Display
30.	LED	:	Light Emitting Diode
31.	LT	:	Low Tension
32.	mA	:	Milli Amperes
33.	MoU	:	Memorandum of Understanding
34.	NA	:	Not Applicable
35.	NAAC	:	National Assessment and Accreditation Council
36.	NSS	:	National Service Scheme
37.	OHT	:	Over Head Tank
38.	Prim/Sec	:	Primary/Secondary
39.	PF	:	Power factor
40.	Ph.D.	:	Doctor of Philosophy

41.	PV	:	Photo Voltaic
42.	RCC	:	Reinforced Cement Concrete
43.	RO	:	Reverse Osmosis
44.	RR. No.	:	Revenue Register Number.
45.	Sq. Ft.	:	Square Feet
46.	Sq.m.	:	Square Meter
47.	SRTPV	:	Solar Roof Top Photo Voltaic
48.	TL	:	Tube Light
49.	TR	:	Ton of Refrigeration
50.	TV	:	Television
51.	V	:	Volts
52.	W	:	Watts
53.	Wi-Fi	:	Wireless Fidelity
54.	Wp	:	Watt peak
55.	#	:	Number

1. INTRODUCTION

The Oxford College of Engineering was started in the year 2000, is one of the most prestigious institutions in Bengaluru that provides quality teaching and training in professional UG courses in 10 streams of Engineering in, Computer Science, AIML, Electronics and Communication, Electrical and Electronics, Mechanical, Civil, Bio-Technology, Mechatronics & Automobile. College also offers 10 Postgraduate programs in Technology (M. Tech), Computer Application (MCA) and Business Administration (MBA), and 11 Research centers recognized by VTU to offer Ph.D. programs. College is affiliated with the Visvesvaraya Technological University (VTU) and approved by the All-India Council for Technical Education (AICTE). The college also has been accredited by the NBA, and IAO quality-assessed organizations. The Institute name is also included in the NIRF & AICTE CII Survey of Industry Linked Technical Institute- 2020. Institution is categorized in Band promising in ARIIA ranking in the year 2021. The college is set in a sprawling 11.5 acres campus in the prestigious IT corridor, ideal for education in a serene environment with over 85,000 square meters of built-up area spread over 2 blocks, with enormous investment for academic purposes. The college has well equipped with state-of-the-art infrastructure facilities to carry out various real-time projects, research, and consultancy activities in recent technologies. All the Departments have undertaken many research/consultancy projects funded both by multinationals and government agencies. The college has a good number of research publications in various reputed journals and patents. College has a good number of R&D projects sponsored by AICTE, VGST, VTU, IEEE, ICMR BRNS, NIF, NRB(DRDO) & BIRAC. It has a history of excellent placement track record in various multinational companies' offers with high salary packages.

VISION

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

MISSION

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

QUALITY POLICY

To equip the students with highest standard of education, knowledge and ethics. To prepare them to meet the challenges of life with full confidence. Aim at all round development of the personality to be useful citizens.

Campus Area and Built-up area

The area of the campus (built up and total) area is given in table 1-1.

S. No.	Description	Units	Details
1	Engineering Campus total area	Acres	11.5
2	Built up area	Sq. mt.	85,000

Table 1-1: College Area

Committee and Cells

The Oxford College of Engineering (TOCE) has various functional committees and cells. They are listed below,

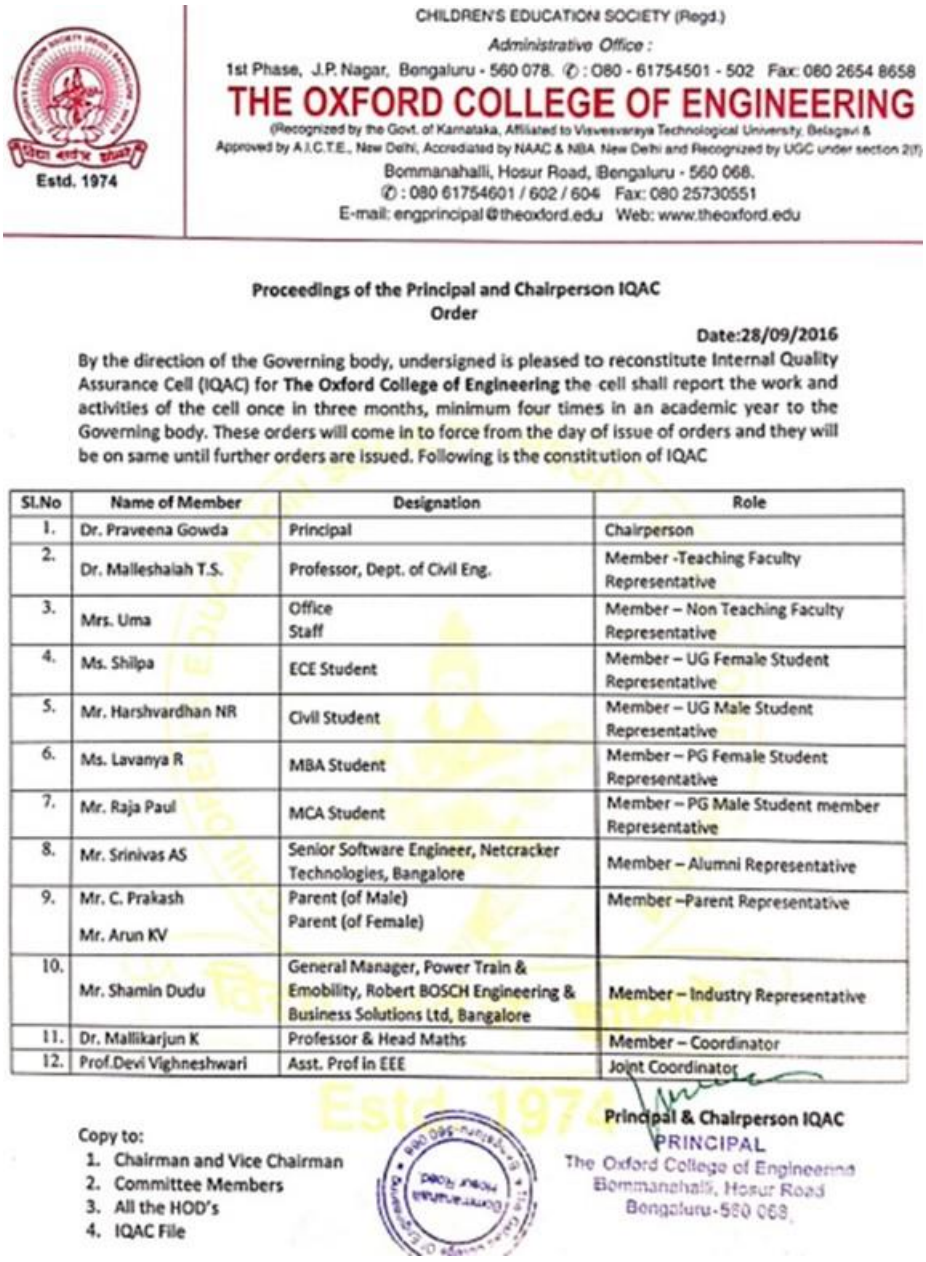
- VTU/AICTE Committee
- Planning & Accreditation Committee
- Library Committee
- Research and Development Committee
- Training & Placement Committee
- Faculty Development Committee
- Purchase & Budget Committee
- College Magazine/Calendar /Newsletter Committee
- Professional Societies / Chapters
- Cultural Association
- Alumni Association
- Sports Committee

- NSS
- Students Grievances Redressal Committee
- Discipline Committee
- Women's Grievance Redressal Committee
- Anti-sexual Harassment Committee
- Entrepreneurship & Incubation cell
- Anti-Ragging Committee
- Website, Server & Internet Committee
- Public Relation Committee
- Hostel & Canteen Committee
- Prevention of Caste Based Discrimination Cell
- College Internal Complaints Committee
- Internal Task Force Team - COVID 19 Coordination Committee
- Internal Quality Assurance Cell (IQAC)
- Exam Cell
- Disability Recourse Centre
- IPR Cell
- IA Answer Scripts Evaluation Review Committee
- IA Question Paper Scrutiny Committee

Internal Quality Assurance Cell (IQAC)

The college management constitutes the Internal Quality Assurance Cell including Principal, teaching faculty, non-teaching faculty, UG students (Male & Female), PG students (Male & Female), alumni, parent and industry representatives every year.

The list of Internal Quality Assurance Cell members for the academic year 2016-2017 is shown in figure 1-1.



CHILDREN'S EDUCATION SOCIETY (Regd.)

Administrative Office :

1st Phase, J.P. Nagar, Bengaluru - 560 078. ✆ : 080 - 61754501 - 502 Fax: 080 2654 8658

THE OXFORD COLLEGE OF ENGINEERING

(Recognized by the Govt. of Karnataka, Affiliated to Visvesvaraya Technological University, Belagavi & Approved by A.I.C.T.E., New Delhi, Accrediated by NAAC & NBA New Delhi and Recognized by UGC under section 2(f)

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Estd. 1974

Proceedings of the Principal and Chairperson IQAC

Order

Date:28/09/2016

By the direction of the Governing body, undersigned is pleased to reconstitute Internal Quality Assurance Cell (IQAC) for **The Oxford College of Engineering** the cell shall report the work and activities of the cell once in three months, minimum four times in an academic year to the Governing body. These orders will come in to force from the day of issue of orders and they will be on same until further orders are issued. Following is the constitution of IQAC

Sl.No	Name of Member	Designation	Role
1.	Dr. Praveena Gowda	Principal	Chairperson
2.	Dr. Malleshaiah T.S.	Professor, Dept. of Civil Eng.	Member -Teaching Faculty Representative
3.	Mrs. Uma	Office Staff	Member – Non Teaching Faculty Representative
4.	Ms. Shilpa	ECE Student	Member – UG Female Student Representative
5.	Mr. Harshvardhan NR	Civil Student	Member – UG Male Student Representative
6.	Ms. Lavanya R	MBA Student	Member – PG Female Student Representative
7.	Mr. Raja Paul	MCA Student	Member – PG Male Student member Representative
8.	Mr. Srinivas AS	Senior Software Engineer, Netcracker Technologies, Bangalore	Member – Alumni Representative
9.	Mr. C. Prakash Mr. Arun KV	Parent (of Male) Parent (of Female)	Member –Parent Representative
10.	Mr. Shamin Dudu	General Manager, Power Train & Emobility, Robert BOSCH Engineering & Business Solutions Ltd, Bangalore	Member – Industry Representative
11.	Dr. Mallikarjun K	Professor & Head Maths	Member – Coordinator
12.	Prof.Devi Vighneshwari	Asst. Prof in EEE	Joint Coordinator

Copy to:

1. Chairman and Vice Chairman
2. Committee Members
3. All the HOD's
4. IQAC File

Principal & Chairperson IQAC

PRINCIPAL

The Oxford College of Engineering

Bommanahalli, Hosur Road

Bengaluru-560 068

Figure 1-1: List of IQAC members 2016-2017

The list of Internal Quality Assurance Cell members for the academic year 2017-2018 is shown in figure 1-2.

CHILDREN'S EDUCATION SOCIETY (Regd.)

Administrative Office :

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✆ : 080 61754601 / 602 / 604 Fax: 080 25730551

E-mail: engprincipal@theoxford.edu Web: www.theoxford.edu

Estd. 1974

Proceedings of the Principal and Chairperson IQAC

Order

Date:28/09/2017

By the direction of the Governing body, undersigned is pleased to reconstitute Internal Quality Assurance Cell (IQAC) for **The Oxford College of Engineering** the cell shall report the work and activities of the cell once in three months, minimum four times in an academic year to the Governing body. These orders will come in to force from the day of issue of orders and they will be on same until further orders are issued. Following is the constitution of IQAC.

Sl.No	Name of Member	Designation	Role
1.	Dr. Praveena Gowda	Principal	Chairperson
2.	Dr. Malleshaiah T.S.	Professor, Dept. of Civil Eng.	Member -Teaching Faculty Representative
3.	Mrs. Uma	Office Staff	Member – Non Teaching Faculty Representative
4.	Ms. Shilpa	ECE Student	Member – UG Female Student Representative
5.	Mr. Harshvardhan NR	Civil Student	Member – UG Male Student Representative
6.	Ms. Lavanya R	MBA Student	Member – PG Female Student Representative
7.	Mr. Raja Paul	MCA Student	Member – PG Male Student member Representative
8.	Mr. Srinivas AS	Senior Software Engineer, Netcracker Technologies, Bangalore	Member – Alumni Representative
9.	Mr. C. Prakash Mr. Arun KV	Parent (of Male) Parent (of Female)	Member –Parent Representative
10.	Mr. Shamin Dudu	General Manager, Power Train & Emobility, Robert BOSCH Engineering & Business Solutions Ltd, Bangalore	Member – Industry Representative
11.	Dr. Mallikarjun K	Professor & Head Maths	Member – Coordinator
12.	Prof.Devi Vighneshwari	Asst. Prof in EEE	Joint Coordinator

Principal & Chairperson IQAC

PRINCIPAL
The Oxford College of Engineering
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Bengaluru-560 068

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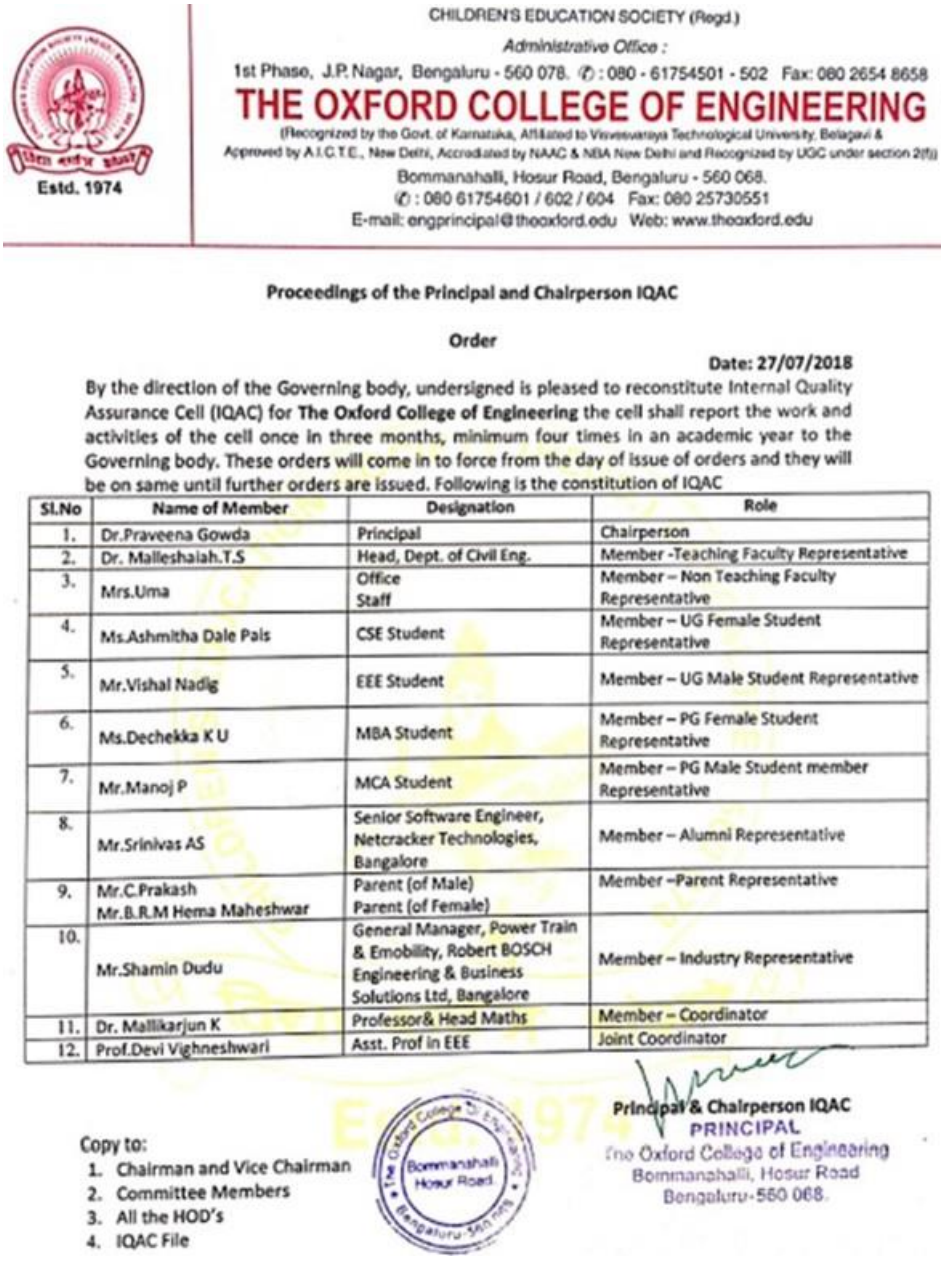
4. IQAC File

Figure 1-2: List of IQAC members 2017-2018

The list of Internal Quality Assurance Cell members for the academic year 2018-2019 is shown in figure 1-3.



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Order

Date: 27/07/2018

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Sl.No	Name of Member	Designation	Role
1.	Dr.Praveena Gowda	Principal	Chairperson
2.	Dr. Malleshaiah.T.S	Head, Dept. of Civil Eng.	Member -Teaching Faculty Representative
3.	Mrs.Uma	Office Staff	Member – Non Teaching Faculty Representative
4.	Ms.Ashmitha Dale Pais	CSE Student	Member – UG Female Student Representative
5.	Mr.Vishal Nadig	EEE Student	Member – UG Male Student Representative
6.	Ms.Dechekka K U	MBA Student	Member – PG Female Student Representative
7.	Mr.Manoj P	MCA Student	Member – PG Male Student member Representative
8.	Mr.Srinivas AS	Senior Software Engineer, Netcracker Technologies, Bangalore	Member – Alumni Representative
9.	Mr.C.Prakash Mr.B.R.M Hema Maheshwar	Parent (of Male) Parent (of Female)	Member –Parent Representative
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Principal & Chairperson IQAC

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Figure 1-3: List of IQAC members 2018-2019

The list of Internal Quality Assurance Cell members for the academic year 2019-2020 is shown in figure 1-4.

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1.	Dr.A.S.Aravind	Principal	Chairperson
2.	Dr. Malleshalah.T.S	Head, Dept. of Civil Eng.	Member -Teaching Faculty Representative
3.	Mrs.Uma	Office Staff	Member – Non Teaching Faculty Representative
4.	Ms.Ashmitha Dale Pais	CSE Student	Member – UG Female Student Representative
5.	Mr.VishalNadig	EEE Student	Member – UG Male Student Representative
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10.	Mr.Shamin Dudu	General Manager, Power Train & Emobility, Robert BOSCH Engineering & Business Solutions Ltd, Bangalore	Member – Industry Representative
11.	Dr. Shashidhar	Professor & Head MCA	Member – Coordinator
12.	Prof.Devi Vighneshwari	Asst. Prof in EEE	Joint Coordinator

Principal & Chairperson IQAC

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Figure 1-4: List of IQAC members 2019-2020

The list of Internal Quality Assurance Cell members for the academic year 2020-2021 is shown in figure 1-5.

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Proceedings of the Principal and Chairperson IQAC

Order

Date:17/08/2020

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3.	Mrs.Uma	Office Staff	Member – Non Teaching Faculty Representative
4.	Ms.Sahana H G	CSE Student	Member – UG Female Student Representative
5.	Mr.Dildar Bashir	EEE Student	Member – UG Male Student Representative
6.	Ms. Dhanyatha K	MBA Student	Member – PG Female Student Representative
7.	Mr.Anmol	MCA Student	Member – PG Male Student member Representative
8.	Mr.Srinivas AS	Senior Software Engineer, Netcracker Technologies, Bangalore	Member – Alumni Representative
9.	Mr.C.Prakash Mr.B.R.M Hema Maheshwar	Parent (of Male) Parent (of Female)	Member –Parent Representative
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Copy to:
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3. All the HOD's
4. IQAC File

The Oxford College of Engineering Bommanahalli Hosur Road

Principal & Chairperson IQAC

PRINCIPAL
The Oxford College of Engineering
Bommanahalli, Hosur Road
Bengaluru-560 068

Figure 1-5: List of IQAC members 2020-2021

Overview of Quality Audit:

Quality Audit helps college / facility to:

- Understand the usage of electricity, water and other natural resources
- Identify opportunities to conserve various natural resources
- Identify various technological improvements
- Evaluate the techno-commercial of identified conservative measures
- Create awareness among the students and staff
- Disseminate the commitment of management towards saving nature
- Develop a culture among students, staff and management to be socially responsible

2. PRE – AUDIT PHASE

A Pre-audit meeting is a prerequisite for the audit, it helps to meet and discuss about the schedule and documents required during the audit. The pre-audit meeting was conducted at The Oxford College of Engineering. During the meeting, introduction of team members, scope and objectives of the audit were discussed.

Management Commitment

The Management of the college has shown great commitment towards Quality Audit during the pre-audit meeting. They were ready to encourage all green activities. It is decided to promote all activities that are environment friendly such as awareness programmes on the environment, campus farming, planting more trees on the campus etc., after the Quality Auditing.

College administration is vital to the process of realizing campus sustainability, and college policy is an essential instrument for any substantial change in the campus environment.

Scope and Goals of Quality Auditing

A clean and healthy environment aids effective learning and provides conducive learning environment. There are various efforts around the world to address environmental education issues. Quality auditing is one among them for educational institutions.

Once a baseline is established, the data can serve as a point of departure for further action in campus greening. Existing data will allow the college to compare its programs and operations with those of peer institutions, identify areas in need of improvement, and prioritize the implementation of future projects.

This data will also provide a basis for calculating the economic benefits of resource conservation projects, by establishing the current rates of resource use and their associated costs. This audit initiative focused initially on educating colleges and universities through workshops, guidebooks, fact sheets and ensuring compliance through inspections and self-audits.

3. ON-SITE AUDIT PHASE

3.1. Scope / Target Areas of Quality Auditing

3.1.1. Water Audit

Water Audit addresses water consumption, water sources, appliances and fixtures. Aquifer depletion and water contamination are taking place at unprecedented rates. It is therefore essential that any environmentally responsible institution should examine its water use practices.

3.1.2. Energy Audit

Energy Audit addresses energy consumption, energy sources, energy monitoring, lighting, appliances, and vehicles. Energy use is clearly an important aspect of campus sustainability.

3.1.3. Waste Management Audit

Waste Audit addresses waste production and disposal, plastic waste, paper waste, food waste, and recycling. Municipal solid waste has a number of adverse environmental impacts, most of which are well known and not in need of elaboration.

3.1.4. Green Campus Management Audit

Green campus initiatives are becoming an integral part of modern day's university systems. Green campus Audit helps in maintaining the air and water clean. It regulates the climatic conditions and provides a healthy and comfortable environment for living.

3.1.5. Environment Footprint Audit

Environment Footprint Audit addresses the usage of fossil fuels (coal, diesel, petrol and gas). The mode of commute to and from college each day has an impact on the environment through the emission of greenhouse gases into the atmosphere by the burning of fossil fuels.

3.2. Audit Methodology and Approach

The methodology and approach adopted for the study involve various steps that include:

- Review of Document and records
- Review of Policies
- Review of MoU
- Review of various measures implemented
- Site Walkthrough
- Data Collection
- Interviews

3.2.1. Review of Document and Records

The various documents and records such as:

- Electricity bills
- Water bills
- Equipment registers
- List of appliances
- Internal Quality Audit document
- Purchase document
- Cash payment receipts
- Equipment service report
- Maintenance and service payment receipts

were reviewed and, relevant data and inputs required for analysis have been collected.

3.2.2. Review of Policies

College has various policies that include safety policy and Anti-ragging policy.

A. Safety Policy:

All the students, teaching staff, non-teaching staff, maintenance and house-keeping staff have been given training to use fire extinguishers in emergency situations of fire and explosion. Fire hydrant system is available at the campus. Also, fire extinguishing cylinders have been installed in each floor and in laboratory areas. Fire order statements and use of fire extinguisher has been posted at each block. Fire alarm is also installed at the premises. Photos of fire order and fire alarm are shown in figure 3-1 and 3-2.

Figure 3-1: Fire order displayed at college premises

Figure 3-2: Fire alarm panel at engineering old block

B. Anti-Ragging policy:

Ragging in all its forms shall be totally banned in the entire institution, including its departments, constituent units, all its premises (academic, hostel, sports, canteen, etc.) whether located within the campus or outside and in all means of transportation of students whether public or private. **'Say No to Ragging'** poster is placed in each block of the campus and a sample photo is as shown in the figure 3-3.

Figure 3-3: Anti-ragging poster

3.2.3. Review of various measures implemented

During the Quality Audit study, it was observed the college has taken various initiatives in conserving natural resources that include:

- Internal Quality Assurance Cell including Staff, Students, Alumni, parents and industrial members.
- Installation of Solar Roof Top Photo Voltaic (SRTPV) system for power generation.
- Wheeling to grid is done.
- Installation of LED fixtures to reduce electricity consumption
- Installation of LCD/LED monitors for all the desktops to conserve electricity
- Switching OFF lights and fans whenever not in use to save electricity
- Installation of RO plant to provide purified drinking water.
- Dual water piping system for washrooms and toilets, to use STP treated water for flushing
- Sewage treatment and using the treated final water for toilet flushing, gardening and cleaning purposes
- Rain water harvesting system is available in the campus.
- Regular testing of STP treated water quality parameters
- Dedicated watering system for greeneries.
- The use of sign boards in all the wash rooms were observed, to create awareness for water conservation
- Installation of waste segregation bins at all the rooms to separate the dry and wet waste
- Maintenance of logbooks and registers is done properly.
- Training is conducted on regular basis regarding usage of fire extinguisher, conservation of resources such as electricity, water, food and green campus.
- Maintenance team is available for electrical, plumbing, waste management and green campus management.

3.2.4. Site walk through

Site walk through was conducted with staff members, students and audit team members. Staff and students have shown very keen interest in the data collection process and methods to be followed in field data collection. The staff and students have given inputs and suggestions for resource conservation as well.

College Infrastructure

The Oxford College of Engineering campus has various blocks and departments. Each floor has state of the art class rooms, staff rooms, laboratories, libraries and many more. Details of infrastructure are as follows:

- Inhouse hostel for boys and girls
- Bank facility
- 24 hrs. atm in the campus
- Solar plant
- Rain water harvesting
- RO water facility
- Lifts & ramps
- Cafeteria
- Gymnasium
- Cricket stadium / basketball court / badminton court
- Wi-Fi facility in the campus
- CCTV security
- Telephone and fax facility
- Photocopying facility
- The oxford enterprises (stationery)
- Library

- Digital library
- Extended library hours
- Hospital facility
- Free dental treatment
- First aid, medical and counseling facility
- Scholarships
- Group insurance
- Placements
- Placements training
- English language coaching
- Add-on courses
- Cloud based ERP for students
- Transport
- Parking facility
- Cultural activities center
- Incubation Centre for research activity
- Staff room
- Smart class rooms
- Conference room
- Student common room
- Green campus

3.2.5. Inventory Collection

To understand the types of appliances used, inventory collection was carried out by the audit team members. The various types of appliances used are lights, fans, computers, projectors, printers, scanners etc., The consolidated list of inventories is given in table 3-1.

S. No.	Dept	Florescent Tube Light		LED		CFL	Fan		Computer		Exhaust Fans	Scanners	Printers	Xerox Machine	CC Camera	TV Screen	Projector	AC	Refridgerator
		40 W	MOR (36W)	18W Tube	12 W		Ceiling Fan	Wall mount Fan	LED /LCD Monito	CRT Monitors									
1	AUTO ENGG	64	0	12	0	0	26	6	5	0	0	1	2	0	0	0	1	0	
2	BT	86	0	0	0	0	42	0	10	9	2	2	2	2	8	0	1	2	4
3	Chemistry	0	0	17	0	0	12	0	0	0	0	0	0	0	0	0	0	0	
4	CSE	52	0	141	0	0	59	13	3	218	0	0	0	4	0	12	0	5	1
5	Civil	52	0	16	0	0	56	4	30	0	0	1	3	0	0	0	0	0	
6	ECE	81	0	0	0	0	44	11	48	0	3	0	4	0	7	0	3	1	
7	EEE	48	2	0	6	0	54	2	41	0	0	0	2	0	7	0	1	0	0
8	ISE	34	0	77	0	0	29	5	128	0	0	0	2	0	0	0	1	0	
9	Library	0	45	0	0	0	53	0	30	0	0	1	1	0	0	0	0	0	
10	Maths	16	0	0	0	0	14	1	5	0	0	0	7	0	0	0	0	0	
11	MBA	39	0	0	0	96	42	0	16	0	0	0	2	0	0	0	3	3	
12	MCA	51	0	0	0	0	31	0	242	0	0	0	2	0	3	0	0	9	
13	MECH	89	0	0	0	0	59	0	84	0	2	0	2	0	5	2	3	0	
14	MTE	24	0	0	0	0	19	0	3	0	0	0	1	0	4	0	1	0	
15	PHYSICS	39	0	0	0	0	27	1	2	0	0	0	1	0	6	0	0	0	
Total (College)		675	47	263	6	96	567	43	647	227	7	5	31	6	40	14	14	20	5
Total(Hostel)		413	0	71	0	0	431	0	1	0	0	0	1	0	0	0	0	0	0
Total (Overall)		1088	47	334	6	96	998	43	648	227	7	5	32	6	40	14	14	20	5

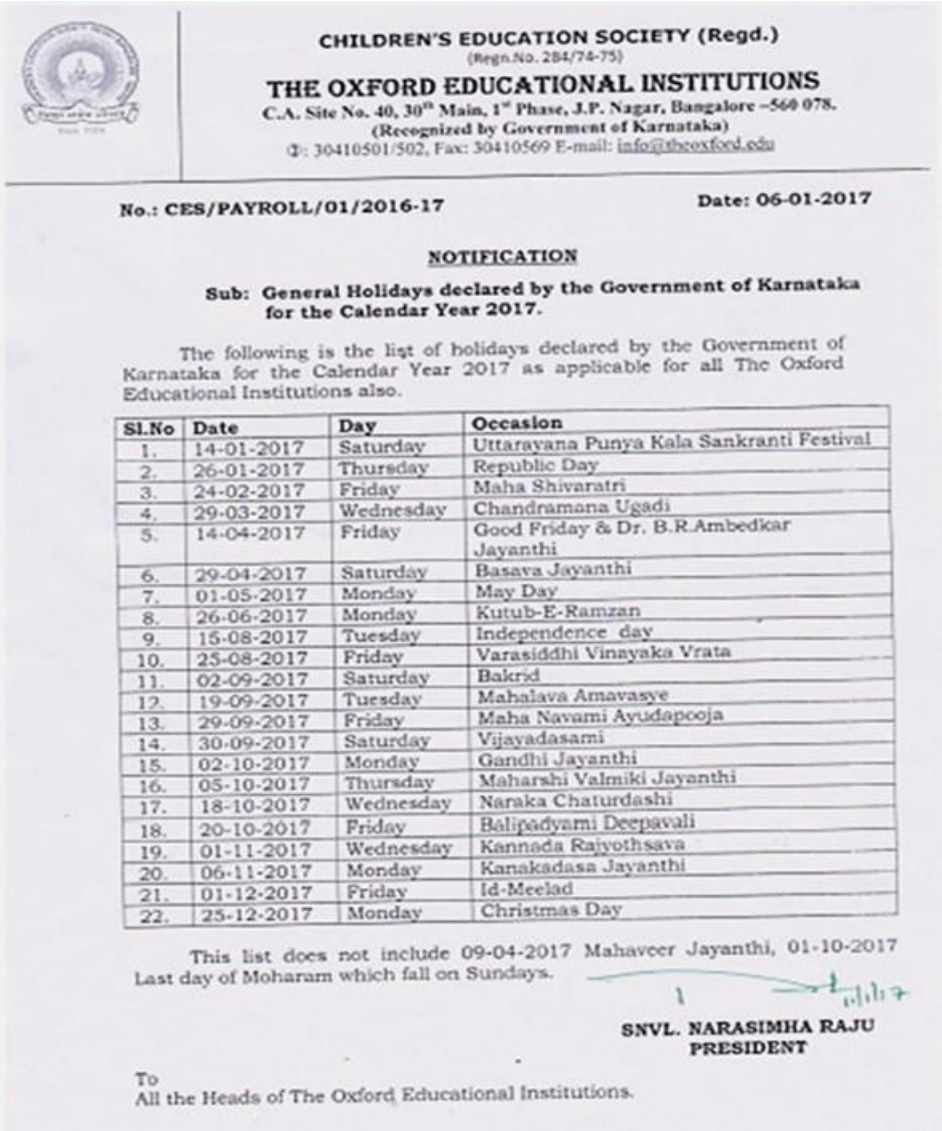
Table 3-1: Consolidated list of inventories

3.2.6. Interviews

To collect the various data, information and operating patterns, interviews were conducted with college staff (Principal, teaching staff, non-teaching staff) and students. The consolidated information from the interviews is given in the following sub-sections.

3.2.6.1. List of Holidays:

The lists of holidays were collected during the study and the same is given below. The list of holidays for the year 2017 is shown in figure 3-4.



CHILDREN'S EDUCATION SOCIETY (Regd.)
(Regn.No. 284/74-75)
THE OXFORD EDUCATIONAL INSTITUTIONS
C.A. Site No. 40, 30th Main, 1st Phase, J.P. Nagar, Bangalore –560 078.
(Recognized by Government of Karnataka)
✆: 30410501/502, Fax: 30410569 E-mail: info@theoxford.edu

No.: CES/PAYROLL/01/2016-17 Date: 06-01-2017

NOTIFICATION

Sub: General Holidays declared by the Government of Karnataka for the Calendar Year 2017.

The following is the list of holidays declared by the Government of Karnataka for the Calendar Year 2017 as applicable for all The Oxford Educational Institutions also.

Sl.No	Date	Day	Occasion
1.	14-01-2017	Saturday	Uttarayana Punya Kala Sankranti Festival
2.	26-01-2017	Thursday	Republic Day
3.	24-02-2017	Friday	Maha Shivaratri
4.	29-03-2017	Wednesday	Chandramana Ugadi
5.	14-04-2017	Friday	Good Friday & Dr. B.R.Ambedkar Jayanthi
6.	29-04-2017	Saturday	Basava Jayanthi
7.	01-05-2017	Monday	May Day
8.	26-06-2017	Monday	Kutub-E-Ramzan
9.	15-08-2017	Tuesday	Independence day
10.	25-08-2017	Friday	Varasiddhi Vinayaka Vrata
11.	02-09-2017	Saturday	Bakrid
12.	19-09-2017	Tuesday	Mahalaya Amavasye
13.	29-09-2017	Friday	Maha Navami Ayudapooja
14.	30-09-2017	Saturday	Vijayadasami
15.	02-10-2017	Monday	Gandhi Jayanthi
16.	05-10-2017	Thursday	Maharshi Valmiki Jayanthi
17.	18-10-2017	Wednesday	Naraka Chaturdashi
18.	20-10-2017	Friday	Balipadyami Deepavali
19.	01-11-2017	Wednesday	Kannada Rajyothsava
20.	06-11-2017	Monday	Kanakadasa Jayanthi
21.	01-12-2017	Friday	Id-Meelad
22.	25-12-2017	Monday	Christmas Day

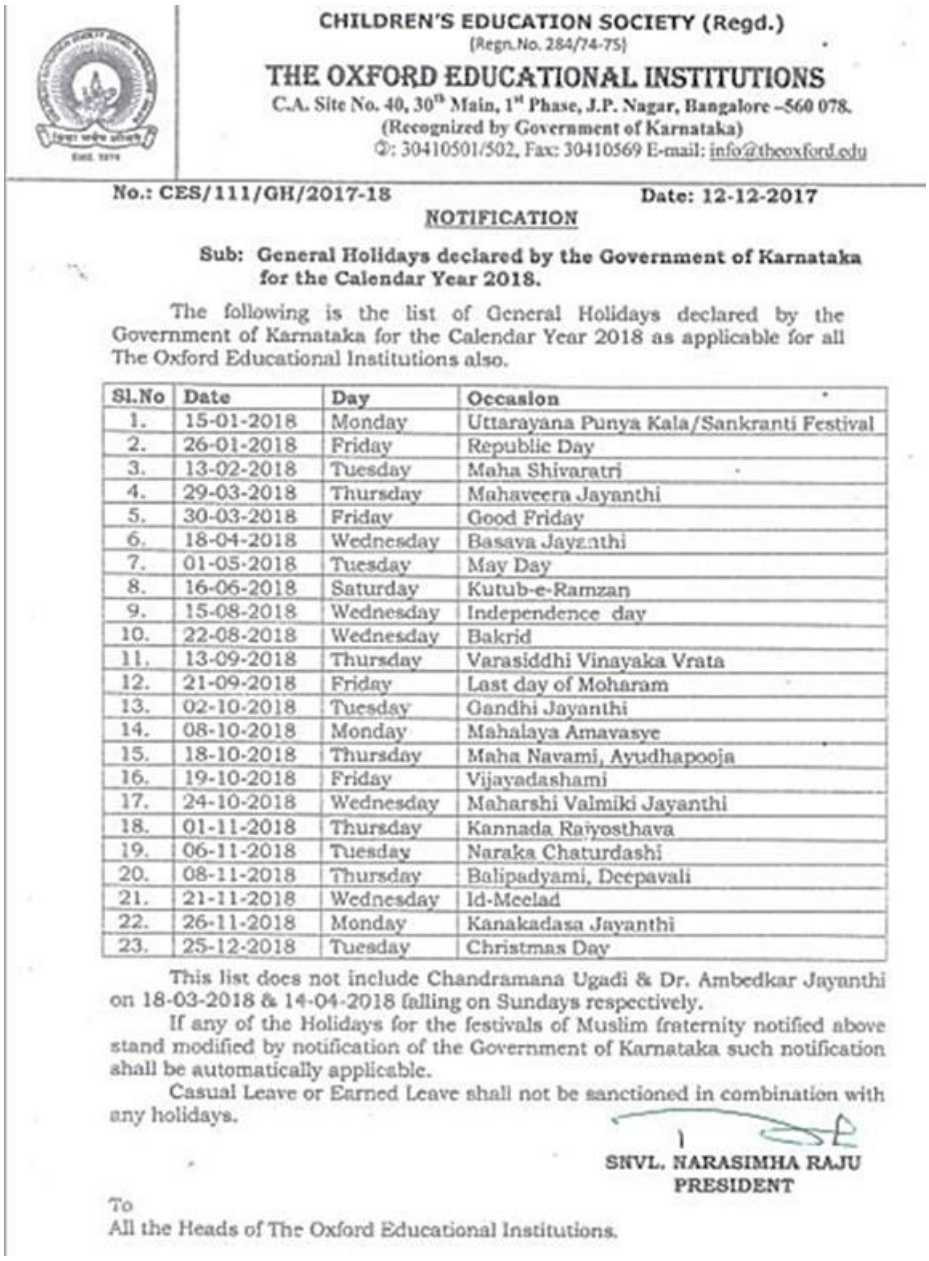
This list does not include 09-04-2017 Mahaveer Jayanthi, 01-10-2017 Last day of Moharam which fall on Sundays.

SNVL. NARASIMHA RAJU
PRESIDENT

To
All the Heads of The Oxford Educational Institutions.

Figure 3-4: List of Holidays-2017

The list of holidays for the year 2018 is shown in figure 3-5.



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✆: 30410501/502, Fax: 30410569 E-mail: info@theoxford.edu

No.: CES/111/GH/2017-18 Date: 12-12-2017

NOTIFICATION

Sub: General Holidays declared by the Government of Karnataka for the Calendar Year 2018.

The following is the list of General Holidays declared by the Government of Karnataka for the Calendar Year 2018 as applicable for all The Oxford Educational Institutions also.

Sl.No	Date	Day	Occasion
1.	15-01-2018	Monday	Uttarayana Punya Kala/Sankranti Festival
2.	26-01-2018	Friday	Republic Day
3.	13-02-2018	Tuesday	Maha Shivaratri
4.	29-03-2018	Thursday	Mahaveera Jayanthi
5.	30-03-2018	Friday	Good Friday
6.	18-04-2018	Wednesday	Basava Jayanthi
7.	01-05-2018	Tuesday	May Day
8.	16-06-2018	Saturday	Kutub-e-Ramzan
9.	15-08-2018	Wednesday	Independence day
10.	22-08-2018	Wednesday	Bakrid
11.	13-09-2018	Thursday	Varasiddhi Vinayaka Vrata
12.	21-09-2018	Friday	Last day of Moharam
13.	02-10-2018	Tuesday	Gandhi Jayanthi
14.	08-10-2018	Monday	Mahalaya Amavasye
15.	18-10-2018	Thursday	Maha Navami, Ayudhapooja
16.	19-10-2018	Friday	Vijayadashami
17.	24-10-2018	Wednesday	Maharshi Valmiki Jayanthi
18.	01-11-2018	Thursday	Kannada Rajyosthava
19.	06-11-2018	Tuesday	Naraka Chaturdashi
20.	08-11-2018	Thursday	Balipadyami, Deepavali
21.	21-11-2018	Wednesday	Id-Meelad
22.	26-11-2018	Monday	Kanakadasa Jayanthi
23.	25-12-2018	Tuesday	Christmas Day

This list does not include Chandramana Ugadi & Dr. Ambedkar Jayanthi on 18-03-2018 & 14-04-2018 falling on Sundays respectively.

If any of the Holidays for the festivals of Muslim fraternity notified above stand modified by notification of the Government of Karnataka such notification shall be automatically applicable.

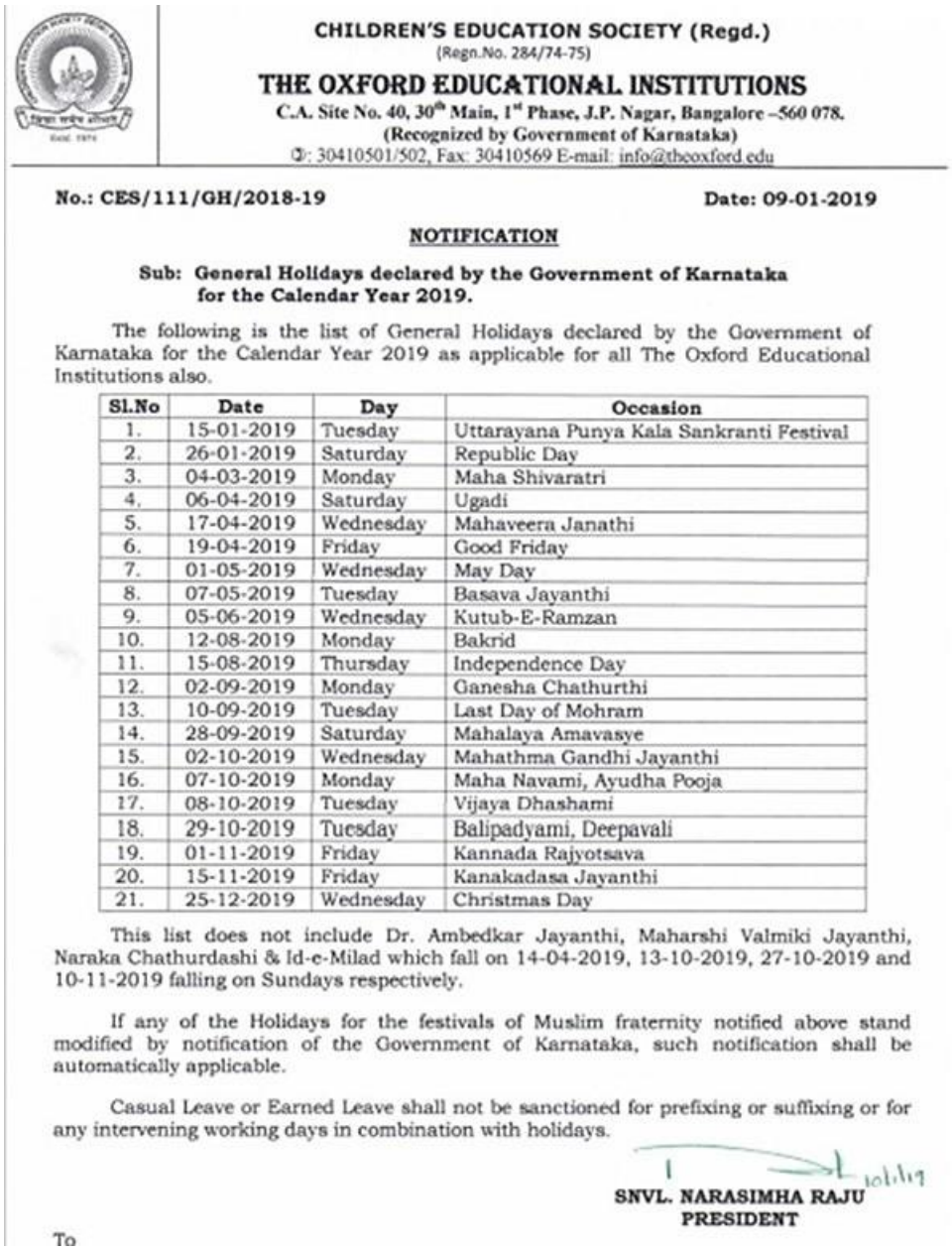
Casual Leave or Earned Leave shall not be sanctioned in combination with any holidays.

SNVL. NARASIMHA RAJU
PRESIDENT

To
All the Heads of The Oxford Educational Institutions.

Figure 3-5: List of Holidays-2018

The list of holidays for the year 2019 is shown in figure 3-6.



CHILDREN'S EDUCATION SOCIETY (Regd.)
(Regn.No. 284/74-75)

THE OXFORD EDUCATIONAL INSTITUTIONS

C.A. Site No. 40, 30th Main, 1st Phase, J.P. Nagar, Bangalore –560 078.
(Recognized by Government of Karnataka)
✆: 30410501/502, Fax: 30410569 E-mail: info@theoxford.edu

No.: CES/111/GH/2018-19 **Date: 09-01-2019**

NOTIFICATION

Sub: General Holidays declared by the Government of Karnataka for the Calendar Year 2019.

The following is the list of General Holidays declared by the Government of Karnataka for the Calendar Year 2019 as applicable for all The Oxford Educational Institutions also.

Sl.No	Date	Day	Occasion
1.	15-01-2019	Tuesday	Uttarayana Punya Kala Sankranti Festival
2.	26-01-2019	Saturday	Republic Day
3.	04-03-2019	Monday	Maha Shivaratri
4.	06-04-2019	Saturday	Ugadi
5.	17-04-2019	Wednesday	Mahaveera Janathi
6.	19-04-2019	Friday	Good Friday
7.	01-05-2019	Wednesday	May Day
8.	07-05-2019	Tuesday	Basava Jayanthi
9.	05-06-2019	Wednesday	Kutub-E-Ramzan
10.	12-08-2019	Monday	Bakrid
11.	15-08-2019	Thursday	Independence Day
12.	02-09-2019	Monday	Ganesha Chathurthi
13.	10-09-2019	Tuesday	Last Day of Mohram
14.	28-09-2019	Saturday	Mahalaya Amavasye
15.	02-10-2019	Wednesday	Mahathma Gandhi Jayanthi
16.	07-10-2019	Monday	Maha Navami, Ayudha Pooja
17.	08-10-2019	Tuesday	Vijaya Dhashami
18.	29-10-2019	Tuesday	Balipadyami, Deepavali
19.	01-11-2019	Friday	Kannada Rajyotsava
20.	15-11-2019	Friday	Kanakadasa Jayanthi
21.	25-12-2019	Wednesday	Christmas Day

This list does not include Dr. Ambedkar Jayanthi, Maharshi Valmiki Jayanthi, Naraka Chathurdashi & Id-e-Milad which fall on 14-04-2019, 13-10-2019, 27-10-2019 and 10-11-2019 falling on Sundays respectively.

If any of the Holidays for the festivals of Muslim fraternity notified above stand modified by notification of the Government of Karnataka, such notification shall be automatically applicable.

Casual Leave or Earned Leave shall not be sanctioned for prefixing or suffixing or for any intervening working days in combination with holidays.

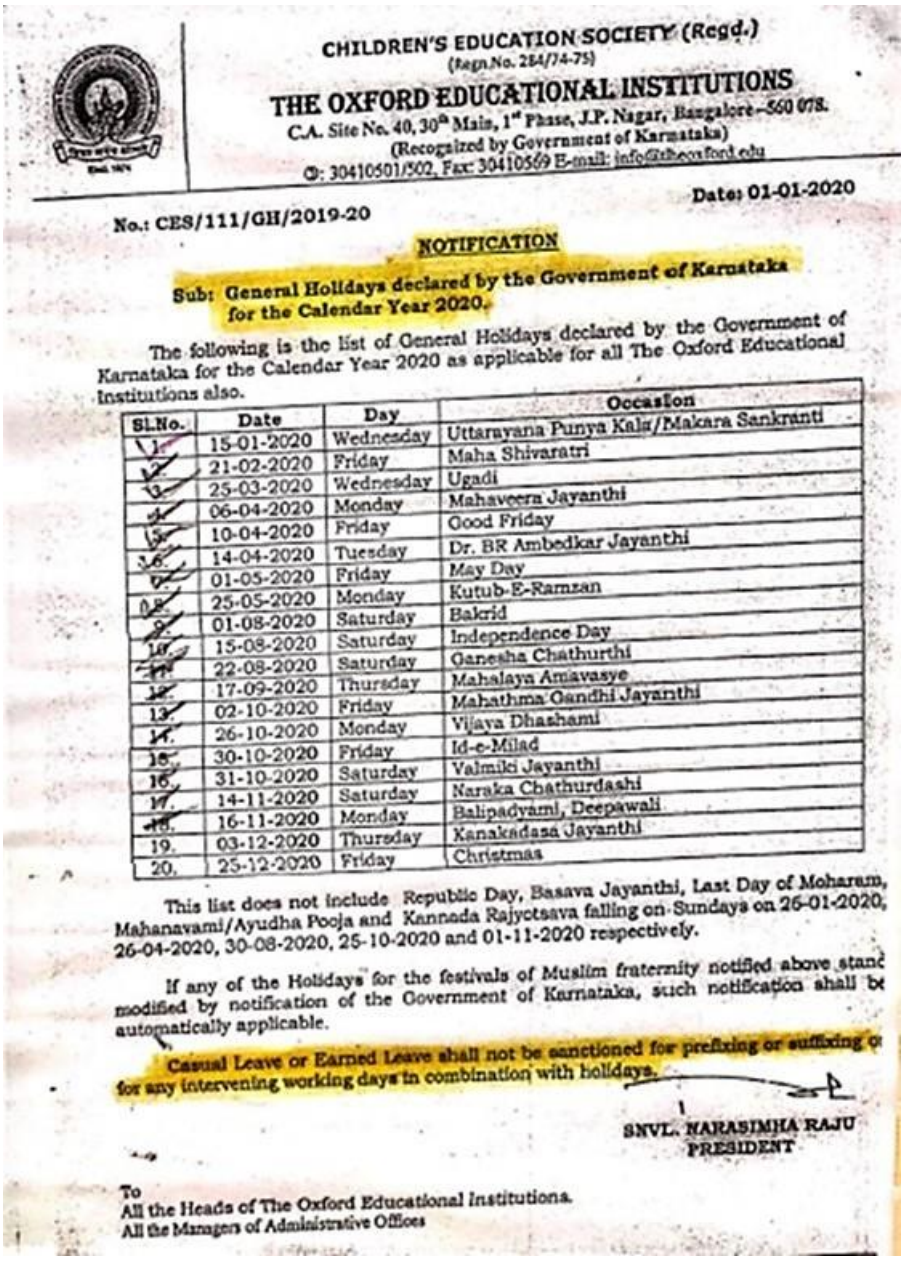
10.1.19

SNVL. NARASIMHA RAJU
PRESIDENT

To

Figure 3-6: List of Holidays-2019

The list of holidays for the year 2020 is shown in figure 3-7.



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(Regn.No. 284/74-75)

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(Recognized by Government of Karnataka)
Ph: 30410501/502, Fax: 30410569 E-mail: info@theoxford.edu

No.: CES/111/GH/2019-20

Date: 01-01-2020

NOTIFICATION

Sub: General Holidays declared by the Government of Karnataka for the Calendar Year 2020.

The following is the list of General Holidays declared by the Government of Karnataka for the Calendar Year 2020 as applicable for all The Oxford Educational Institutions also.

Sl.No.	Date	Day	Occasion
1.	15-01-2020	Wednesday	Uttarayana Punya Kala/Makara Sankranti
2.	21-02-2020	Friday	Maha Shivaratri
3.	25-03-2020	Wednesday	Ugadi
4.	06-04-2020	Monday	Mahaveera Jayanthi
5.	10-04-2020	Friday	Good Friday
6.	14-04-2020	Tuesday	Dr. BR Ambedkar Jayanthi
7.	01-05-2020	Friday	May Day
8.	25-05-2020	Monday	Kutub-E-Ramzan
9.	01-08-2020	Saturday	Bakrid
10.	15-08-2020	Saturday	Independence Day
11.	22-08-2020	Saturday	Ganesha Chathurthi
12.	17-09-2020	Thursday	Mahalaya Amavasye
13.	02-10-2020	Friday	Mahathma Gandhi Jayanthi
14.	26-10-2020	Monday	Vijaya Dhashami
15.	30-10-2020	Friday	Id-e-Milad
16.	31-10-2020	Saturday	Valmiki Jayanthi
17.	14-11-2020	Saturday	Naraka Chathurdashi
18.	16-11-2020	Monday	Balipadyami, Deepawali
19.	03-12-2020	Thursday	Kanakadasa Jayanthi
20.	25-12-2020	Friday	Christmas

This list does not include Republic Day, Basava Jayanthi, Last Day of Moharam, Mahanavami/Ayudha Pooja and Kannada Rajyotsava falling on Sundays on 26-01-2020, 26-04-2020, 30-08-2020, 25-10-2020 and 01-11-2020 respectively.

If any of the Holidays for the festivals of Muslim fraternity notified above stand modified by notification of the Government of Karnataka, such notification shall be automatically applicable.

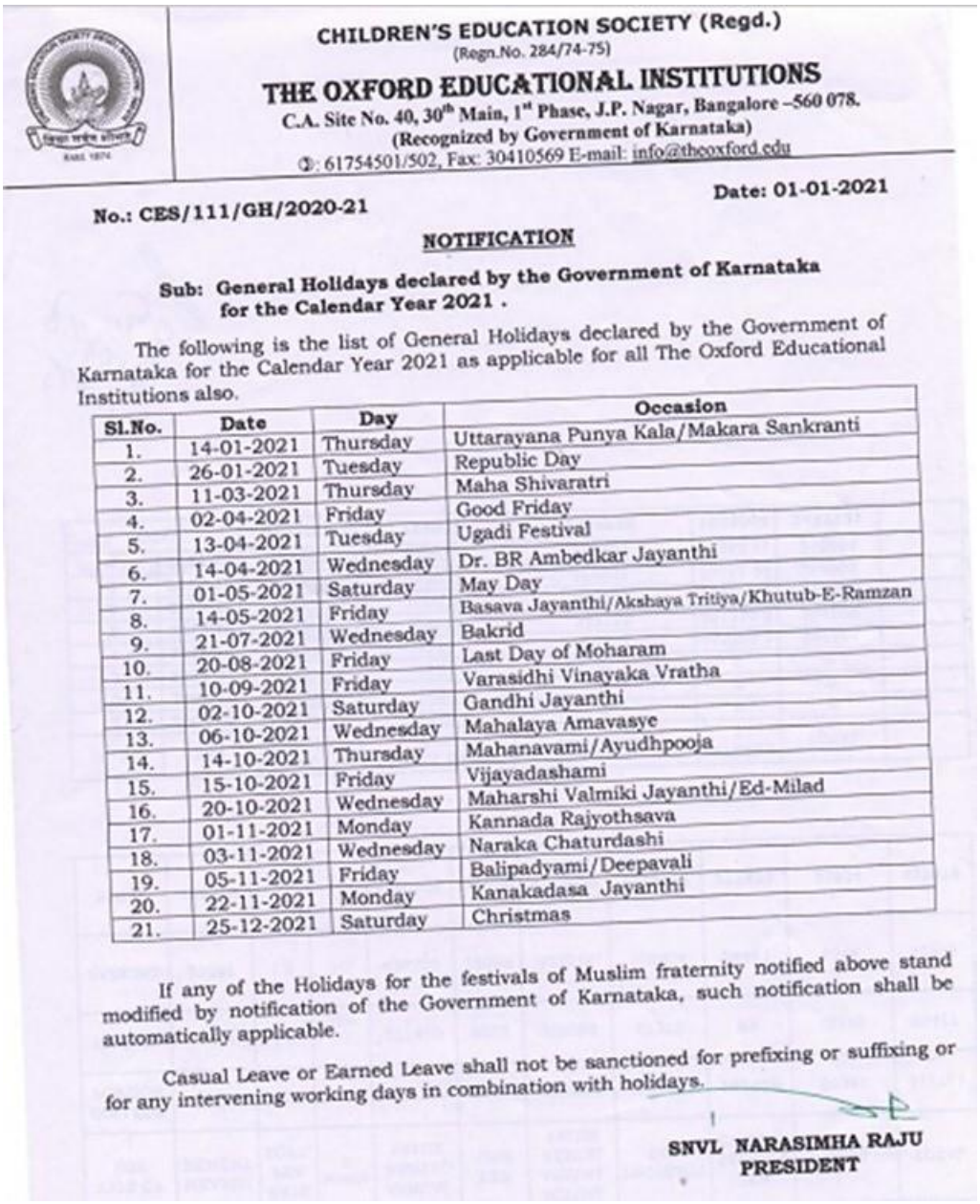
Casual Leave or Earned Leave shall not be sanctioned for prefixing or suffixing or for any intervening working days in combination with holidays.

SNVL. NARASIMHA RAJU
PRESIDENT

To
All the Heads of The Oxford Educational Institutions.
All the Managers of Administrative Offices

Figure 3-7: List of Holidays-2020

The list of holidays for the year 2021 is shown in figure 3-8.



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(Recognized by Government of Karnataka)
✆: 61754501/502, Fax: 30410569 E-mail: info@theoxford.edu

No.: CES/111/GH/2020-21 Date: 01-01-2021

NOTIFICATION

Sub: General Holidays declared by the Government of Karnataka for the Calendar Year 2021 .

The following is the list of General Holidays declared by the Government of Karnataka for the Calendar Year 2021 as applicable for all The Oxford Educational Institutions also.

Sl.No.	Date	Day	Occasion
1.	14-01-2021	Thursday	Uttarayana Punya Kala/Makara Sankranti
2.	26-01-2021	Tuesday	Republic Day
3.	11-03-2021	Thursday	Maha Shivaratri
4.	02-04-2021	Friday	Good Friday
5.	13-04-2021	Tuesday	Ugadi Festival
6.	14-04-2021	Wednesday	Dr. BR Ambedkar Jayanthi
7.	01-05-2021	Saturday	May Day
8.	14-05-2021	Friday	Basava Jayanthi/Akshaya Tritiya/Khutub-E-Ramzan
9.	21-07-2021	Wednesday	Bakrid
10.	20-08-2021	Friday	Last Day of Moharam
11.	10-09-2021	Friday	Varasidhi Vinayaka Vratha
12.	02-10-2021	Saturday	Gandhi Jayanthi
13.	06-10-2021	Wednesday	Mahalaya Amavasye
14.	14-10-2021	Thursday	Mahanavami/Ayudhpooja
15.	15-10-2021	Friday	Vijayadashami
16.	20-10-2021	Wednesday	Maharshi Valmiki Jayanthi/Ed-Milad
17.	01-11-2021	Monday	Kannada Rajyothsava
18.	03-11-2021	Wednesday	Naraka Chaturdashi
19.	05-11-2021	Friday	Balipadyami/Deepavali
20.	22-11-2021	Monday	Kanakadasa Jayanthi
21.	25-12-2021	Saturday	Christmas

If any of the Holidays for the festivals of Muslim fraternity notified above stand modified by notification of the Government of Karnataka, such notification shall be automatically applicable.

Casual Leave or Earned Leave shall not be sanctioned for prefixing or suffixing or for any intervening working days in combination with holidays.

SNVL NARASIMHA RAJU
PRESIDENT

Figure 3-8: List of Holidays-2021

3.2.6.2. Tentative Schedule of College

The tentative schedule of the college is 09.00 AM to 4:15 PM.

The library timing is 09:00 AM to 10:00 PM.

The details of the class sessions are given in table 3-2.

S. No.	Session	Timings
1	1st Hour	09:00 TO 9:55AM
2	2nd Hour	09:55 TO 10:50 AM
3	Short Break	10:50 TO 11:00 AM
4	3rd Hour	11:00 TO 11:55 AM
5	4th Hour	11:55 TO 12:50 PM
6	Lunch	12:50 TO 01:30 PM
7	5th Hour	1:30 TO 2:25 PM
9	6th Hour	2:25 TO 3:20 PM
10	7th Hour	3:20 TO 4:15 PM

Table 3-2: Tentative College Schedule

3.2.6.3. Staff and Students of College:

The number of staff including teaching, non-teaching, and house-keeping is given in the table 3-3. The number of students includes both boys and girls.

S. No.	Year	Teaching Staff	Non-Teaching staff	Total Staff	Total Students
1	2017	303	122	425	3572
2	2018	285	95	380	3044
3	2019	269	92	361	3124
4	2020	240	68	308	2728
5	2021	222	57	279	2722

Table 3-3: Number of staff and students

4. ENVIRONMENT AUDIT (CARBON FOOTPRINT ANALYSIS)

4.1. Facility Description

The carbon footprint is "the total amount of greenhouse gas (GHG) emissions caused by an organization, event or product". Global warming and climate change are the foremost environmental challenges facing the world today. It is our responsibility to minimize the consumption of energy and hence reduce the emissions of greenhouse gases.

To analysis the carbon footprint, transportation details of students and staff are collected as below:

a. Number (or Percentage) of Staff using public transport: 39 %

b. Number (or Percentage) of Staff using College transport: 10%

c. Number (or Percentage) of Staff using Bike: 25%

d. Number (or Percentage) of Staff using Car: 25%

e. Number (or Percentage) of Staff using cycle: 1%

f. Number of students using public transport: 38%

g. Number of students using College transport: 10%

h. Number of students using Bike: 50%

i. Number of students using Car: 1%

j. Number of students using cycle: 1%

The transportation details of staff are shown in figure 4-1.

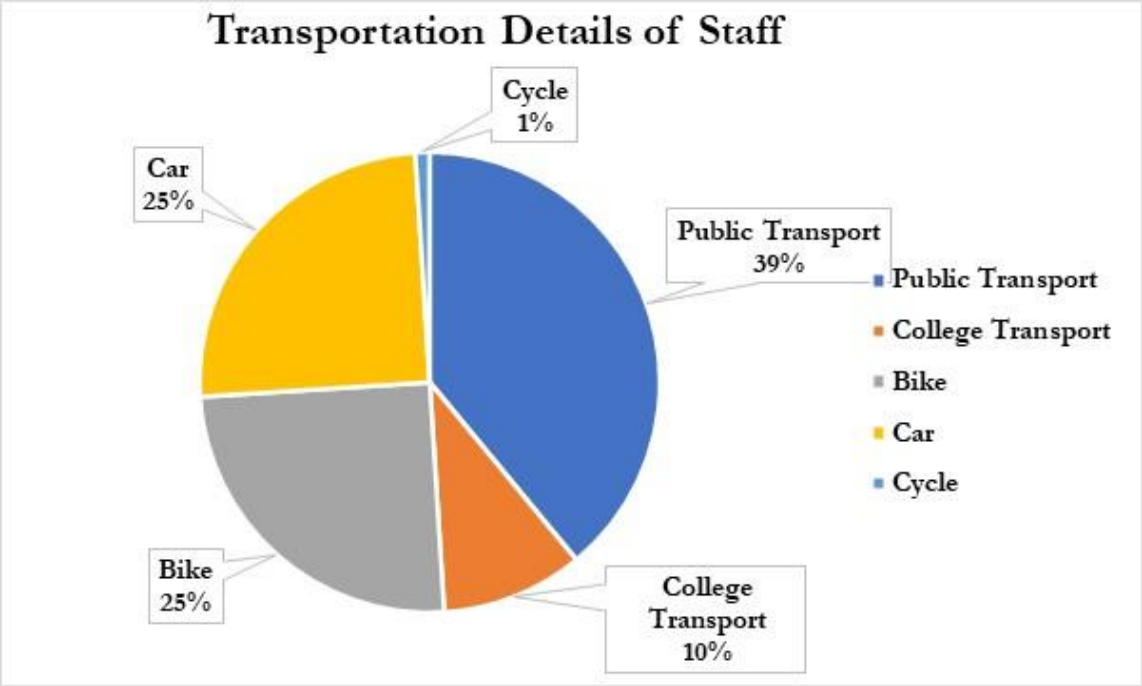


Figure 4-1: Transportation details of staff

The transportation details of students are shown in figure 4-2.

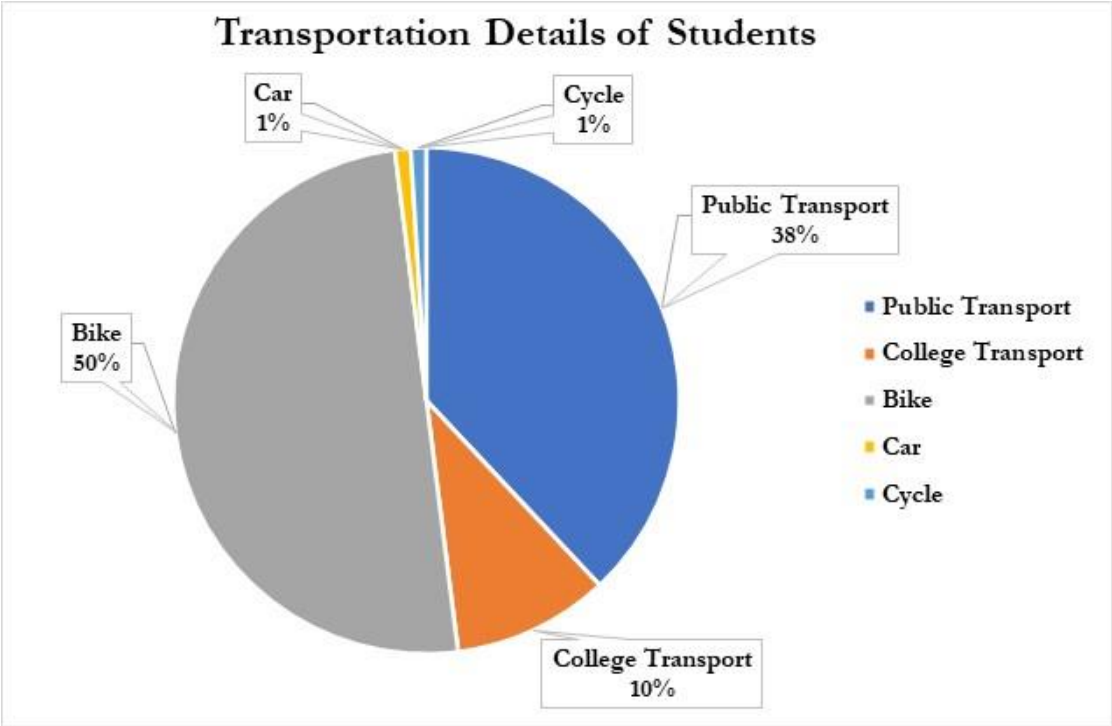


Figure 4-2: Transportation details of students

4.2. Best Practices Implemented for Environment Conservation

4.2.1. Pedestrian Friendly Pathways

The institution had pedestrian friendly pathways where all staff & faculty can walk safely. Pedestrian friendly pathways are designed in such a way that there is no accidental intervention of vehicles on pathway of pedestrians. Platforms are available for pedestrians. Trees and streetlights are available in all roads inside the campus. Vehicle parking is available in front of engineering new block. The pedestrian friendly pathway is shown in figure 4-3.

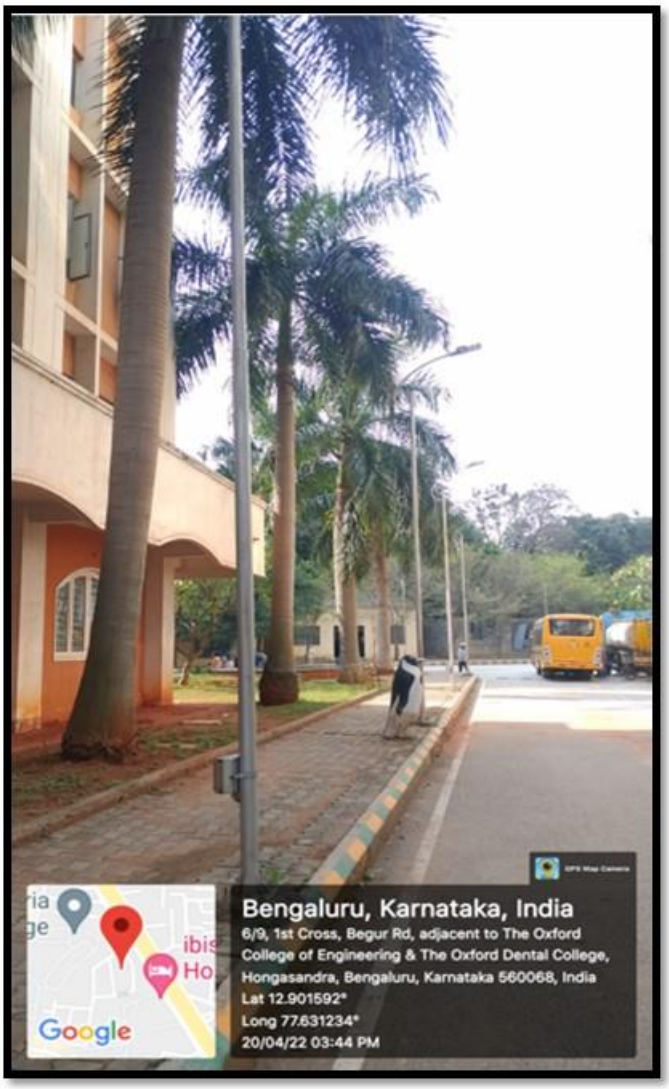


Figure 4-3: Pedestrian friendly pathways with trees and streetlight

Figure 4-4: Platforms for pedestrians

4.2.2. Ramp facility for physically challenged persons

Wheelchair ramps enable physically challenged as well as elderly people to enjoy complete freedom, as they allow users to move in and around the campus safely. The ramp facility available at the campus is shown in figure 4-5.

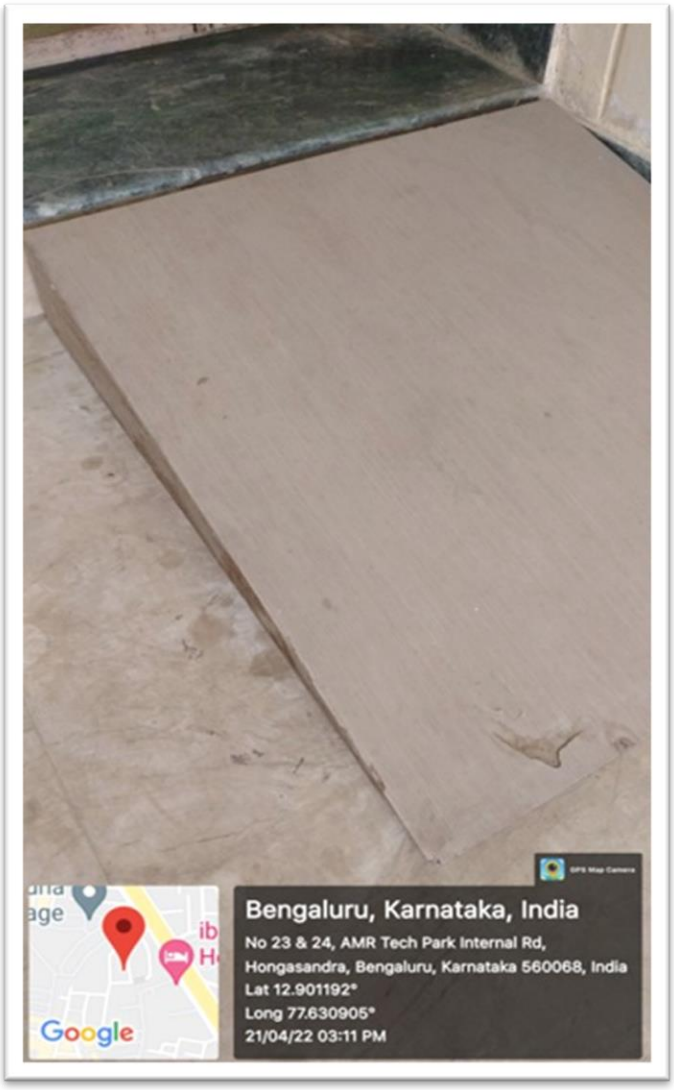


Figure 4-5: Ramp facility for physically challenged

4.2.3. Awareness campaigns on environment conservation

Earth Day: Trees for the Earth!

The Oxford College of Engineering organized 'Earth Day: Trees for the Earth' on 22-4-2016 at The Oxford College of Science, HSR campus.

The event raised awareness among masses about climate change and global warming. Inspired to act towards the protection of the environment and focus on the need for conservation.

The effect of global warming on climate change and need of protecting the environment was explained during the event.

The image of the event is shown in figure 4-6.

Figure 4-6: Earth Day: Trees for the Earth! - 2016

SWACHHTA HI SEVA 2019

The Oxford College of Engineering in association with NSS unit organized **SWACHHTA HI SEVA 2019 -Plastic Waste Free Campaign** at Garebhavipalya village. The event was conducted during 1st & 2nd October 2019.

The main objective of this program is to make people understand Plastic Waste Management, detrimental effect of uncollected plastic waste on human beings, animals and the environment.

The image during the event is shown in figure 4-7.

Figure 4-7: Plastic Waste Free Campaign - 2019

Plastic Awareness Campaign:

The Plastic Awareness Campaign, was carried out by the students and the faculties of the Department of Civil Engineering, The Oxford College of Engineering, in order to create awareness of the unnecessary use of plastic nowadays and how to utilize plastic in a fruitful manner. The campaign was conducted on **24.07.2021.**

The Waste will be the source of energy creation for future. Therefore, awareness was also brought about the corporation's, dry waste and wet waste segregation policy to the surrounding shop vendors, construction workers etc.

In this regard a possession was carried out with the posters displaying various slogans to the common people around.

The activity was carried out at the Garebhavipalya, service road stretch in the surrounding vicinity of our college campus.

The image of invitation for the event is shown in figure 4-8.

Figure 4-8: Plastic Awareness Campaign - Invitation

The sample image of students indulged in 'Plastic Awareness Campaign' at Garebhavipalya is shown in figure 4-9.

Figure 4-9: Plastic Awareness Campaign - at Garebhavipalya - 2021

Clean India Campaign:

The department of civil engineering in association with the NSS unit and Civil Engineering Students Technical Association Conducted a clean India Campaign in and around Bommanahalli, to cater the needs of the cleanliness in our daily lives.

The event was organized on **23-07-2021** on the Begur road, Bengaluru up to a certain stretch where importance of cleanliness was highlighted to the common public. This event bought a good response from the people and was a success.

The image of invitation for the event is shown in figure 4-10.

Figure 4-10: Clean India Campaign - Invitation

The sample image of students indulged in 'Clean India Campaign' at Bommanahalli is shown in figure 4-11.

Figure 4-11: Clean India Campaign - at Bommanahalli

Awareness on Impact of Sound Pollution:

An outreach programme on "**Awareness on Impact of Sound Pollution**" was organized by students of Department of MBA in association with NSS unit of The Oxford College of Engineering on **19th July 2021** at Hongasandra, Bangalore. 25 MBA Students have participated in the awareness campaign.

The programme created awareness among citizens of Bangalore regarding various problems due to Sound pollution.

The sample image of students indulged in 'Awareness on Impact of Sound Pollution' at Hongasandra is shown in figure 4-12.

Figure 4-12: Awareness on Impact of Sound Pollution-Hongasandra

4.2.4. Day-light Integration

During the audit phase classrooms, Staff-rooms, computer lab, seminar hall, UPS & batteries room and library areas were surveyed for illumination levels and fresh air-circulation. It was observed most of the rooms are well ventilated and day-light integrated; sample photos of daylight integration are shown in figure 4-13 and 4-14.

Figure 4-13: Day-light integration at Class room

Figure 4-14: Day-light integration at laboratory

The images of daylight integration at college premises are shown in figure 4-15 and 4-16.

Figure 4-15: Day-light integration at engineering old block

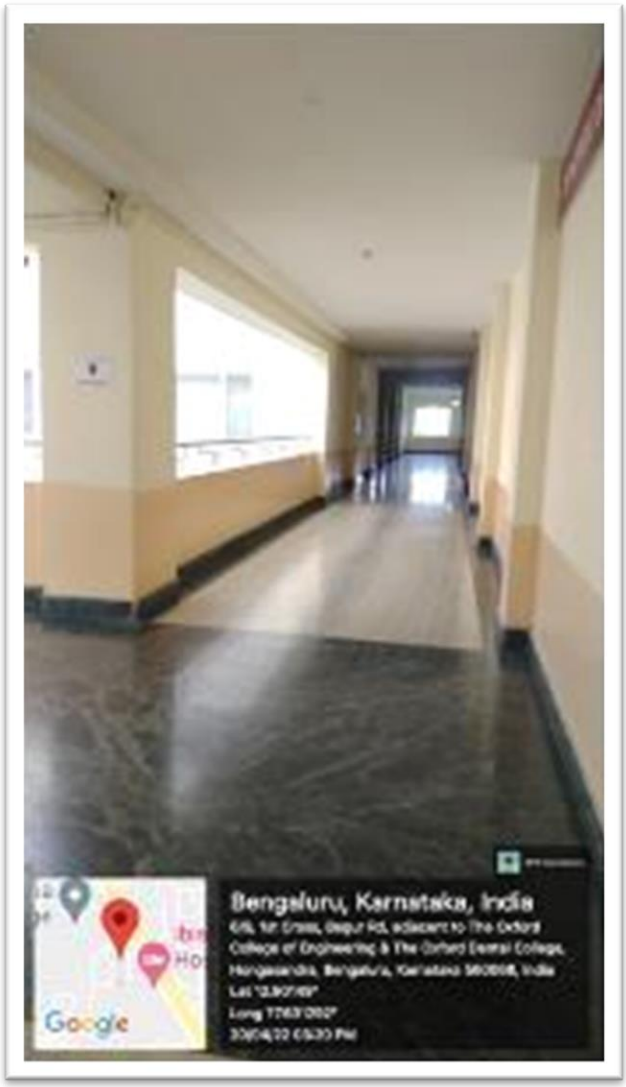


Figure 4-16: Day-light integration at engineering new block

4.2.5. Installation of LED lights

Many of the FTL in all the blocks of the campus are replaced with LED lights. LED tube lights are used in the class rooms, staff-rooms, corridors, hostel, dining area, street lighting and in labs. Sample photo of LED lamp used in the some of the locations of the college area are shown in figure 4-17 and 4-18.

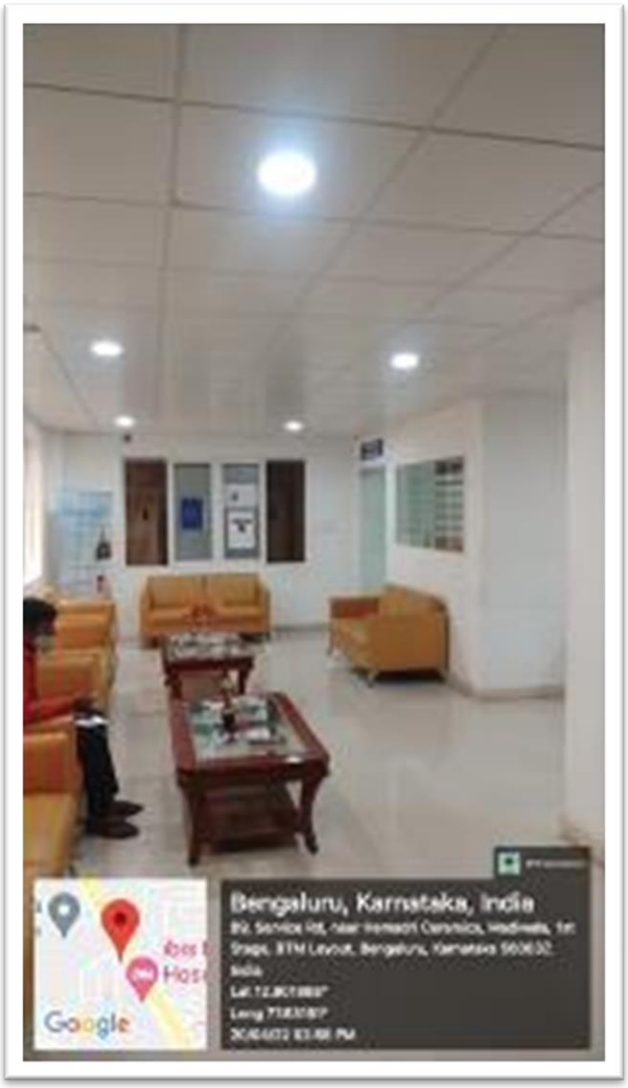


Figure 4-17: Use of LED lights at engineering new block -office area

Figure 4-18: Use of LED lights at engineering new block - at labs

The sample bill copy of LED tube light purchase is shown in figure 4-19.

Figure 4-19: LED tube light - Sample purchase bill

4.2.6. Installation of LED street lights

In college premises, LED street lights are installed all around the campus. The image of LED street light fixture is shown in figure 4-20.

Figure 4-20: Use of LED street lights

The sample bill copy of LED street light is shown in figure 4-21.

Figure 4-21: LED street light - Purchase bill

The cost savings due to existing LED street lights are given in table 4-1.

S. No.	Description	Unit	Values
1	Rated Wattage of LED street light installed	W	75
2	Quantity of LED street lights installed	Nos	64
3	Rated wattage if conventional fixtures used	W	100
4	Savings due to installation of one LED street light	W	25
5	Total savings (considering all LED street lights)	kW	1.6
6	Working hours per day	hours	12
7	No. of working days per year	days	365
8	Annual electricity savings	kWh	7008
9	Average electricity cost	Rs./kWh	9.18
10	Annual cost savings achieved per year	Rs. lakh/year	0.64
11	CO_2 mitigations per year	Tons/year	5.96

Table 4-1: Annual cost savings by installation of LED street lights

The cost savings due to existing 1x20 W LED fixtures are given in table 4-2.

S. No.	Description	Unit	Values
1	Rated Wattage of LED lamps installed	W	20
2	Quantity of LED lamps installed	Nos	263
3	Rated wattage of lamps used earlier	W	40
4	Savings per lamp by installation of LED lamps	W	20
5	Total savings	kW	5.26
6	Working hours per day	hours	9
7	No. of working days per year	days	250
8	Annual electricity savings	kWh	11835
9	Average electricity cost	Rs./kWh	9.18
10	Annual cost savings achieved per year	Rs. lakh/year	1.09
11	CO_2 mitigations per year	Tons/year	10.06

Table 4-2: Annual cost savings due to existing LED fixtures

4.2.7. Installation of Solar Water Heater

Solar water heaters are installed at terrace of girl's hostel for to provide hot water supply. Three solar water heaters with capacity of 3 kL each is available. Sample photo of solar water heaters used in the hostel are shown in figure 4-22.

Figure 4-22: Girl's hostel – Solar Water Heater system

The cost savings by installation of solar water heaters of the campus are given in table 4-3.

S. No.	Description	Unit	Values
1	Solar water heater installed	L	9000
2	Total amount of heat produced	kCal/hr	270000
3	Electricity equivalent	kWh	314
4	No. of working days per year	days	250
5	Annual electricity savings	kWh	78488
6	Average electricity cost	Rs./kWh	9.18
7	Annual cost savings achieved per year	Rs. lakh/year	7.21
8	CO_2 mitigations per year	Tons/year	66.72

Table 4-3: Annual cost savings by solar water heater

4.2.8. Usage of LED/LCD monitors

LCD monitors are used for all the desktop computers in office, staff rooms and in labs. Sample photos of the LCD monitors used in labs are as shown in the figure 4-23.

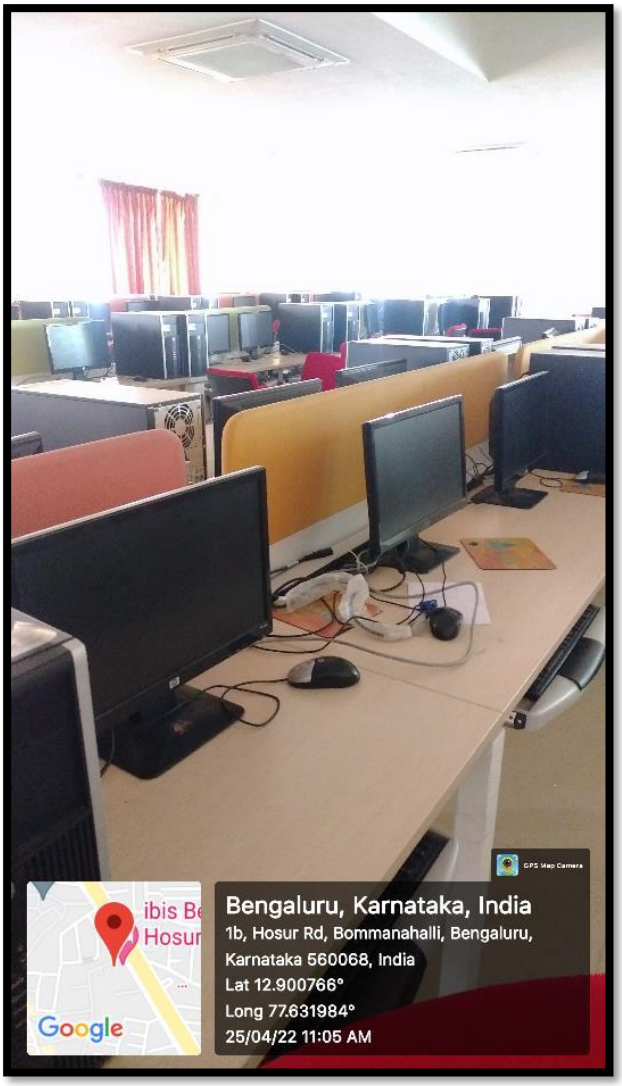


Figure 4-23: Use of LED/LCD monitors in the computer labs

4.2.9. Rain Water Harvesting System

The rain water harvesting system is available in the campus. The schematic of rain water harvesting system is shown in figure 4-24.

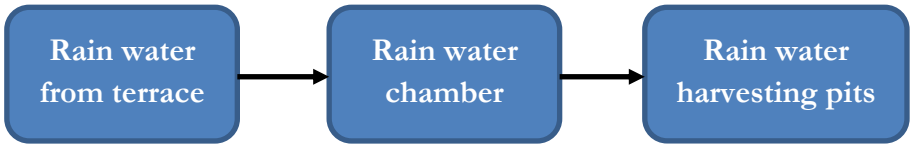


Figure 4-24: Schematic of rain water harvesting

The rain water from terrace of the buildings are brought down through a dedicated pipeline to the rain water chambers. Then, from rain water chambers the rain water is sent to the rain water harvesting pits through underground pipeline. There are two rain water harvesting pits available.

The sample image of pipeline for rain water from terrace of the engineering new block is shown in figure 4-25.

Figure 4-25: Pipeline for rain water from terrace

The rain water chamber is shown in figure 4-26.

Figure 4-26: Rain water chamber

The rain water harvesting pits are shown in figure 4-27 and 4-28. The pits are located near the STP area.

Figure 4-27: Rain water harvesting pit 1

Figure 4-28: Rain water harvesting pit 2

4.2.10. Sewage Water System

The sources of waste water in the college campus are as follows,

- Washrooms
- Toilets
- Kitchen
- Hostel
- Labs
- RO reject
- Canteen

The schematic of Sewage Treatment Plant (STP) is shown in figure 4-29.

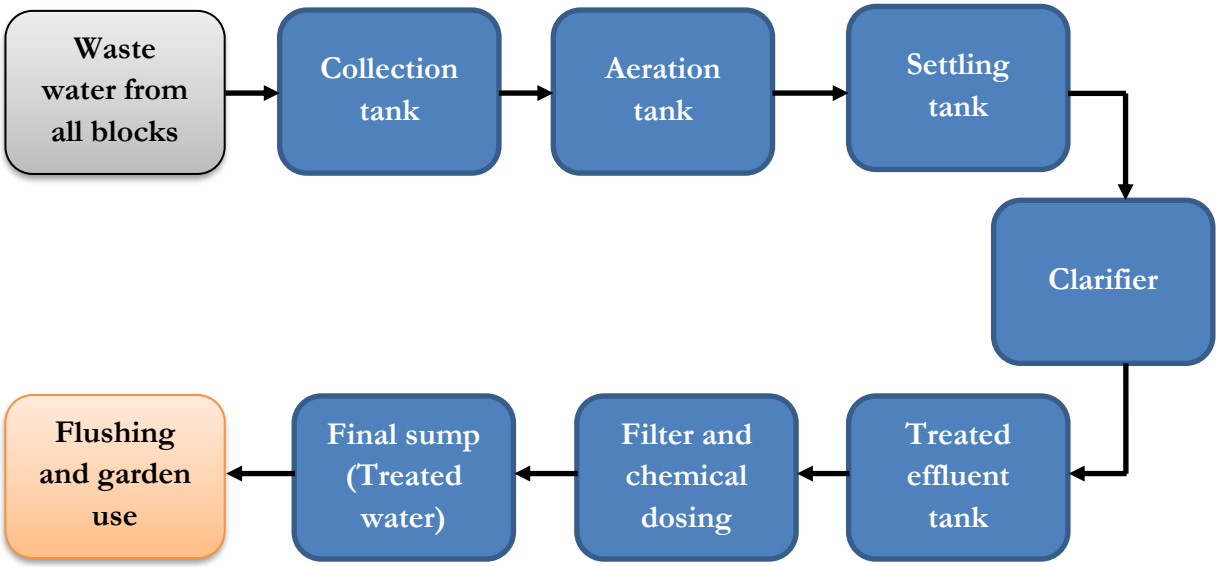


Figure 4-29: Schematic of STP

The capacity of the Sewage Treatment Plant (STP) is 300 kL per day. The STP is actually operated for 100 kL per day. Waste water from the college and hostel premises are collected and treated at sewage treatment plant.

The plumbing system (waste water collection, waste water transfer to STP, STP treated water storage and STP treated water to land scaping) is very well designed, the pipes are laid underground, and access / chambers are provided to regulate and control the flow of water.

The treated water from the STP is used for toilet flushing at engineering new block and girl's hostel. Treated STP water is supplied through a dedicated line for watering the garden. The STP area is shown in figure 4-30.

Figure 4-30: STP area

Sludge drying unit:

The sludge drying unit is established near STP collection tank. The sludge drying unit has six tanks in which the sludge is let to dry naturally. The water from the sludge is sent to collection tank. The dry sludge is then removed and decomposed. The decomposed sludge along with the dry plant waste is used as manure for trees and plant.

The sludge drying bed is shown in figure 4-31.

Figure 4-31: Sludge drying bed

The sludge decomposer pit is shown in figure 4-32.

Figure 4-32: Sludge decomposer pit

4.2.11. Dual piping system

Dual piping system is implemented in engineering new block and girl's hostel block.

Engineering new block:

The treated STP water is used for toilet flushing in new engineering block. For this purpose, pneumatic pressure pump system is installed at the STP room. The STP water is connected through a dedicated pipeline for toilet flushing. Three pneumatic pumps are used to pump water for flushing line. Whenever flush button is pressed the pneumatic pumping system delivers water for flushing line.

The pneumatic pressure tank for dual piping system is shown in figure 4-33.

Figure 4-33: Pneumatic pressure tank for dual piping system

The pneumatic pressure pumps for dual piping system are shown in figure 4-34.

Figure 4-34: Pneumatic pressure pumps for dual piping system

The dual piping system flushing button is shown in figure 4-35.

Figure 4-35: Dual piping system - Flushing button

Girl's hostel block:

The toilets in girl's hostel have been provided with dual piping system. The dual piping system consists of raw water piping network and STP treated water piping network. The STP treated water is pumped to the overhead tank of girl's hostel. The capacity of pump is 10 HP. The overhead tank in girl's hostel is capable of storing 12 kL of STP treated water. The STP treated water is used for toilet flushing through a dedicated pipeline.

The pump used for pumping STP treated water to the girl's hostel overhead tank is shown in figure 4-36.

Figure 4-36: Pump for treated STP water

The flushing tank connected to dual piping system is shown in figure 4-37.

Figure 4-37: Dual piping system - Flushing tank

4.2.12. STP treated water for garden use

The treated STP water is used for watering the trees and garden. For this purpose, dedicated pipeline is provided. Taps are provided at various locations to facilitate the watering of garden.

The tap near STP area for providing STP treated water to garden is shown in figure 4-38.

Figure 4-38: STP treated water tap for garden use- near STP area

The tap near engineering new block for providing STP treated water to garden is shown in figure 4-39.

Figure 4-39: STP treated water tap for garden use- near engineering new block

The institution has installed STP with capacity of 300 kLPD and the quantity of STP water treated per day is 100 kL/Day. The quantity of water reused and cost savings per annum is given in table 4-4.

S. No.	Description	Unit	Values
1	STP capacity	kL/Day	300
2	Quantity of STP water treated per day	kL/Day	100
3	Assumed quantity of water reused @ 40% utilization factor	kL/Day	40
4	No. of working days per year	Days	250
5	Annual Quantity of water reused (saved)	kL/Annum	10000
6	Average water cost	Rs./Litre	0.086
7	Annual cost savings achieved	Rs. lakh/year	8.6

Table 4-4: Annual quantity of water reused and cost savings by installation of STP

4.3. Recommendations on Carbon Footprint Analysis

During the study, there was continuous interaction between the audit team, college engineers and staff members to ensure that the suggestions made are realistic, practical and implementable.

- Recommend staff to use car-pooling system
- Recommend students and staff to use public transport system
- Recommend students and staff to use bicycle
- Recommend staff and students to use electric vehicles
- Use of Display Boards to conserve fuel and the use of bicycle.
- Use of Digital Display is encouraged instead of plastic banners.

4.3.1. Replacement of conventional 1x40W FTL lamps with energy efficient 1x20W LED lamps

Background

From the inventory data; collected during study it is observed conventional FTL lighting fixtures are used in the campus. The power consumed by FTL in comparison with LED fixtures is 50% higher. Replacing the existing FTL with LED will result in energy savings.

Recommendation

It is recommended to replace the existing 1x40W FTL lamps with 1x20W LED tube lights.

Energy Savings

Engineering New & old block:

The energy savings and investment cost for replacement of FTL with LED fixtures and its payback period are given in table 4-5. The total number of 1x40W FTL fixtures is 675.

S. No.	Description	Unit	Values
1	Total no. of 1x40W FTL	No.s	675
2	Power consumption by 1x40W FTL	kW	27
3	% of savings if all FTL replaced by LED fixtures	%	50
4	% of savings in kW if replaced by LED fixtures (Considering all fixtures)	kW	13.5
5	%of Lights found to be ON during working hours	%	50
6	Energy savings for fixtures in ON condition (4 x 5%)	kW	6.75
7	Total working hours per day	hours	9.0
8	Annual savings (6 x **7** x **250days**)	kWh/Annum	15187.5
9	Average energy cost per kWh	Rs./kWh	9.18
10	Annual cost savings	Rs. lakh	1.4
11	Cost of LED per fixture	Rs.	350.0
12	Total Investment cost for 675 LED fixtures	Rs.lakh	2.4
13	Simple payback period (12 / 10)	Years	1.69
14	CO_2 mitigations per year	Tons/year	12.91

Table 4-5: FTL to LED replacement cost and payback period calculations - Engineering new & old block

Hostel block

The energy savings and investment cost for replacement of FTL with LED fixtures and its payback period are given in table 4-6. The total number of 1x40W FTL fixtures is 413.

S. No.	Description	Unit	Values
1	Total no. of 1x40W FTL	No.s	413
2	Power consumption by 1x40W FTL	kW	16.52
3	% of savings if all FTL replaced by LED fixtures	%	50
4	% of savings in kW if replaced by LED fixtures (Considering all fixtures)	kW	8.26
5	%of Lights found to be ON during working hours	%	70
6	Energy savings for fixtures in ON condition (4 x 5%)	kW	5.78
7	Total working hours per day	hours	8
8	Annual savings (6 x **7** x **250days**)	kWh/Annum	11564
9	Average energy cost per kWh	Rs./kWh	9.18
10	Annual cost savings	Rs. lakh	1.1
11	Cost of LED per fixture	Rs.	350
12	Total Investment cost for 675 LED fixtures	Rs.lakh	1.4
13	Simple payback period (12 / 10)	Years	1.4
14	CO_2 mitigations per year	Tons/year	9.83

Table 4-6: FTL to LED replacement cost and payback period calculations-Hostel block

4.3.2. Aerator for taps

The aerator is a small attachment that either fits onto the end of the tap or can be inserted inside of the existing spout. These water saving devices will control the amount of water that flows through the tap without affecting the water pressure as they mix the water with air which will save water and money.

The aerators will separate a single flow of water into many tiny streams which introduces the air in to the water flow. Also, as there is less space for the water to flow through, the water flow is reduced, resulting in water savings. As the water pressure is maintained, most people don't notice a difference in the amount of water coming out of an aerated faucet yet benefit from the water efficiency.

Tap aerators are of most use to those with older taps which run on average around 15 litres of water per minute. Adding an aerator to an older tap can reduce this to as little as 6 litres of water per minute.

The biggest water saving benefit is achieved in the bathroom / hand wash / kitchen sinks where you are often turning the taps on and off to wash your hands and for other uses.

The aerator tap is shown in figure 4-40.

Figure 4-40: Aerators for taps

Tap aerators can save as much as up to half your water usage through this way. When you are using aerated water, you are unlikely to notice the difference except for saving water resulting in lower bills.

4.3.3. Waterless Urinals

Traditional water-based urinals are one of the major waters consuming area in any facility. Apart from the normal water usage, the cost for handling raw water to the urinals is an added expenditure. Also, maintaining the water taps and flushes for urinals will add to maintenance cost as well.

To overcome these challenges and as part of water conservation measure, implementation of waterless urinals can be incorporated in the campus.

Waterless urinals may look similar to regular flush urinals, but they use no water and have no flush valves. The sample image of waterless urinals is shown in figure 4-41.

Figure 4-41: Waterless urinals

The advantages of water less urinals are as follows:

- Saves water
- Reduces water bill
- Reduces maintenance cost
- Reduces water handling cost (electricity cost for pumping raw water)
- Reduces usage of chemicals

Improves overall bathroom hygiene

5. ANNEXURES

5.1. Data Collection Questionnaire

A questionnaire is a checklist used as the primary tool for the collection of data / information in a systematic manner that enables to perform the audit.

5.1.1. General information of the college:

General information of the college needs to be collected to get an overview of the campus for the walk-through purpose. It includes a set of questionnaires as given below.

1. Previous NAAC Grading's:

Previous NAAC Grading's of the college was collected from table 5-1.

S. No.	Phase	Grade	CGPA/Percentage	Year of Acc.	Acc. Period
1	I				
2	II				
3	III				

Table 5-1: NAAC grading's Table

2. Internal Quality Audit Team: 2020 – 2021

Table 5-2 depicts the format for the collection of Internal Quality Audit team.

S. No.	Name	Designation	Role
1			
2			
3			

Table 5-2: Internal Quality Audit team

3. General Information of the college

General information of the college includes an address of college and head office, contact person details, year of establishment etc., as given in table 5-3.

S. No.	Description	Details	
1.	Name of the College and address:		
1.a	Head office address :		
2.	Telephone/Fax No		
3.	Co-ordinating officer:	Name:	
		Mob:	
		Email:	
4.	Year of Establishment:		
5.	Hostel (Available/Not Available)		
6.	No. of Working days/year		
7.	Brief description of Campus		

Table 5-3: General information of the college

4. College Infrastructure

Infrastructure details of the college were gathered from table 5-4.

S. No.	Description	Details
1	Block Name	Class rooms
		Labs
		Staff rooms
		Wash rooms
2		
3		

Table 5-4: Detail Infrastructure of the college

5. Details of Student clubs
6. Details of cells that support students
7. Tentative Schedule of a working day:

a. No. of working days per year:
b. List of holidays:

8. Total area of the campus

9. Details of List of Departments and Courses (Faculty wise)

The total number of department, laboratories, conference hall, Libraries, Auditorium, and Cafeteria are obtained from table 5-5.

S. No.	Description	Details
1	Department	
2	Laboratories	
3	Conference Hall	
4	Libraries	
5	Auditorium	
6	Cafeteria	

Table 5-5: Details of the departments

10. Number of staff

Teaching, non-teaching, supporting staff with a male and female breakup is obtained from table 5-6

S. No.	Teaching Staff	Non-teaching Staff	Support Staff (Security, House Keeping)

	Male	Female	Male	Female	Male	Female

Table 5-6: Details of the Staff

11. Number of Students

Number of students is collected from table 5-7.

S. No.	Boys	Girls
1		

Table 5-7: Details of the Students

12. Additional infrastructure details have been collected from table 5-8.

S. No.	Description	Details	
1.	Number of blocks available for boys hostel	Nos.	
2.	Number of rooms available for boys hostel	Nos.	
3.	Number of blocks available for girls hostel	Nos.	
4.	Number of rooms available for girls hostel	Nos.	
5.	Whether Laundry is available in the hostel	Yes / No	
6.	If Yes List the Electrical Equipment in Laundry Section of the hostel (like Washing machine, Dry Cleaning Machine, Iron)		
7.	Whether gym/ indoor sports hall is available in hostel	Yes / No	
8.	Whether Solar PV based Power Generation is available in campus (academic or hostel block)	Yes / No	
9.	Whether lifts available in academic block	Yes / No	
10.	Whether Kitchen is available in the academic block	Yes / No	
11.	Whether any food counter (outside caterers) available in academic block	Yes / No	

12.	Whether any commercial shops available in academic block	Yes / No	
13.	Any more information or additional details of academic block you would like to share – kindly elaborate here		

Table 5-8: Details of the departments

5.1.2. Water Audit details:

1. General information

General information required for water management analysis is collected from table 5-9.

S. No.	Description	Details
1	Source of water	
2	Types of water	
3	No of Wells	
4	No of motors used	
5	No of bore wells	
6	Rating of the motors in HP	
7	Depth of each bore-well	
8	Water level of bore well	
9	Number of water tanks (overhead & underground tanks)	
10	Capacity of overhead tank	
11	Capacity of underground tank	
12	Quantity of water pumped every day	
13	Any water wastage of water /why?	
14	Water usage for gardening	
15	Waste water sources	
16	Use of waste water	
17	Faith of waste water from labs	
18	Whether waste water from labs mixed with ground water?	
19	Any treatment method available for lab water?	
20	Whether any green chemistry method practiced in labs?	
21	Total number of water coolers	
22	Whether Rain water harvesting system available?	
23	Whether Sewage Treatment Plant (STP) is available?	
24	List of equipment installed in STP (If S.No.23 is Yes)	
25	Whether Solar Hot Water System is available in the campus	

S. No.	Description	Details
26	Number of units and amount of water harvested	
27	Any leaky taps in the campus	
28	Amount of water lost per day	
29	Any water management plan used?	
30	Any water-saving techniques followed?	
31	Are there any signs reminding peoples to turn off the water?	
32	No. of water flow meters available	
33	Method of water consumption monitoring	
34	Breakup of daily water consumption	
35	Attach Month wise water bill for last 2 years	
36	Please attach recent water quality test reports for Bore well water, Drinking Water and STP processed water.	
37	What are the sources of hot water	
38	What are the usage areas of hot water	

Table 5-9: Water management details

2. STP information

STP details are collected from table 5-10

S. No.	Description	Details
1.	Number of STP plants installed	
2.	Capacity of STP	
3.	Technology of STP	
4.	Year of Installation	
5.	Schematic / Layout of STP	
6.	Water flow meters installed	
7.	Quantity of Sludge	
8.	Disposal of Sludge	

Table 5-10: Details of STP

3. RO Plant information

RO Plant details are obtained from table 5-11.

S. No.	Location	Quantity	Capacity
1.			
2.			

3.			

Table 5-11: Details of RO Plant

5.1.3. Energy consumption details:

1. Energy consumption details:

The energy consumption details required for the audit is collected, the brief format of the same is given in table 5-12.

S. No.	Type	Units		Value	Cost in Rs.
1	Electricity	kWh	2019		
			2020		
2	LPG	Cylinders			
3	Diesel	Litres (Month wise consumption for the last two years)			
4	Others resources (Please specify)				
5	Total connected load	kW			
6	Contract demand	kVA			
7	Maximum demand recorded	kVA			
8	Average power factor				
9	Energy charges	Rs./kWh			
10	Demand charges	Rs./kVA			
	*** Attach Electricity Bill Copy of last 2 years**				

Table 5-12: Details of Energy consumption

2. Solar Energy details:

The solar energy details required are collected from table 5-13.

S. No.	Building No./ Name	Solar water Heater			Solar PV System		
		Capacity	Working / Not working	Year of Installation	Capacity	Working / Not working	Year of Installation

Table 5-13: Details of Solar Energy

3. Solar Street lights details:

a. Quantity -
b. Capacity -
c. Year of Installation –

4. Electrical Equipment details:

Electrical Equipment like transformers DGs UPS Capacitor Bank, AC, Computers, water coolers, fans, exhaust fans are obtained from the table 5-14.

S. No.	Description	Details	
1.	Number of Transformers Installed	Nos.	
2.	Number of Electrical Panels / Electrical Panel Rooms	Nos.	
3.	Whether Diesel Generator Set Backup Power is Available	Yes / No	
4..	How many number of DG Sets available in the campus (If S.No.3 is Yes)	Nos.	
5.	Whether UPS is available for labs, computers and/or any equipment	Yes / No	
6.	Number of UPS installed with location and capacity (If S.No.5 is Yes)	Nos.	
7.	Whether Capacitor Banks is installed in the electrical panel rooms	Yes / No	
8..	Whether Air Conditioning Units have been installed in the campus	Yes / No	
9.	Type of AC units (split, cassette or packaged) available, capacity and installed location (If S.No.8 is Yes)	Nos.	
10.	Total number of computers available in the campus	Nos.	
11.	Type of computer monitors available (CRT, LCD, LED)	Nos.	
12.	Whether water coolers are installed in the academic blocks	Yes/No	

S. No.	Description	Details	
13.	Type of lamps (Fluorescent Tube Light, CFL, LED, Incandescent, Sodium / Mercury lamps, etc.,) installed in the campus	Nos.	
14.	Type of fans (ceiling, wall mount, standing, exhaust, etc.,) installed in the campus	Nos.	
15.	Whether exhaust fans are installed in hostel / kitchen.(If Yes, share the quantity and installed location)	Yes /No	
16.	Any other electrical equipment's in college buildings.		

Table 5-14: Details of Electrical Equipment

5. List of energy saving initiatives implemented
6. List of energy saving initiatives in plan for future

5.1.4. Waste management details:

Waste management includes the activities and actions required to manage waste from its inception to its final disposal. The various data/ information required for the assessment of waste management is as collected from the following set of questionnaires.

1. Basic information

Basic information for waste management is collected from table 5-15.

S. No.	Description	Yes/ No
1	Whether wet and dry garbage segregation is done inside the campus?	
2	Whether garbage is given to external agencies / municipal agencies?	

Table 5-15: Basic details of waste management

2. Types of Waste generated

Types of waste generated in the college are obtained from table 5-16.

S. No.	Description	Yes / No	Remarks
1	E-Waste (Computers, electrical and electronic parts)		
2	Hazardous / Chemical Waste		
3	Solid Waste (Damaged furniture, paper waste, paper plates)		
4	Dry Leaves		
5	Food Waste		
6	Waste Water (Washing, urinals, bathrooms)		
7	Glass Waste (Broken glass wares from the labs)		
8	Unused Materials		
9	Plastic Waste (Pen, Refill, Plastic water bottles and other plastic containers, wrappers etc.)		

Table 5-16: Types of waste generated

3. Segregation of waste

Segregation of waste information at different locations with quantity is gathered from table 5-17.

S. No.	Location	Bio-degradable	Non-Biodegradable	E-waste	Quantity, kgs/month
1	Office				
2	Labs				
3	Cafeteria / Kitchen				
4	College				

Table 5-17: Segregation of waste

4. Waste generation management

Waste generation management of the college was collected from table 5-18

S. No.	Description	Yes / No	Remarks
1	Composting / Vermicomposting		
2	Recycling		
3	Reusing		
4	Other ways		

Table 5-18: Waste Disposal methods

5.1.5. Green campus management details:

1. Total number of plants and trees

The total number of plantations, garden area, and many more are collected as per the set of questionnaires given in table 5-19

S. No	Description	Details
1	Total number of plant species identified	
2	Total number of plants on the campus	
3	Total number of Trees on the campus	
4	Garden area inside the college –	
5	Total number of medicinal plants /trees on the campus	
6	Total number of vegetables and fruits plantation in the campus	
7	Whether display boards are given to plants and trees for identification	

8	Does Institute celebrate World environment day?	
9	Does Institute celebrate World water day?	
10	Does Institute celebrate World ozone day?	
11	Does Institute celebrate World Earth day?	
12	Total number of aquatic water plants	

Table 5-19: List of plantation details

2. List of plants/ trees

List of plants/ trees with their scientific names obtained from table 5-20.

S. No.	Common/Local Name	Scientific name	No. of Trees/Plants

Table 5-20: List of plants/trees in campus

5.1.6. Carbon footprint management details:

The carbon emission from various activities such as transport, diesel generator usage, LPG consumption, and electricity consumption were collected, as per table 5-21.

S. No	Description	Details
1	Whether college provides transport facility for staff and students (Yes/No)	
2	Number (or Percentage) of staff using transport services provided by college	
3	Number (or Percentage) of students using transport services provided by college	
4	Number (or Percentage) of Staff using public transport	
5	Number (or Percentage) of Staff using Bike	
6	Number (or Percentage) of Staff using Car	
7	Number (or Percentage) of students using Public transport	
8	Number (or Percentage) of students using Car	
9	Number (or Percentage) of students using Bike	
10	Number (or Percentage) of students using Bicycles	
11	Average consumption of diesel per month	
12	Average electricity consumption per month	
13	Average LPG consumption per month	

Table 5-21: Details of Carbon footprint management

5.1.7. Photos required for Audit:

1. General Photos

In various sections, different types of photos are required to validate the existence of things, and hence they are collected from table 5-22.

S. No	Description	Details
1	Photos of student's NSS activities	
2	Photos of Safety policy	
3	Photos of the training program on the use of fire extinguishers	
4	Photos of environmental policies adopted by college	
5	Photos of MoUs for Waste management	

6	Photos of any other policies adopted by college		
7	Photos of water test report	Drinking Water	
		STP processed water	
		Bore-well water	
		Other water Sources (Like Tanker water and any other)	
8	Photos of use of Energy efficient devices like fan, bulbs etc.		
9	Photos of LCD/LED monitors used in Labs		
10	Photos of dry and wet waste collection bins		
11	Photos of celebrating World Environment Day		
12	Photos of celebrating World Water Day		
13	Photos of celebrating World Earth Day		
14	Photos of celebrating World Ozone Day		

Table 5-22: List of photos

QUALITY AUDIT REPORT

ON

WASTE MANAGEMENT AUDIT

OF

THE OXFORD COLLEGE OF ENGINEERING

10TH MILESTONE, BOMMANAHALLI, HOSUR ROAD,

BANGALORE - 560 068

2016 -17 TO 2020 -21

ECO ENERGIME ENGINEERS LLP

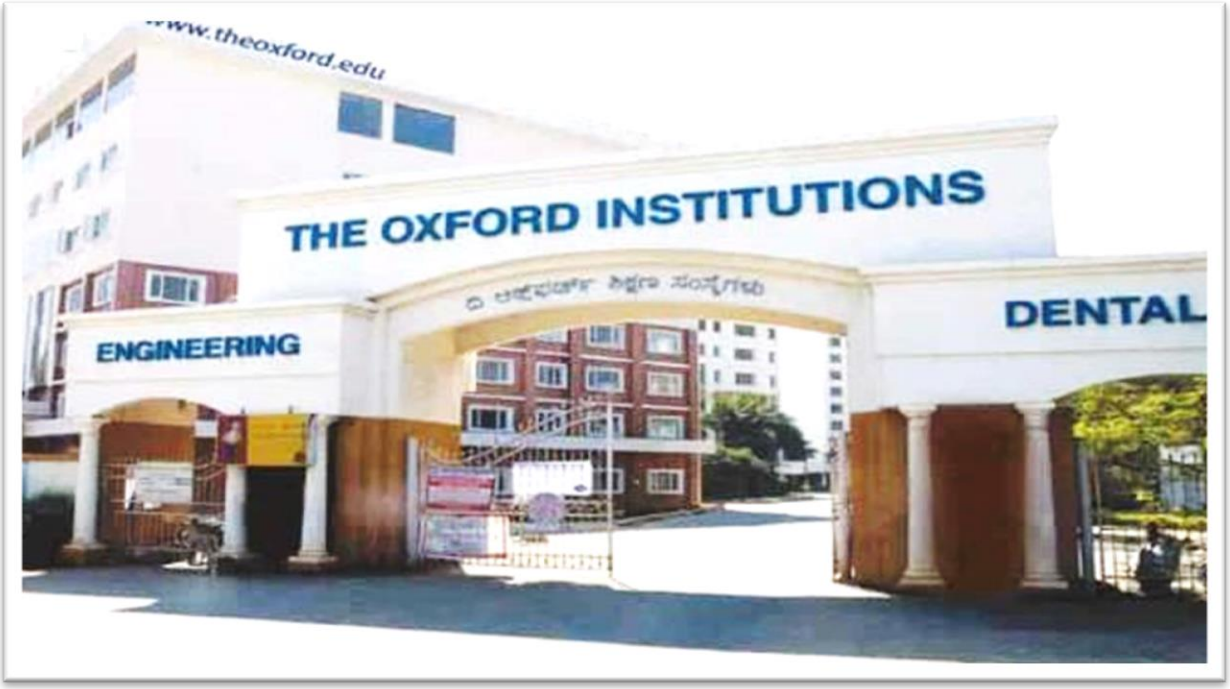
ENHANCING RESOURCE EFFICIENCY

QUALITY AUDIT REPORT

OF

'THE OXFORD COLLEGE OF ENGINEERING'

10TH MILESTONE, BOMMANAHALLI, HOSUR ROAD, BANGALORE - 560 068



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We are thankful to the management of **The Oxford College of Engineering, Bengaluru,** for the support, guidance and, giving us the opportunity to be involved in this very interesting and challenging assignment.

We would be happy to provide any further clarifications, if required, to facilitate the implementation of the recommendations.

We received full co-operation and support from the concerned personnel/ staff members of the college. We would like to thank:

Chairman – The Oxford Educational Institutions

The Oxford College of Engineering

And other Staff in personnel who have given full co-operation and support. They took a keen interest and gave valuable inputs during the course of study.

Certificate

of Completion

This is to certify that

The Oxford College of Engineering, Bommanahalli, Bengaluru

has successfully completed

Waste Management Audit

The study was conducted by

Eco Energime Engineers LLP, Bengaluru.

Start Date : 21.10.2020
End Date : 24.10.2020

Date Of Issue : 24.11.2020
Valid Till : 23.11.2021

Aparna R.

Aparna Reddy
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Smart Solutions for Sustainable Tomorrow

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www.eeellp.com

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DISCLAIMER

The Audit Team has prepared this report for The Oxford College of Engineering, Bengaluru based on the input data submitted by the representatives of college complemented with the best judgment capacity of the expert team.

While all reasonable care has been taken in its preparation, details contained in this report have been compiled in good faith based on information gathered.

It is further informed that the recommendations are arrived following best judgments and no representation, warranty or undertaking, express or implied is made and no responsibility is accepted by Audit Team in this report or for any direct or consequential loss arising from any use of the information, statements or forecasts in the report

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ABBREVIATION AND ACRONYMS

1.	A	:	Amperes
2.	AC	:	Air Conditioner
3.	APFC	:	Automatic Power Factor Controller
4.	AMF	:	Automatic Mains Failure
5.	BBMP	:	Bruhat Bengaluru Mahanagara Palike
6.	BESCOM	:	Bangalore Electricity Supply Company
7.	BWSSB	:	Bangalore Water Supply and Sewerage Board
8.	CC Camera	:	Closed Circuit Camera
9.	DG	:	Diesel Generators
10.	EE Fan	:	Energy Efficient Fan
11.	E-Waste	:	Electronic Waste
12.	FTL	:	Fluorescent Tube Light
13.	GHG	:	Green House Gas
14.	Hz	:	Hertz
15.	HP	:	Horse Power
16.	HT	:	High Tension
17.	I	:	Current
18.	ICT	:	Information and Communications Technology
19.	IQAC	:	Internal Quality Assurance Cell
20.	ISO	:	International Organization for Standardization
21.	kgs	:	Kilograms
22.	kL	:	Kilo Liters
23.	kV	:	kilo volt
24.	kVA	:	kilo volt ampere
25.	kVAr	:	Reactive kilo volt ampere
26.	kW	:	Kilo Watt
27.	kWh	:	kilo Watt hour
28.	kWp	:	kilo Watt peak
29.	LCD	:	Liquid Crystal Display
30.	LED	:	Light Emitting Diode
31.	LT	:	Low Tension
32.	mA	:	Milli Amperes
33.	MoU	:	Memorandum of Understanding
34.	NA	:	Not Applicable
35.	NAAC	:	National Assessment and Accreditation Council
36.	NSS	:	National Service Scheme
37.	OHT	:	Over Head Tank
38.	Prim/Sec	:	Primary/Secondary
39.	PF	:	Power factor
40.	Ph.D.	:	Doctor of Philosophy

41.	PV	:	Photo Voltaic
42.	RCC	:	Reinforced Cement Concrete
43.	RO	:	Reverse Osmosis
44.	RR. No.	:	Revenue Register Number.
45.	Sq. Ft.	:	Square Feet
46.	Sq.m.	:	Square Meter
47.	SRTPV	:	Solar Roof Top Photo Voltaic
48.	TL	:	Tube Light
49.	TR	:	Ton of Refrigeration
50.	TV	:	Television
51.	V	:	Volts
52.	W	:	Watts
53.	Wi-Fi	:	Wireless Fidelity
54.	Wp	:	Watt peak
55.	#	:	Number

1. INTRODUCTION

The Oxford College of Engineering was started in the year 2000, is one of the most prestigious institutions in Bengaluru that provides quality teaching and training in professional UG courses in 10 streams of Engineering in, Computer Science, AIML, Electronics and Communication, Electrical and Electronics, Mechanical, Civil, Bio-Technology, Mechatronics & Automobile. College also offers 10 Postgraduate programs in Technology (M. Tech), Computer Application (MCA) and Business Administration (MBA), and 11 Research centers recognized by VTU to offer Ph.D. programs. College is affiliated with the Visvesvaraya Technological University (VTU) and approved by the All-India Council for Technical Education (AICTE). The college also has been accredited by the NBA, and IAO quality-assessed organizations. The Institute name is also included in the NIRF & AICTE CII Survey of Industry Linked Technical Institute- 2020. Institution is categorized in Band promising in ARIIA ranking in the year 2021. The college is set in a sprawling 11.5 acres campus in the prestigious IT corridor, ideal for education in a serene environment with over 85,000 square meters of built-up area spread over 2 blocks, with enormous investment for academic purposes. The college has well equipped with state-of-the-art infrastructure facilities to carry out various real-time projects, research, and consultancy activities in recent technologies. All the Departments have undertaken many research/consultancy projects funded both by multinationals and government agencies. The college has a good number of research publications in various reputed journals and patents. College has a good number of R&D projects sponsored by AICTE, VGST, VTU, IEEE, ICMR BRNS, NIF, NRB(DRDO) & BIRAC. It has a history of excellent placement track record in various multinational companies' offers with high salary packages.

VISION

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

MISSION

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

QUALITY POLICY

To equip the students with highest standard of education, knowledge and ethics. To prepare them to meet the challenges of life with full confidence. Aim at all round development of the personality to be useful citizens.

Campus Area and Built-up area

The area of the campus (built up and total) area is given in table 1-1.

S. No.	Description	Units	Details
1	Engineering Campus total area	Acres	11.5
2	Built up area	Sq. mt.	85,000

Table 1-1: College Area

Committee and Cells

The Oxford College of Engineering (TOCE) has various functional committees and cells. They are listed below,

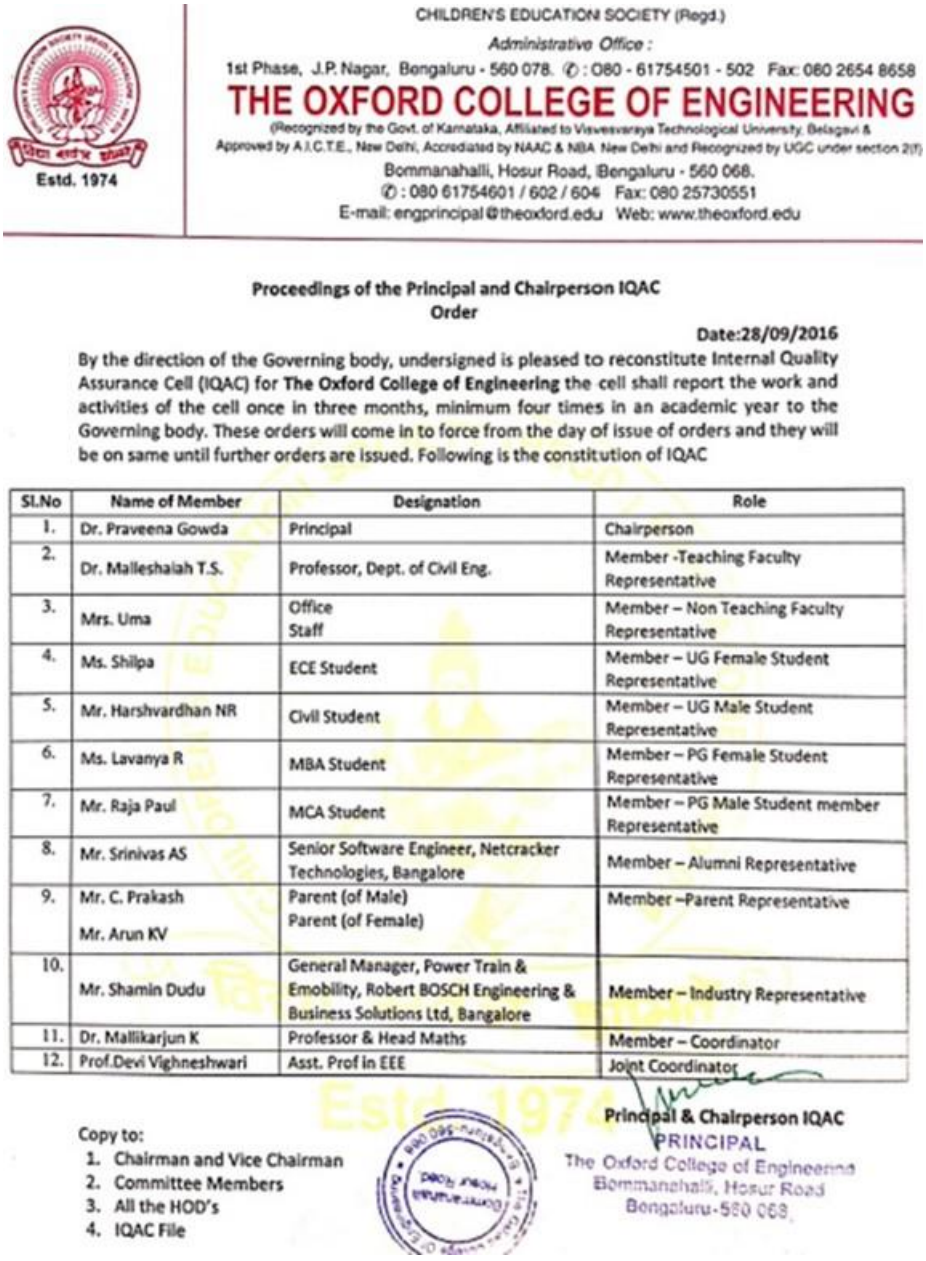
- VTU/AICTE Committee
- Planning & Accreditation Committee
- Library Committee
- Research and Development Committee
- Training & Placement Committee
- Faculty Development Committee
- Purchase & Budget Committee
- College Magazine/Calendar /Newsletter Committee
- Professional Societies / Chapters
- Cultural Association
- Alumni Association

- Sports Committee
- NSS
- Students Grievances Redressal Committee
- Discipline Committee
- Women's Grievance Redressal Committee
- Anti-sexual Harassment Committee
- Entrepreneurship & Incubation cell
- Anti-Ragging Committee
- Website, Server & Internet Committee
- Public Relation Committee
- Hostel & Canteen Committee
- Prevention of Caste Based Discrimination Cell
- College Internal Complaints Committee
- Internal Task Force Team - COVID 19 Coordination Committee
- Internal Quality Assurance Cell (IQAC)
- Exam Cell
- Disability Recourse Centre
- IPR Cell
- IA Answer Scripts Evaluation Review Committee
- IA Question Paper Scrutiny Committee

Internal Quality Assurance Cell (IQAC)

The college management constitutes the Internal Quality Assurance Cell including Principal, teaching faculty, non-teaching faculty, UG students (Male & Female), PG students (Male & Female), alumni, parent and industry representatives every year.

The list of Internal Quality Assurance Cell members for the academic year 2016-2017 is shown in figure 1-1.



CHILDREN'S EDUCATION SOCIETY (Regd.)
Administrative Office :
1st Phase, J.P. Nagar, Bengaluru - 560 078. ✆ : 080 - 61754501 - 502 Fax: 080 2654 8658

THE OXFORD COLLEGE OF ENGINEERING

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Bommanahalli, Hosur Road, Bengaluru - 560 068.
✆ : 080 61754601 / 602 / 604 Fax: 080 25730551
E-mail: engprincipal@theoxford.edu Web: www.theoxford.edu

Estd. 1974

Proceedings of the Principal and Chairperson IQAC
Order

Date:28/09/2016

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Sl.No	Name of Member	Designation	Role
1.	Dr. Praveena Gowda	Principal	Chairperson
2.	Dr. Malleshaiah T.S.	Professor, Dept. of Civil Eng.	Member -Teaching Faculty Representative
3.	Mrs. Uma	Office Staff	Member – Non Teaching Faculty Representative
4.	Ms. Shilpa	ECE Student	Member – UG Female Student Representative
5.	Mr. Harshvardhan NR	Civil Student	Member – UG Male Student Representative
6.	Ms. Lavanya R	MBA Student	Member – PG Female Student Representative
7.	Mr. Raja Paul	MCA Student	Member – PG Male Student member Representative
8.	Mr. Srinivas AS	Senior Software Engineer, Netcracker Technologies, Bangalore	Member – Alumni Representative
9.	Mr. C. Prakash Mr. Arun KV	Parent (of Male) Parent (of Female)	Member –Parent Representative
10.	Mr. Shamin Dudu	General Manager, Power Train & Emobility, Robert BOSCH Engineering & Business Solutions Ltd, Bangalore	Member – Industry Representative
11.	Dr. Mallikarjun K	Professor & Head Maths	Member – Coordinator
12.	Prof.Devi Vighneshwari	Asst. Prof in EEE	Joint Coordinator

Copy to:
1. Chairman and Vice Chairman
2. Committee Members
3. All the HOD's
4. IQAC File

Principal & Chairperson IQAC
PRINCIPAL
The Oxford College of Engineering
Bommanahalli, Hosur Road
Bengaluru-560 068

Figure 1-1: List of IQAC members 2016-2017

The list of Internal Quality Assurance Cell members for the academic year 2017-2018 is shown in figure 1-2.

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Principal & Chairperson IQAC

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The Oxford College of Engineering
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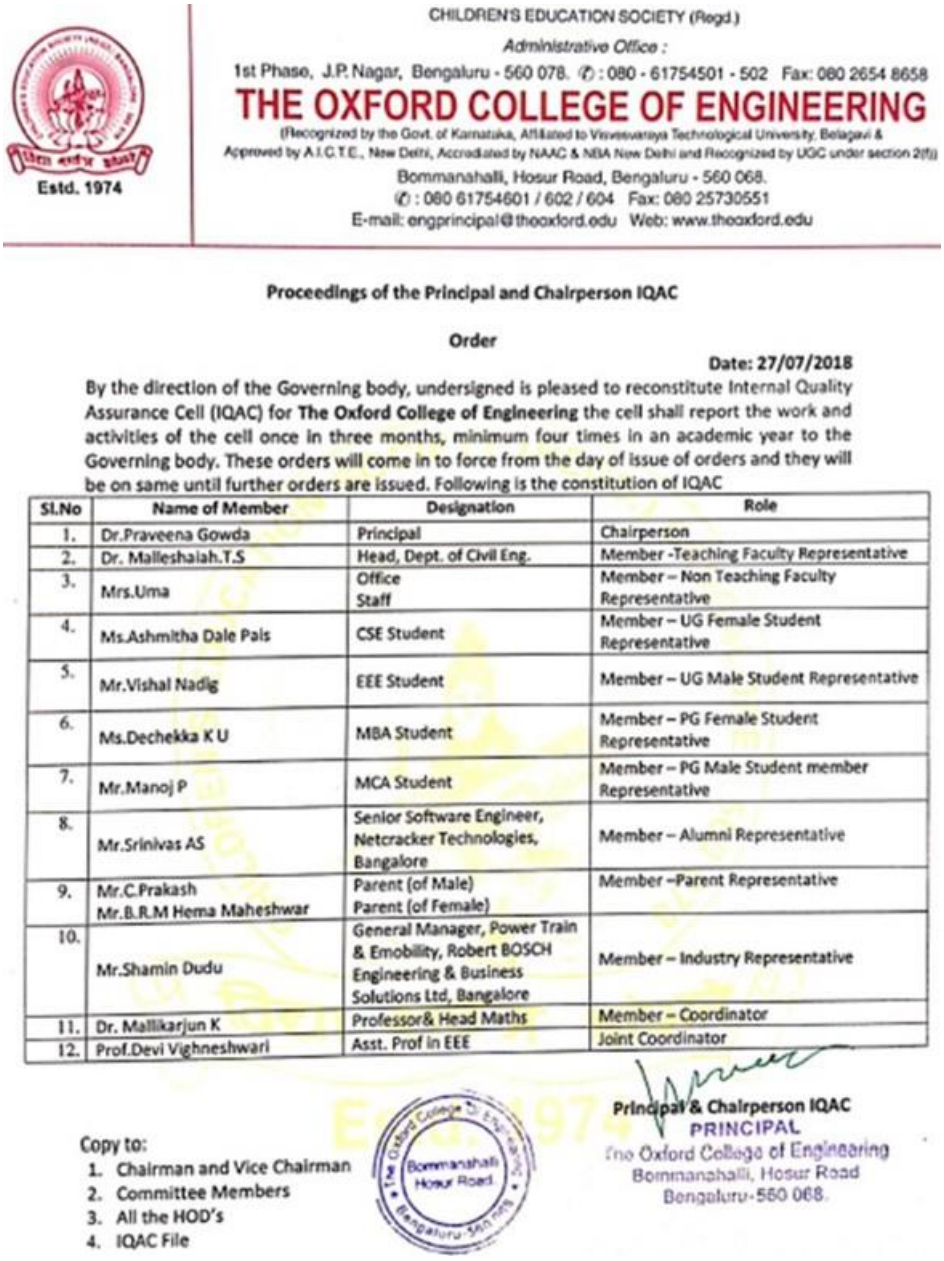
Figure 1-2: List of IQAC members 2017-2018

The list of Internal Quality Assurance Cell members for the academic year 2018-2019 is shown in figure 1-3.



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3.	Mrs.Uma	Office Staff	Member – Non Teaching Faculty Representative
4.	Ms.Ashmitha Dale Pais	CSE Student	Member – UG Female Student Representative
5.	Mr.Vishal Nadig	EEE Student	Member – UG Male Student Representative
6.	Ms.Dechekka K U	MBA Student	Member – PG Female Student Representative
7.	Mr.Manoj P	MCA Student	Member – PG Male Student member Representative
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Figure 1-3: List of IQAC members 2018-2019

The list of Internal Quality Assurance Cell members for the academic year 2019-2020 is shown in figure 1-4.

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Figure 1-4: List of IQAC members 2019-2020

The list of Internal Quality Assurance Cell members for the academic year 2020-2021 is shown in figure 1-5.

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The Oxford College of Engineering Bommanahalli Hosur Road

Principal & Chairperson IQAC

PRINCIPAL
The Oxford College of Engineering
Bommanahalli, Hosur Road
Bengaluru-560 068

Figure 1-5: List of IQAC members 2020-2021

Overview of Quality Audit:

Quality Audit helps college / facility to:

- Understand the usage of electricity, water and other natural resources
- Identify opportunities to conserve various natural resources
- Identify various technological improvements
- Evaluate the techno-commercial of identified conservative measures
- Create awareness among the students and staff
- Disseminate the commitment of management towards saving nature
- Develop a culture among students, staff and management to be socially responsible

2. PRE – AUDIT PHASE

A Pre-audit meeting is a prerequisite for the audit, it helps to meet and discuss about the schedule and documents required during the audit. The pre-audit meeting was conducted at The Oxford College of Engineering. During the meeting, introduction of team members, scope and objectives of the audit were discussed.

Management Commitment

The Management of the college has shown great commitment towards Quality Audit during the pre-audit meeting. They were ready to encourage all green activities. It is decided to promote all activities that are environment friendly such as awareness programmes on the environment, campus farming, planting more trees on the campus etc., after the Quality Auditing.

College administration is vital to the process of realizing campus sustainability, and college policy is an essential instrument for any substantial change in the campus environment.

Scope and Goals of Quality Auditing

A clean and healthy environment aids effective learning and provides conducive learning environment. There are various efforts around the world to address environmental education issues. Quality auditing is one among them for educational institutions.

Once a baseline is established, the data can serve as a point of departure for further action in campus greening. Existing data will allow the college to compare its programs and operations with those of peer institutions, identify areas in need of improvement, and prioritize the implementation of future projects.

This data will also provide a basis for calculating the economic benefits of resource conservation projects, by establishing the current rates of resource use and their associated costs. This audit initiative focused initially on educating colleges and universities through workshops, guidebooks, fact sheets and ensuring compliance through inspections and self-audits.

3. ON-SITE AUDIT PHASE

3.1. Scope / Target Areas of Quality Auditing

3.1.1. Water Audit

Water Audit addresses water consumption, water sources, appliances and fixtures. Aquifer depletion and water contamination are taking place at unprecedented rates. It is therefore essential that any environmentally responsible institution should examine its water use practices.

3.1.2. Energy Audit

Energy Audit addresses energy consumption, energy sources, energy monitoring, lighting, appliances, and vehicles. Energy use is clearly an important aspect of campus sustainability.

3.1.3. Waste Management Audit

Waste Audit addresses waste production and disposal, plastic waste, paper waste, food waste, and recycling. Municipal solid waste has a number of adverse environmental impacts, most of which are well known and not in need of elaboration.

3.1.4. Green Campus Management Audit

Green campus initiatives are becoming an integral part of modern day's university systems. Green campus Audit helps in maintaining the air and water clean. It regulates the climatic conditions and provides a healthy and comfortable environment for living.

3.1.5. Environment Footprint Audit

Environment Footprint Audit addresses the usage of fossil fuels (coal, diesel, petrol and gas). The mode of commute to and from college each day has an impact on the environment through the emission of greenhouse gases into the atmosphere by the burning of fossil fuels.

3.2. Audit Methodology and Approach

The methodology and approach adopted for the study involve various steps that include:

- Review of Document and records
- Review of Policies
- Review of MoU
- Review of various measures implemented
- Site Walkthrough
- Data Collection
- Interviews

3.2.1. Review of Document and Records

The various documents and records such as:

- Electricity bills
- Water bills
- Equipment registers
- List of appliances
- Internal Quality Audit document
- Purchase document
- Cash payment receipts
- Equipment service report
- Maintenance and service payment receipts

were reviewed and, relevant data and inputs required for analysis have been collected.

3.2.2. Review of Policies

College has various policies that include safety policy and Anti-ragging policy.

A. Safety Policy:

All the students, teaching staff, non-teaching staff, maintenance and house-keeping staff have been given training to use fire extinguishers in emergency situations of fire and explosion. Fire hydrant system is available at the campus. Also, fire extinguishing cylinders have been installed in each floor and in laboratory areas. Fire order statements and use of fire extinguisher has been posted at each block. Fire alarm is also installed at the premises. Photos of fire order and fire alarm are shown in figure 3-1 and 3-2.

Figure 3-1: Fire order displayed at college premises

Figure 3-2: Fire alarm panel at engineering old block

B. Anti-Ragging policy:

Ragging in all its forms shall be totally banned in the entire institution, including its departments, constituent units, all its premises (academic, hostel, sports, canteen, etc.) whether located within the campus or outside and in all means of transportation of students whether public or private. **'Say No to Ragging'** poster is placed in each block of the campus and a sample photo is as shown in the figure 3-3.

Figure 3-3: Anti-ragging poster

3.2.3. Review of various measures implemented

During the Quality Audit study, it was observed the college has taken various initiatives in conserving natural resources that include:

- Internal Quality Assurance Cell including Staff, Students, Alumni, parents and industrial members.
- Installation of Solar Roof Top Photo Voltaic (SRTPV) system for power generation.
- Wheeling to grid is done.
- Installation of LED fixtures to reduce electricity consumption
- Installation of LCD/LED monitors for all the desktops to conserve electricity
- Switching OFF lights and fans whenever not in use to save electricity
- Installation of RO plant to provide purified drinking water.
- Dual water piping system for washrooms and toilets, to use STP treated water for flushing
- Sewage treatment and using the treated final water for toilet flushing, gardening and cleaning purposes
- Rain water harvesting system is available in the campus.
- Regular testing of STP treated water quality parameters
- Dedicated watering system for greeneries.
- The use of sign boards in all the wash rooms were observed, to create awareness for water conservation
- Installation of waste segregation bins at all the rooms to separate the dry and wet waste
- Maintenance of logbooks and registers is done properly.
- Training is conducted on regular basis regarding usage of fire extinguisher, conservation of resources such as electricity, water, food and green campus.
- Maintenance team is available for electrical, plumbing, waste management and green campus management.

3.2.4. Site walk through

Site walk through was conducted with staff members, students and audit team members. Staff and students have shown very keen interest in the data collection process and methods to be followed in field data collection. The staff and students have given inputs and suggestions for resource conservation as well.

College Infrastructure

The Oxford College of Engineering campus has various blocks and departments. Each floor has state of the art class rooms, staff rooms, laboratories, libraries and many more. Details of infrastructure are as follows:

- Inhouse hostel for boys and girls
- Bank facility
- 24 hrs. ATM in the campus
- Solar plant
- Rain water harvesting
- RO water facility
- Lifts & ramps
- Cafeteria
- Gymnasium
- Cricket stadium / basketball court / badminton court
- Wi-Fi facility in the campus
- CCTV security
- Telephone and fax facility
- Photocopying facility
- The oxford enterprises (stationery)
- Library

- Digital library
- Extended library hours
- Hospital facility
- Free dental treatment
- First aid, medical and counseling facility
- Scholarships
- Group insurance
- Placements
- Placements training
- English language coaching
- Add-on courses
- Cloud based ERP for students
- Transport
- Parking facility
- Cultural activities center
- Incubation Centre for research activity
- Staff room
- Smart class rooms
- Conference room
- Student common room
- Green campus

3.2.5. Inventory Collection

To understand the types of appliances used, inventory collection was carried out by the audit team members. The various types of appliances used are lights, fans, computers, projectors, printers, scanners etc., The consolidated list of inventories is given in table 3-1.

S. No.	Dept	Florescent Tube Light		LED		CFL	Fan		Computer		Exhaust Fans	Scanners	Printers	Xerox Machine	CC Camera	TV Screen	Projector	AC	Refridgerator
		40 W	MOR (36W)	18W Tube	12 W		Ceiling Fan	Wall mount Fan	LED /LCD Monito	CRT Monitors									
1	AUTO ENGG	64	0	12	0	0	26	6	5	0	0	1	2	0	0	0	1	0	
2	BT	86	0	0	0	0	42	0	10	9	2	2	2	2	8	0	1	2	4
3	Chemistry	0	0	17	0	0	12	0	0	0	0	0	0	0	0	0	0	0	
4	CSE	52	0	141	0	0	59	13	3	218	0	0	0	4	0	12	0	5	1
5	Civil	52	0	16	0	0	56	4	30	0	0	1	3	0	0	0	0	0	
6	ECE	81	0	0	0	0	44	11	48	0	3	0	4	0	7	0	3	1	
7	EEE	48	2	0	6	0	54	2	41	0	0	0	2	0	7	0	1	0	0
8	ISE	34	0	77	0	0	29	5	128	0	0	0	2	0	0	0	1	0	
9	Library	0	45	0	0	0	53	0	30	0	0	1	1	0	0	0	0	0	
10	Maths	16	0	0	0	0	14	1	5	0	0	0	7	0	0	0	0	0	
11	MBA	39	0	0	0	96	42	0	16	0	0	0	2	0	0	0	3	3	
12	MCA	51	0	0	0	0	31	0	242	0	0	0	2	0	3	0	0	9	
13	MECH	89	0	0	0	0	59	0	84	0	2	0	2	0	5	2	3	0	
14	MTE	24	0	0	0	0	19	0	3	0	0	0	1	0	4	0	1	0	
15	PHYSICS	39	0	0	0	0	27	1	2	0	0	0	1	0	6	0	0	0	
Total (College)		675	47	263	6	96	567	43	647	227	7	5	31	6	40	14	14	20	5
Total(Hostel)		413	0	71	0	0	431	0	1	0	0	0	1	0	0	0	0	0	0
Total (Overall)		1088	47	334	6	96	998	43	648	227	7	5	32	6	40	14	14	20	5

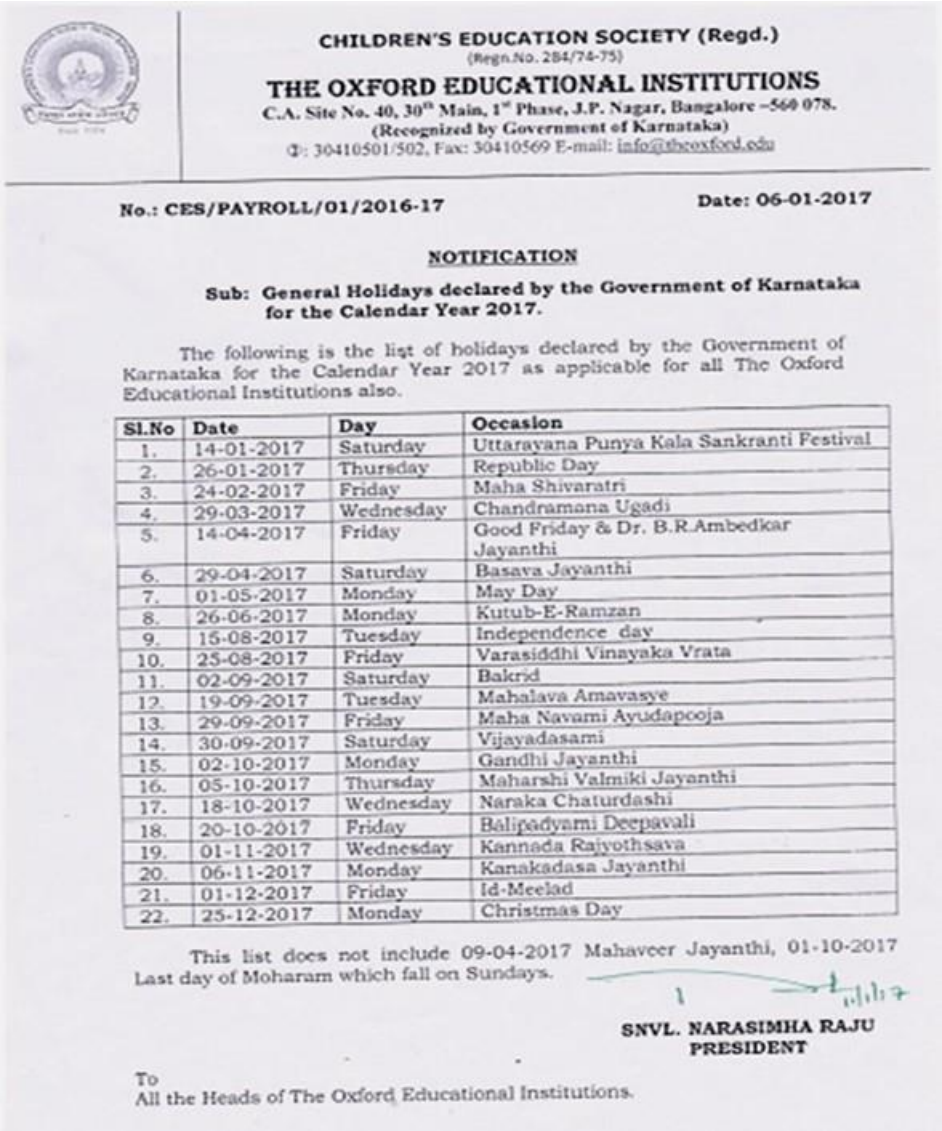
Table 3-1: Consolidated list of inventories

3.2.6. Interviews

To collect the various data, information and operating patterns, interviews were conducted with college staff (Principal, teaching staff, non-teaching staff) and students. The consolidated information from the interviews is given in the following sub-sections.

3.2.6.1. List of Holidays:

The lists of holidays were collected during the study and the same is given below. The list of holidays for the year 2017 is shown in figure 3-4.



CHILDREN'S EDUCATION SOCIETY (Regd.)
(Regn.No. 284/74-75)
THE OXFORD EDUCATIONAL INSTITUTIONS
C.A. Site No. 40, 30th Main, 1st Phase, J.P. Nagar, Bangalore –560 078.
(Recognized by Government of Karnataka)
✆: 30410501/502, Fax: 30410569 E-mail: info@theoxford.edu

No.: CES/PAYROLL/01/2016-17 Date: 06-01-2017

NOTIFICATION

Sub: General Holidays declared by the Government of Karnataka for the Calendar Year 2017.

The following is the list of holidays declared by the Government of Karnataka for the Calendar Year 2017 as applicable for all The Oxford Educational Institutions also.

Sl.No	Date	Day	Occasion
1.	14-01-2017	Saturday	Uttarayana Punya Kala Sankranti Festival
2.	26-01-2017	Thursday	Republic Day
3.	24-02-2017	Friday	Maha Shivaratri
4.	29-03-2017	Wednesday	Chandramana Ugadi
5.	14-04-2017	Friday	Good Friday & Dr. B.R.Ambedkar Jayanthi
6.	29-04-2017	Saturday	Basava Jayanthi
7.	01-05-2017	Monday	May Day
8.	26-06-2017	Monday	Kutub-E-Ramzan
9.	15-08-2017	Tuesday	Independence day
10.	25-08-2017	Friday	Varasiddhi Vinayaka Vrata
11.	02-09-2017	Saturday	Bakrid
12.	19-09-2017	Tuesday	Mahalaya Amavasye
13.	29-09-2017	Friday	Maha Navami Ayudapooja
14.	30-09-2017	Saturday	Vijayadasami
15.	02-10-2017	Monday	Gandhi Jayanthi
16.	05-10-2017	Thursday	Maharshi Valmiki Jayanthi
17.	18-10-2017	Wednesday	Naraka Chaturdashi
18.	20-10-2017	Friday	Balipadyami Deepavali
19.	01-11-2017	Wednesday	Kannada Rajyothsava
20.	06-11-2017	Monday	Kanakadasa Jayanthi
21.	01-12-2017	Friday	Id-Meelad
22.	25-12-2017	Monday	Christmas Day

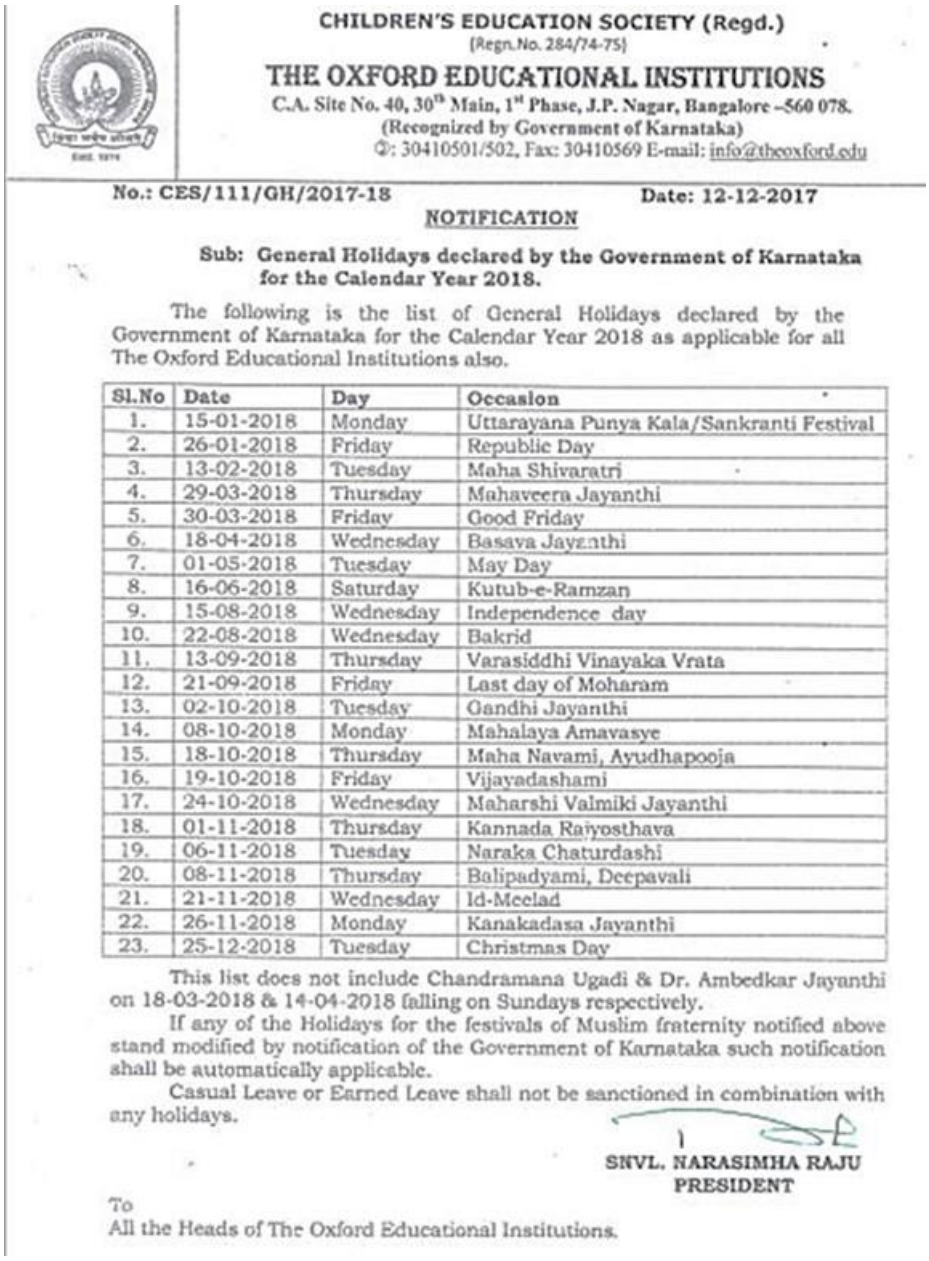
This list does not include 09-04-2017 Mahaveer Jayanthi, 01-10-2017 Last day of Moharam which fall on Sundays.

SNVL. NARASIMHA RAJU
PRESIDENT

To
All the Heads of The Oxford Educational Institutions.

Figure 3-4: List of Holidays-2017

The list of holidays for the year 2018 is shown in figure 3-5.



CHILDREN'S EDUCATION SOCIETY (Regd.)
(Regn.No. 284/74-75)

THE OXFORD EDUCATIONAL INSTITUTIONS
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(Recognized by Government of Karnataka)
✆: 30410501/502, Fax: 30410569 E-mail: info@theoxford.edu

No.: CES/111/GH/2017-18 Date: 12-12-2017

NOTIFICATION

Sub: General Holidays declared by the Government of Karnataka for the Calendar Year 2018.

The following is the list of General Holidays declared by the Government of Karnataka for the Calendar Year 2018 as applicable for all The Oxford Educational Institutions also.

Sl.No	Date	Day	Occasion
1.	15-01-2018	Monday	Uttarayana Punya Kala/Sankranti Festival
2.	26-01-2018	Friday	Republic Day
3.	13-02-2018	Tuesday	Maha Shivaratri
4.	29-03-2018	Thursday	Mahaveera Jayanthi
5.	30-03-2018	Friday	Good Friday
6.	18-04-2018	Wednesday	Basava Jayanthi
7.	01-05-2018	Tuesday	May Day
8.	16-06-2018	Saturday	Kutub-e-Ramzan
9.	15-08-2018	Wednesday	Independence day
10.	22-08-2018	Wednesday	Bakrid
11.	13-09-2018	Thursday	Varasiddhi Vinayaka Vrata
12.	21-09-2018	Friday	Last day of Moharam
13.	02-10-2018	Tuesday	Gandhi Jayanthi
14.	08-10-2018	Monday	Mahalaya Amavasye
15.	18-10-2018	Thursday	Maha Navami, Ayudhapooja
16.	19-10-2018	Friday	Vijayadashami
17.	24-10-2018	Wednesday	Maharshi Valmiki Jayanthi
18.	01-11-2018	Thursday	Kannada Rajyosthava
19.	06-11-2018	Tuesday	Naraka Chaturdashi
20.	08-11-2018	Thursday	Balipadyami, Deepavali
21.	21-11-2018	Wednesday	Id-Meelad
22.	26-11-2018	Monday	Kanakadasa Jayanthi
23.	25-12-2018	Tuesday	Christmas Day

This list does not include Chandramana Ugadi & Dr. Ambedkar Jayanthi on 18-03-2018 & 14-04-2018 falling on Sundays respectively.

If any of the Holidays for the festivals of Muslim fraternity notified above stand modified by notification of the Government of Karnataka such notification shall be automatically applicable.

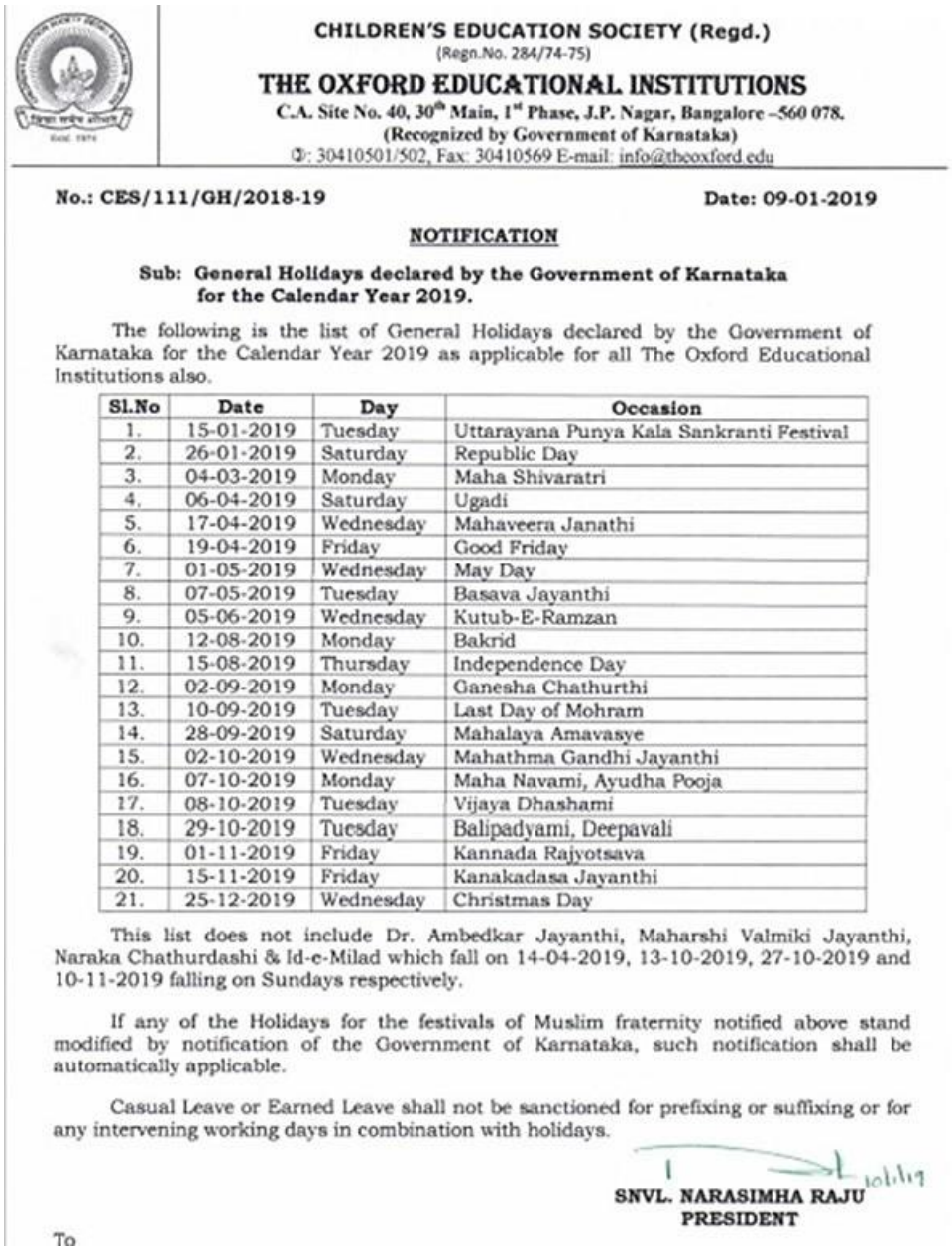
Casual Leave or Earned Leave shall not be sanctioned in combination with any holidays.

SNVL. NARASIMHA RAJU
PRESIDENT

To
All the Heads of The Oxford Educational Institutions.

Figure 3-5: List of Holidays-2018

The list of holidays for the year 2019 is shown in figure 3-6.



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No.: CES/111/GH/2018-19 **Date: 09-01-2019**

NOTIFICATION

Sub: General Holidays declared by the Government of Karnataka for the Calendar Year 2019.

The following is the list of General Holidays declared by the Government of Karnataka for the Calendar Year 2019 as applicable for all The Oxford Educational Institutions also.

Sl.No	Date	Day	Occasion
1.	15-01-2019	Tuesday	Uttarayana Punya Kala Sankranti Festival
2.	26-01-2019	Saturday	Republic Day
3.	04-03-2019	Monday	Maha Shivaratri
4.	06-04-2019	Saturday	Ugadi
5.	17-04-2019	Wednesday	Mahaveera Janathi
6.	19-04-2019	Friday	Good Friday
7.	01-05-2019	Wednesday	May Day
8.	07-05-2019	Tuesday	Basava Jayanthi
9.	05-06-2019	Wednesday	Kutub-E-Ramzan
10.	12-08-2019	Monday	Bakrid
11.	15-08-2019	Thursday	Independence Day
12.	02-09-2019	Monday	Ganesha Chathurthi
13.	10-09-2019	Tuesday	Last Day of Mohram
14.	28-09-2019	Saturday	Mahalaya Amavasye
15.	02-10-2019	Wednesday	Mahathma Gandhi Jayanthi
16.	07-10-2019	Monday	Maha Navami, Ayudha Pooja
17.	08-10-2019	Tuesday	Vijaya Dhashami
18.	29-10-2019	Tuesday	Balipadyami, Deepavali
19.	01-11-2019	Friday	Kannada Rajyotsava
20.	15-11-2019	Friday	Kanakadasa Jayanthi
21.	25-12-2019	Wednesday	Christmas Day

This list does not include Dr. Ambedkar Jayanthi, Maharshi Valmiki Jayanthi, Naraka Chathurdashi & Id-e-Milad which fall on 14-04-2019, 13-10-2019, 27-10-2019 and 10-11-2019 falling on Sundays respectively.

If any of the Holidays for the festivals of Muslim fraternity notified above stand modified by notification of the Government of Karnataka, such notification shall be automatically applicable.

Casual Leave or Earned Leave shall not be sanctioned for prefixing or suffixing or for any intervening working days in combination with holidays.

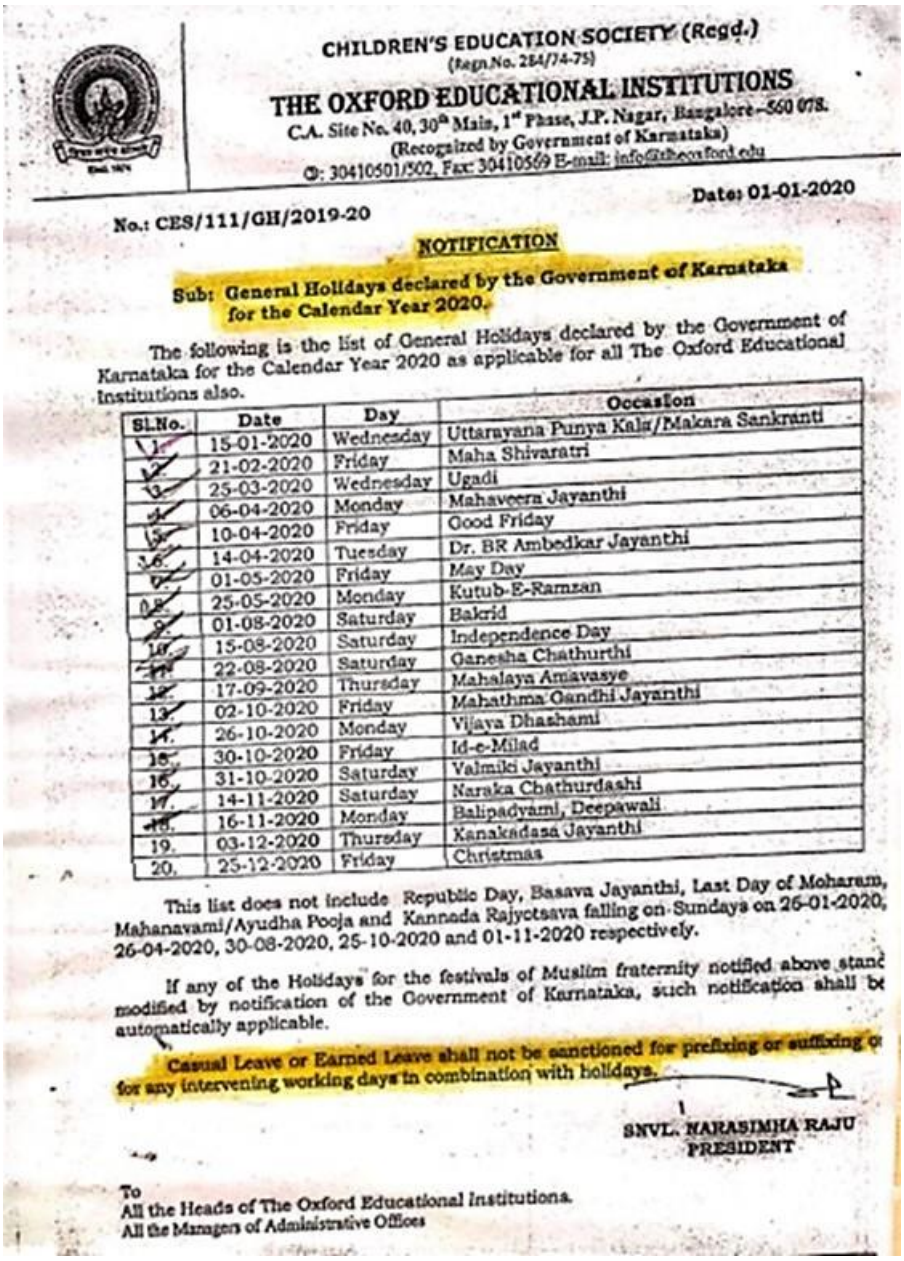
10.1.19

SNVL. NARASIMHA RAJU
PRESIDENT

To

Figure 3-6: List of Holidays-2019

The list of holidays for the year 2020 is shown in figure 3-7.



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Ph: 30410501/502, Fax: 30410569 E-mail: info@theoxford.edu

No.: CES/111/GH/2019-20

Date: 01-01-2020

NOTIFICATION

Sub: General Holidays declared by the Government of Karnataka for the Calendar Year 2020.

The following is the list of General Holidays declared by the Government of Karnataka for the Calendar Year 2020 as applicable for all The Oxford Educational Institutions also.

Sl.No.	Date	Day	Occasion
1.	15-01-2020	Wednesday	Uttarayana Punya Kala/Makara Sankranti
2.	21-02-2020	Friday	Maha Shivaratri
3.	25-03-2020	Wednesday	Ugadi
4.	06-04-2020	Monday	Mahaveera Jayanthi
5.	10-04-2020	Friday	Good Friday
6.	14-04-2020	Tuesday	Dr. BR Ambedkar Jayanthi
7.	01-05-2020	Friday	May Day
8.	25-05-2020	Monday	Kutub-E-Ramzan
9.	01-08-2020	Saturday	Bakrid
10.	15-08-2020	Saturday	Independence Day
11.	22-08-2020	Saturday	Ganesha Chathurthi
12.	17-09-2020	Thursday	Mahalaya Amavasye
13.	02-10-2020	Friday	Mahathma Gandhi Jayanthi
14.	26-10-2020	Monday	Vijaya Dhashami
15.	30-10-2020	Friday	Id-e-Milad
16.	31-10-2020	Saturday	Valmiki Jayanthi
17.	14-11-2020	Saturday	Naraka Chathurdashi
18.	16-11-2020	Monday	Balipadyami, Deepawali
19.	03-12-2020	Thursday	Kanakadasa Jayanthi
20.	25-12-2020	Friday	Christmas

This list does not include Republic Day, Basava Jayanthi, Last Day of Moharam, Mahanavami/Ayudha Pooja and Kannada Rajyotsava falling on Sundays on 26-01-2020, 26-04-2020, 30-08-2020, 25-10-2020 and 01-11-2020 respectively.

If any of the Holidays for the festivals of Muslim fraternity notified above stand modified by notification of the Government of Karnataka, such notification shall be automatically applicable.

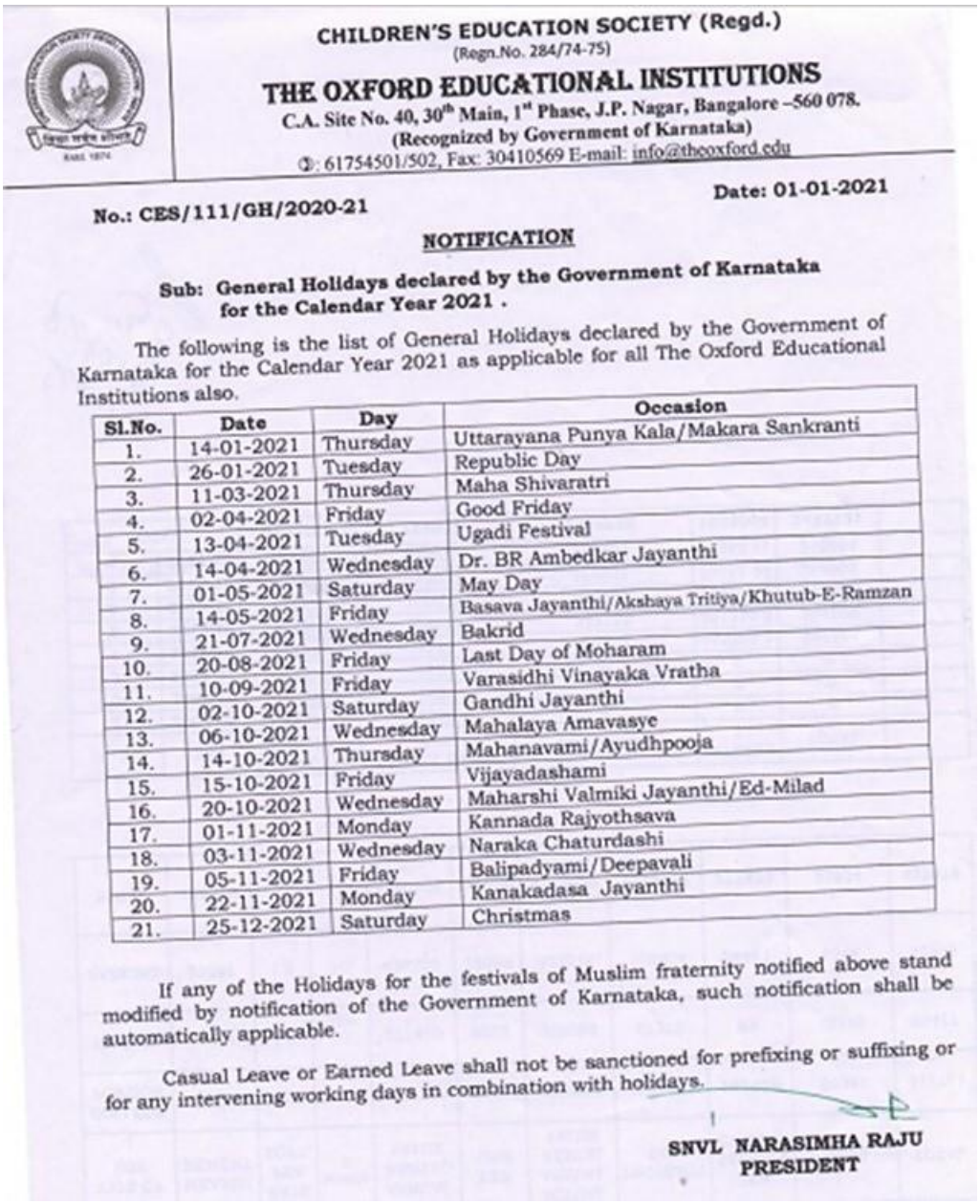
Casual Leave or Earned Leave shall not be sanctioned for prefixing or suffixing or for any intervening working days in combination with holidays.

SNVL. NARASIMHA RAJU
PRESIDENT

To
All the Heads of The Oxford Educational Institutions.
All the Managers of Administrative Offices

Figure 3-7: List of Holidays-2020

The list of holidays for the year 2021 is shown in figure 3-8.



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No.: CES/111/GH/2020-21 Date: 01-01-2021

NOTIFICATION

Sub: General Holidays declared by the Government of Karnataka for the Calendar Year 2021 .

The following is the list of General Holidays declared by the Government of Karnataka for the Calendar Year 2021 as applicable for all The Oxford Educational Institutions also.

Sl.No.	Date	Day	Occasion
1.	14-01-2021	Thursday	Uttarayana Punya Kala/Makara Sankranti
2.	26-01-2021	Tuesday	Republic Day
3.	11-03-2021	Thursday	Maha Shivaratri
4.	02-04-2021	Friday	Good Friday
5.	13-04-2021	Tuesday	Ugadi Festival
6.	14-04-2021	Wednesday	Dr. BR Ambedkar Jayanthi
7.	01-05-2021	Saturday	May Day
8.	14-05-2021	Friday	Basava Jayanthi/Akshaya Tritiya/Khutub-E-Ramzan
9.	21-07-2021	Wednesday	Bakrid
10.	20-08-2021	Friday	Last Day of Moharam
11.	10-09-2021	Friday	Varasidhi Vinayaka Vratha
12.	02-10-2021	Saturday	Gandhi Jayanthi
13.	06-10-2021	Wednesday	Mahalaya Amavasye
14.	14-10-2021	Thursday	Mahanavami/Ayudhpooja
15.	15-10-2021	Friday	Vijayadashami
16.	20-10-2021	Wednesday	Maharshi Valmiki Jayanthi/Ed-Milad
17.	01-11-2021	Monday	Kannada Rajyothsava
18.	03-11-2021	Wednesday	Naraka Chaturdashi
19.	05-11-2021	Friday	Balipadyami/Deepavali
20.	22-11-2021	Monday	Kanakadasa Jayanthi
21.	25-12-2021	Saturday	Christmas

If any of the Holidays for the festivals of Muslim fraternity notified above stand modified by notification of the Government of Karnataka, such notification shall be automatically applicable.

Casual Leave or Earned Leave shall not be sanctioned for prefixing or suffixing or for any intervening working days in combination with holidays.

SNVL NARASIMHA RAJU
PRESIDENT

Figure 3-8: List of Holidays-2021

3.2.6.2. Tentative Schedule of College

The tentative schedule of the college is 09.00 AM to 4:15 PM.

The library timing is 09:00 AM to 10:00 PM.

The details of the class sessions are given in table 3-2.

S. No.	Session	Timings
1	1st Hour	09:00 TO 9:55AM
2	2nd Hour	09:55 TO 10:50 AM
3	Short Break	10:50 TO 11:00 AM
4	3rd Hour	11:00 TO 11:55 AM
5	4th Hour	11:55 TO 12:50 PM
6	Lunch	12:50 TO 01:30 PM
7	5th Hour	1:30 TO 2:25 PM
9	6th Hour	2:25 TO 3:20 PM
10	7th Hour	3:20 TO 4:15 PM

Table 3-2: Tentative College Schedule

3.2.6.3. Staff and Students of College:

The number of staff including teaching, non-teaching, and house-keeping is given in the table 3-3. The number of students includes both boys and girls.

S. No.	Year	Teaching Staff	Non-Teaching staff	Total Staff	Total Students
1	2017	303	122	425	3572
2	2018	285	95	380	3044
3	2019	269	92	361	3124
4	2020	240	68	308	2728
5	2021	222	57	279	2722

Table 3-3: Number of staff and students

4. WASTE MANAGEMENT AUDIT

The Institution has taken up various initiatives to maintain an environment friendly campus. The campus is full of greenery and is kept clean and tidy. The gardens, lawns and plantations inside the campus is maintained by a dedicated group of caretakers, sweepers and housekeeping staff. The Institution implements effective waste management through waste segregation and recycling of the waste.

4.1. Facility Description

The study involved carrying out various analyses to realistically assess waste generation. There are different types of waste generated in the college and is tabulated in table 4-1.

S. No.	Description	Yes / No	Details
1	E-Waste	Yes	External Agency
2	Hazardous / Chemical Waste	No	NA
3	Solid Waste	Yes	External Agency
4	Dry Leaves	Yes	Compost Unit
5	Food Waste	Yes	Organic Waste Digester
6	Waste Water	Yes	STP
7	Glass Waste	No	NA
8	Unused Materials	No	External Agency
10	Plastic Waste	Yes	External Agency

Table 4-1: Types of Waste Generated in the college

4.1.1. Dry Waste Management

The Institution implements solid waste management by enforcing the waste segregation rules. Solid waste includes both biodegradable and non-biodegradable components. The non-biodegradable solid waste generated in the campus include, paper, plastics, metal cans etc. Biodegradable waste includes food waste, vegetable peels, leaves etc.

Dustbins have been provided at designated locations in the campus. Housekeeping/sweepers are allotted to each floor who manage all the waste generated in the campus. All waste/garbage from college and hostel is collected, segregated and disposed of in a proper manner.

Wastes like old newspapers and records is sold to proper recycling agencies/vendors. There is no hazardous waste and radioactive waste is generated inside the campus.

Cleaning activities are carried out using chemicals wherever necessary.

The sample image of regular cleaning activity is shown in figure 4-1.

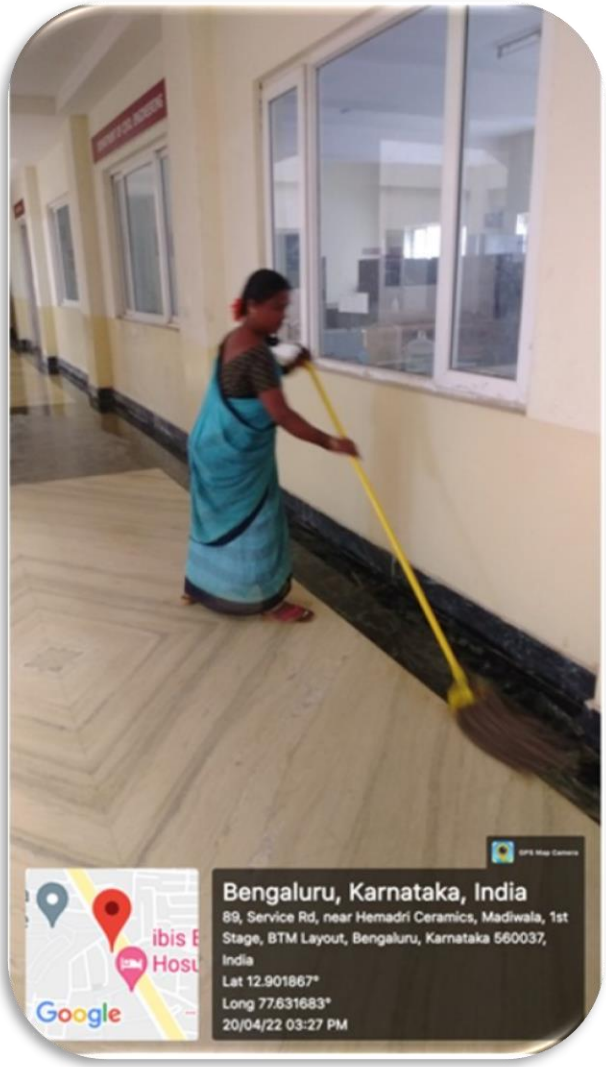


Figure 4-1: Regular cleaning activity of the college premises

4.1.2. Wet Waste Management

The food waste from the hostels / canteen are collected in separate bins. To collect food waste and used plates, trolley with waste bin is kept in dining hall of girl's hostel. The used plates are kept at trolley. Whereas, the food waste is disposed to the waste bin.

The image of trolley with waste bin at girl's hostel dining hall is shown in figure 4-2.

Figure 4-2: Trolley with waste bin

The waste bin kept at dining hall to dispose food waste is shown in figure 4-3.

Figure 4-3: Waste bin at dining hall

Food waste collected in girl's hostel block is shown in figure 4-4.

Figure 4-4: Food Waste at hostel mess

Vegetable waste from the kitchen is collected separately. Then it is kept at common disposal point behind the dining hall. The vegetable waste kept at disposal point is taken by BBMP personnel daily.

Sample image of vegetable waste kept is shown in figure 4-5.

Figure 4-5: Vegetable waste for disposal

4.1.3. Bio-Waste Management

Bio-medical waste includes discarded masks, napkins etc. Dustbins are placed at designated locations in the campus to collect bio-medical waste. Waste bins are provided in girl's restrooms and girl's hostel for disposing the used napkins. The waste bins kept near at girl's hostel restroom area is shown in figure 4-6.

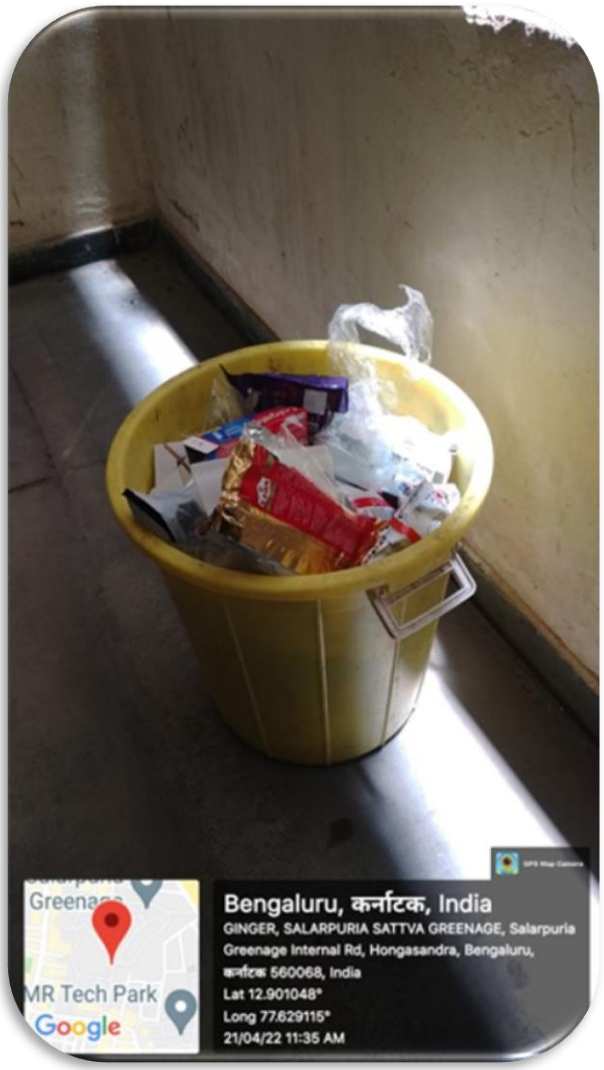


Figure 4-6: Waste at girl's hostel restroom area

4.1.4. Liquid- Waste Management

The Institution follows a systematic procedure for proper management and disposal of liquid waste. The waste water generated from the sanitary facilities is disposed through a dedicated waste water pipeline. The pipeline drains the waste water into the water chamber. Then, from waste water chamber, it is sent to sewage treatment plant through underground pipes.

The sources of waste water in the college campus are as follows,

- Washrooms
- Toilets
- Kitchen
- Hostel
- Labs
- RO reject
- Canteen

The schematic of Sewage Treatment Plant (STP) is shown in figure 4-7.

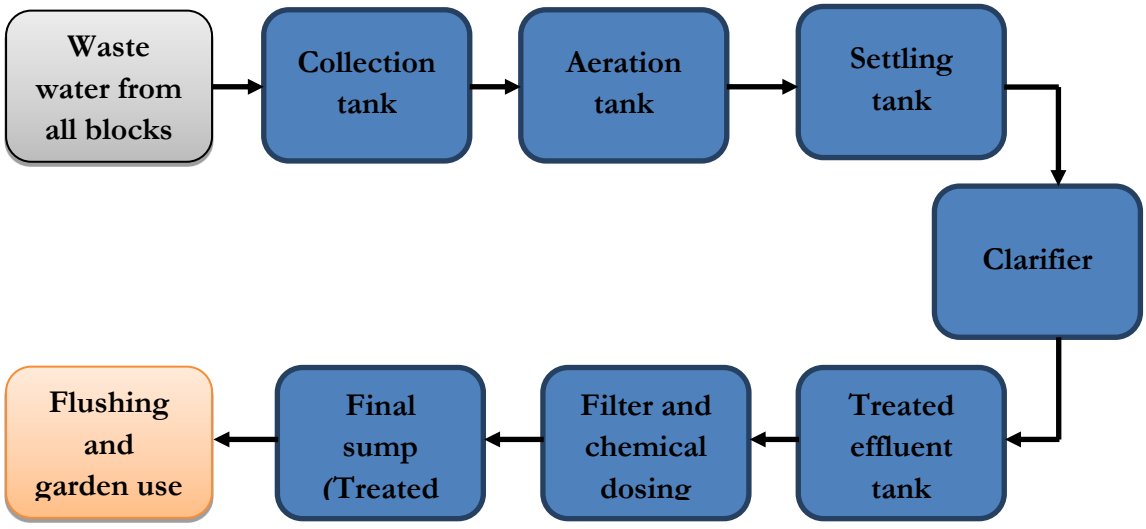


Figure 4-7: Schematic of STP

The capacity of the Sewage Treatment Plant (STP) is 300 kL per day. The STP is actually operated for 100 kL per day. Waste water from the college and hostel premises are collected and treated at sewage treatment plant.

The plumbing system (waste water collection, waste water transfer to STP, STP treated water storage and STP treated water to land scaping) is very well designed, the pipes are laid underground, and access / chambers are provided to regulate and control the flow of water.

The treated water from the STP is used for toilet flushing at engineering new block and girl's hostel. Treated STP water is supplied through a dedicated line for watering the garden. The STP area is shown in figure 4-8.

Figure 4-8: STP area

The STP collection tank is shown in figure 4-9.

Figure 4-9: STP -Collection tank

The aeration tank and clarifier are shown in figure 4-10.

Figure 4-10: Aeration tank

The clarifier section is shown in figure 4-11.

Figure 4-11: Clarifier section

The treated effluent tank is shown in figure 4-12.

Figure 4-12: Treated effluent tank

The filtering tank is shown in figure 4-13.

Figure 4-13: Filter and chemical dosing tank

The chemical dosing tank is shown in figure 4-14.

Figure 4-14: Chemical dosing tank

The final sump for storing treated water is shown in figure 4.15.

Figure 4-15: Final sump for treated STP water

4.1.5. E - Waste Management

The Institution has undertaken a number of E-waste Management initiatives with the objective of creating an eco-friendly environment in the campus. E-waste such as computers and its peripherals are upgraded regularly to continue usage and to avoid its wastage.

E-wastes such as electronic components (plastic/metallic) are handed over to agencies which help recycle these materials.

E-waste generated in each department is listed and handed over to the facilities manager. Then, the e-waste is disposed through vendors.

The proforma for shifting of e-waste materials is shown in figure 4-16.

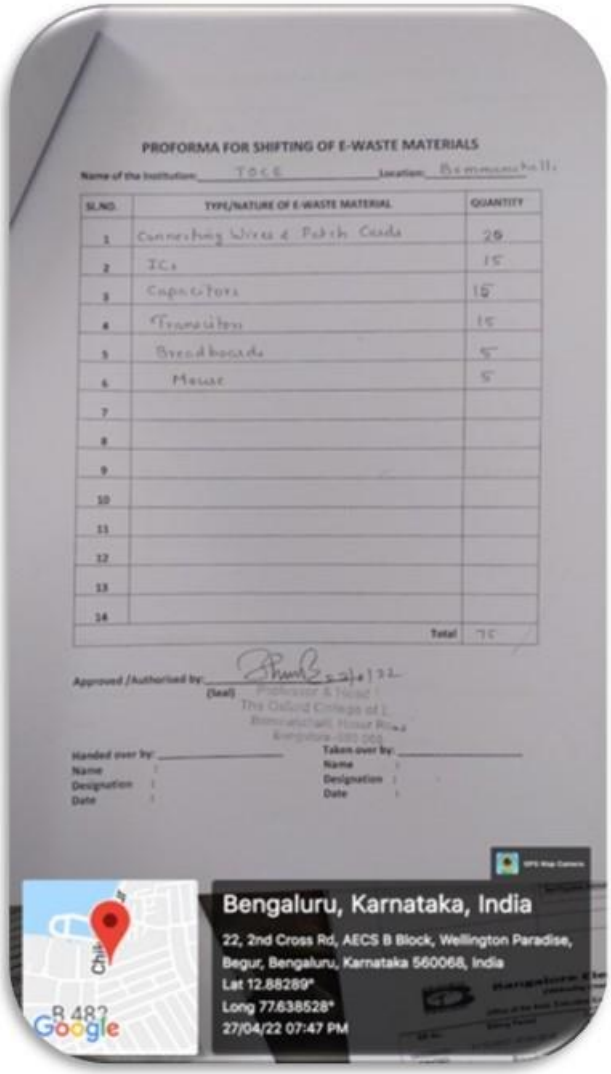


Figure 4-16: Proforma for shifting of E – waste

4.2. Best Practices Implemented for Waste management

4.2.1. Sewage Treatment Plant for waste water recycling

The procedure for removing contaminants from the wastewater basically from the household sewage is called sewage treatment. It has to undergo the chemical, physical and biological procedure to remove these contaminants and give out an environmentally safe treated effluent. A semi-solid slurry called the sewage sludge is the by-product of the sewage treatment. This sludge is further processed before it is suitable for land application.

The institution has installed STP with capacity of 300 kLPD and the quantity of STP water treated per day is 100 kL/Day. The quantity of water reused and cost savings per annum is given in table 4-2.

S. No.	Description	Unit	Values
1	STP capacity	kL/Day	300
2	Quantity of STP water treated per day	kL/Day	100
3	Assumed quantity of water reused @ 40% utilization factor	kL/Day	40
4	No. of working days per year	Days	250
5	Annual Quantity of water reused (saved)	kL/Annum	10000
6	Average water cost	Rs./Litre	0.086
7	Annual cost savings achieved	Rs. lakh/year	8.6

Table 4-2: Annual quantity of water reused and cost savings by installation of STP

4.2.2. Usage of STP water for toilet flushing

Engineering New Block:

The treated STP water is used for toilet flushing in new engineering block. For this purpose, pneumatic pressure pump system is installed at the STP room. The STP water is connected through a dedicated pipeline for toilet flushing. Three pneumatic pumps are used to pump water for flushing line. Whenever flush button is pressed the pneumatic pumping system delivers water for flushing line. The pneumatic pressure tank for dual piping system is shown in figure 4-17.

Figure 4-17: Pneumatic pressure tank for dual piping system

The pneumatic pressure pumps for dual piping system are shown in figure 4-18.

Figure 4-18: Pneumatic pressure pumps for dual piping system

The dual piping system flushing button is shown in figure 4-19.

Figure 4-19: Dual piping system - Flushing button

Girl's hostel block:

The toilets in girl's hostel have been provided with dual piping system. The dual piping system consists of raw water piping network and STP treated water piping network. The STP treated water is pumped to the overhead tank of girl's hostel. The capacity of pump is 10 HP. The overhead tank in girl's hostel is capable of storing 12 kL of STP treated water. The STP treated water is used for toilet flushing through a dedicated pipeline.

The pump used for pumping STP treated water to the girl's hostel overhead tank is shown in figure 4-20.

Figure 4-20: Pump for treated STP water

The flushing tank connected to dual piping system is shown in figure 4-21.

Figure 4-21: Dual piping system - Flushing tank

4.2.3. STP treated water for garden use

The treated STP water is used for watering the trees and garden. For this purpose, dedicated pipeline is provided. Taps are provided at various locations to facilitate the watering of garden.

The tap near STP area for providing STP treated water to garden is shown in figure 4-22.

Figure 4-22: STP treated water tap for garden use- near STP area

The tap near engineering new block for providing STP treated water to garden is shown in figure 4-23.

Figure 4-23: STP treated water tap for garden use - near engineering new block

4.2.4. Waste collection bins

To maintain the college premises clean & hygiene, waste collection bins are kept at appropriate locations i.e., office, staff rooms, class rooms, laboratories, corridors, rest rooms, canteen and campus area. The cleaning activity is carried out routinely.

The waste from all waste collection bins is collected by housekeeping staff. Then, it is segregated and kept at waste disposal point. From waste disposal point the segregated waste is collected by the BBMP vehicle. The image of waste collection bin kept at class room is shown in figure 4-24.

Figure 4-24: Waste bin at class room

The image of waste collection bin kept near boy's rest room is shown in figure 4-25.

Figure 4-25: Waste bin at boy's rest room

At girl's hostel block, waste collection bins are kept near entrance of each room. The sample image is shown in figure 4-26.

Figure 4-26: Waste bin at girl's hostel

The sample image of larger waste bins kept at corridors of each floor in girl's hostel is shown in figure 4-27.

Figure 4-27: Larger waste bins at girl's hostel corridor

The images of waste collection bins kept all around the campus are shown in figure 4-28 and 4-29.

Figure 4-28: Waste bins near girl's hostel

Figure 4-29: Waste bins near engineering old block

4.2.5. Regular purchase of housekeeping materials

To keep the college campus clean and hygiene, the housekeeping materials like scrub, all-purpose cleaner spray, phenyls, acids, mops, garbage bags, chemical disinfectants, broom sticks, and waste bins are purchased regularly.

The purchased housekeeping materials are distributed to housekeeping staffs to carry out the cleaning activity.

The sample bill for purchase of housekeeping materials for the year 2017 is shown in figure 4-30.

Figure 4-30: Sample housekeeping material purchase bill -2017

The sample bill for purchase of housekeeping materials for the year 2018 is shown in figure 4-31.

Figure 4-31: Sample housekeeping material purchase bill -2018

The sample bill for purchase of housekeeping materials for the year 2019 is shown in figure 4-32.

Figure 4-32: Sample housekeeping material purchase bill -2019

The sample bill for purchase of housekeeping materials for the year 2020 is shown in figure 4-33.

Figure 4-33: Sample housekeeping material purchase bill -2020

The sample bill for purchase of housekeeping materials for the year 2021 is shown in figure 4-34.

Figure 4-34: Sample housekeeping material purchase bill -2021

The sample image of procured housekeeping materials like mops and mop sticks for engineering blocks is shown in figure 4-35 and figure 4-36.

Figure 4-35: Mops - For Engineering blocks

Figure 4-36: Mop sticks - For Engineering blocks

The sample image of procured housekeeping materials like phenyls and acids for engineering blocks is shown in figure 4-37.

Figure 4-37: Phenyls and acids -For engineering blocks

The sample image of procured housekeeping materials i.e., disinfectants for girl's hostel block is shown in figure 4-38.

Figure 4-38: Disinfectants for girl's hostel block

The sample image of procured housekeeping materials i.e., scrub, glass cleaner for girl's hostel block is shown in figure 4-39.

Figure 4-39: Scrub and glass cleaners for girl's hostel block

Garbage lifting expenses:

The sample bill for lifting of garbage for the year 2017 is shown in figure 4-40.

Figure 4-40: Sample bill for lifting garbage - 2017

The sample bill for lifting of garbage for the year 2018 is shown in figure 4-41.

Figure 4-41: Sample bill for lifting garbage - 2018

The sample bill for lifting of garbage for the year 2019 is shown in figure 4-42.

Figure 4-42: Sample bill for lifting garbage - 2019

The sample bill for lifting of garbage for the year 2020 is shown in figure 4-43.

Figure 4-43: Sample bill for lifting garbage - 2020

The sample bill for lifting of garbage for the year 2021 is shown in figure 4-44.

Figure 4-44: Sample bill for lifting garbage - 2021

4.2.6. Waste Segregation

The waste collected from the college premises are segregated and kept at waste disposal point. The wastes are segregated as plastic waste, PET bottle waste, paper waste, food waste and vegetable waste.

The image of plastic wrapper waste kept at waste disposal point is shown in figure 4-45.

Figure 4-45: Segregated plastic waste

The image of PET bottle waste kept at waste disposal point is shown in figure 4-46.

Figure 4-46: Segregated PET bottle waste

4.2.7. Sludge waste as manure

The sludge drying unit is established near STP collection tank. The sludge drying unit has six tanks in which the sludge is let to dry naturally. The water from the sludge is sent to collection tank. The dry sludge waste is then removed and decomposed. The decomposed sludge along with the dry plant waste is used as manure for trees and plant.

The sludge waste drying bed is shown in figure 4-47.

Figure 4-47: Sludge waste drying bed

The sludge decomposer pit is shown in figure 4-48.

Figure 4-48: Sludge waste decomposer pit

4.2.8. Use of steel cutleries at hostel

To reduce the usage of plastic, re-usable steel cutleries are being used at college hostel and canteen.

The sample image of steel cutleries used at hostel is shown in figure 4-49.

Figure 4-49: Steel cutleries at hostel

4.2.9. Awareness program

Decomposition Awareness Program:

A program titled 'Decomposition Awareness Program' was organized by the NSS volunteers of TOCE at Karnataka Rajya Vignana Parisath on **05.06.2017**.

The volunteers have successfully provided the information, to have awareness, help people and professionals, for making best practices for a wide range of conditions, including:

- Garbage Harvesting
- Save and clean the earth
- How to make society clean with garbage

The sample images taken during the program is shown in figure 4-50.

Figure 4-50: Decomposition Awareness Program

Clean the Environment event:

The Oxford College of Engineering in association with NSS unit has organized **"SWACHATHA ANDOLAN" (Clean the Environment)** event at Mangammanapalya village on **6/2/2018**.

'Swachatha Andolan' is a country-wide campaign initiated by the Government of India in 2014 to eliminate open defecation and improve solid waste management in surrounding environment.

The image taken during the event is shown in figure 4-51.

Figure 4-51: Clean the Environment - at Mangammanapalya village

Waste Management Awareness Programme-2019

Waste management awareness program was conducted on 16.06.2019 at Garebhavipalya village. During the program, students were highlighting the importance of managing house hold waste effectively. Students awakened the people about the need of Reduce, Reuse and Recycle of waste.

Students have explained about following factors

- Single Stream Recycling.
- Commercial Recycling.
- Organic and Food Waste Recovery.
- Multi-family Recycling.
- Away from Home and Special Event Recycling.
- Waste Awareness and 'How to Recycle' Communications.

The image taken during the program is shown in figure 4-52.

Figure 4-52: Students indulged in Waste Management awareness program-2019

Waste Management Awareness Programme-2021

An outreach programme on "Waste Management Awareness Programme" was organized by 6th semester students of Department of CSE on 17th July 2021 at JP Nagar 7th phase BOB colony Bangalore. The main aim of this awareness programme is to create awareness about the importance of waste management to maximum number of people for proper management of waste as it is important for building sustainable and livable cities.

The awareness programme successfully managed to engage the community and the students visited different places, residential of that area and heavily populated areas to educate people on importance of managing the waste such as Recycling, Re-use, and not but the garbage waste.

The invitation for the event is shown in figure 4-53.

Figure 4-53: Waste Management awareness program - Invitation

The image taken during the event is shown in figure 4-54.

Figure 4-54: Students involved in Waste Management awareness program-2021

SWACHH BHARAT – GO GREEN INITIATIVE:

The Department of Mechanical engineering, carried out the awareness program on SWACHH BHARAT – GO GREEN INITIATIVE on **26.07.2021.** The initiative focused on bringing awareness about the importance of growing plants and keeping our surroundings clean and healthy.

The image of invitation for the event is shown in figure 4-55.

Figure 4-55: Swachh Bharat - Go Green Initiative - Invitation

The image of Students indulged in SWACHH BHARATH initiative is shown in figure 4-56.

Figure 4-56: Students Participation in Swachh Bharath initiative - 2021

4.2.10. Maintenance team

The housekeeping staff carry out the waste management process at college premises. The name list of housekeeping staff is given in table 4-3.

S. No.	Block	Name of the housekeeping staff
1	Engineering new block	Smt. Mahalakshmi
2		Smt. Vaddi Padmavathi
3		Smt. Mahalakshimma
4		Smt. Shanthamma
5		Smt. Arogya Mary
6		Smt. Munithyamma
7		Smt. Jothi
1	Engineering old block	Smt. Sarojamma
2		Smt. Amala
3		Mr. Kumara swamy
1	Hostel block	Smt. Asha
2		Smt. Ambika
3		Smt. Andalamma
4		Smt. Manjula
5		Smt. Vasantha
6		Smt. Gowaramma
7		Smt. Venkataramanamma

Table 4-3: Maintenance team - Waste management

4.3. Recommendations on Waste Management Audit

4.3.1. Color Code Bins

Different color code bins for the waste segregation (Dry, Wet, Bio-medical/Sanitary) at the source itself will make the segregation easy and hence it is recommended to place standard color code bins at all waste collection points of the campus.

4.3.2. Posters on Plastic Ban

Different posters on 'Plastic Ban' can be placed in and around the blocks of the campus. So that the students, staff and trespassers are aware of the college is Plastic Free zone.

4.3.3. Usage of awareness signboards

Use of more sign boards to create awareness for better waste management like 'Plastic ban', 'Do not litter', 'Think clean and use dustbin' etc., shall be placed at appropriate locations.

4.3.4. Installation of leaf composter

The dry leaves can be collected separately and disposed in the leaf composter. A large landscape with many types of trees will need leaf composters to ensure that no garden clippings and leaves leave the site. Gardeners value leaf compost highly for use in lawns. It saves expense on external fertiliser for the garden and increases biodiversity in the garden and landscaped area.

5. ANNEXURES

5.1. Data Collection Questionnaire

A questionnaire is a checklist used as the primary tool for the collection of data / information in a systematic manner that enables to perform the audit.

5.1.1. General information of the college:

General information of the college needs to be collected to get an overview of the campus for the walk-through purpose. It includes a set of questionnaires as given below.

1. Previous NAAC Grading's:

Previous NAAC Grading's of the college was collected from table 5-1.

S. No.	Phase	Grade	CGPA/Percentage	Year of Acc.	Acc. Period
1	I				
2	II				
3	III				

Table 5-1: NAAC grading's Table

2. Internal Quality Audit Team: 2020 – 2021

Table 5-2 depicts the format for the collection of Internal Quality Audit team.

S. No.	Name	Designation	Role
1			
2			
3			

Table 5-2: Internal Quality Audit team

3. General Information of the college

General information of the college includes an address of college and head office, contact person details, year of establishment etc., as given in table 5-3.

S. No.	Description	Details	
1.	Name of the College and address:		
1.a	Head office address :		
2.	Telephone/Fax No		
3.	Co-ordinating officer:	Name:	
		Mob:	
		Email:	
4.	Year of Establishment:		
5.	Hostel (Available/Not Available)		
6.	No. of Working days/year		
7.	Brief description of Campus		

Table 5-3: General information of the college

4. College Infrastructure

Infrastructure details of the college were gathered from table 5-4.

S. No.	Description	Details
1	Block Name	Class rooms
		Labs
		Staff rooms
		Wash rooms
2		
3		

Table 5-4: Detail Infrastructure of the college

5. Details of Student clubs
6. Details of cells that support students
7. Tentative Schedule of a working day:

a. No. of working days per year:
b. List of holidays:

8. Total area of the campus

9. Details of List of Departments and Courses (Faculty wise)

The total number of department, laboratories, conference hall, Libraries, Auditorium, and Cafeteria are obtained from table 5-5.

S. No.	Description	Details
1	Department	
2	Laboratories	
3	Conference Hall	
4	Libraries	
5	Auditorium	
6	Cafeteria	

Table 5-5: Details of the departments

10. Number of staff

Teaching, non-teaching, supporting staff with a male and female breakup is obtained from table 5-6

S. No.	Teaching Staff	Non-teaching Staff	Support Staff (Security, House Keeping)

	Male	Female	Male	Female	Male	Female

Table 5-6: Details of the Staff

11. Number of Students

Number of students is collected from table 5-7.

S. No.	Boys	Girls
1		

Table 5-7: Details of the Students

12. Additional infrastructure details have been collected from table 5-8.

S. No.	Description	Details	
1.	Number of blocks available for boys hostel	Nos.	
2.	Number of rooms available for boys hostel	Nos.	
3.	Number of blocks available for girls hostel	Nos.	
4.	Number of rooms available for girls hostel	Nos.	
5.	Whether Laundry is available in the hostel	Yes / No	
6.	If Yes List the Electrical Equipment in Laundry Section of the hostel (like Washing machine, Dry Cleaning Machine, Iron)		
7.	Whether gym/ indoor sports hall is available in hostel	Yes / No	
8.	Whether Solar PV based Power Generation is available in campus (academic or hostel block)	Yes / No	
9.	Whether lifts available in academic block	Yes / No	
10.	Whether Kitchen is available in the academic block	Yes / No	
11.	Whether any food counter (outside caterers) available in academic block	Yes / No	

12.	Whether any commercial shops available in academic block	Yes / No	
13.	Any more information or additional details of academic block you would like to share – kindly elaborate here		

Table 5-8: Details of the departments

5.1.2. Water Audit details:

1. General information

General information required for water management analysis is collected from table 5-9.

S. No.	Description	Details
1	Source of water	
2	Types of water	
3	No of Wells	
4	No of motors used	
5	No of bore wells	
6	Rating of the motors in HP	
7	Depth of each bore-well	
8	Water level of bore well	
9	Number of water tanks (overhead & underground tanks)	
10	Capacity of overhead tank	
11	Capacity of underground tank	
12	Quantity of water pumped every day	
13	Any water wastage of water /why?	
14	Water usage for gardening	
15	Waste water sources	
16	Use of waste water	
17	Faith of waste water from labs	
18	Whether waste water from labs mixed with ground water?	
19	Any treatment method available for lab water?	
20	Whether any green chemistry method practiced in labs?	
21	Total number of water coolers	
22	Whether Rain water harvesting system available?	
23	Whether Sewage Treatment Plant (STP) is available?	
24	List of equipment installed in STP (If S.No.23 is Yes)	
25	Whether Solar Hot Water System is available in the campus	

S. No.	Description	Details
26	Number of units and amount of water harvested	
27	Any leaky taps in the campus	
28	Amount of water lost per day	
29	Any water management plan used?	
30	Any water-saving techniques followed?	
31	Are there any signs reminding peoples to turn off the water?	
32	No. of water flow meters available	
33	Method of water consumption monitoring	
34	Breakup of daily water consumption	
35	Attach Month wise water bill for last 2 years	
36	Please attach recent water quality test reports for Bore well water, Drinking Water and STP processed water.	
37	What are the sources of hot water	
38	What are the usage areas of hot water	

Table 5-9: Water management details

2. STP information

STP details are collected from table 5-10

S. No.	Description	Details
1.	Number of STP plants installed	
2.	Capacity of STP	
3.	Technology of STP	
4.	Year of Installation	
5.	Schematic / Layout of STP	
6.	Water flow meters installed	
7.	Quantity of Sludge	
8.	Disposal of Sludge	

Table 5-10: Details of STP

3. RO Plant information

RO Plant details are obtained from table 5-11.

S. No.	Location	Quantity	Capacity
1.			
2.			

3.			

Table 5-11: Details of RO Plant

5.1.3. Energy consumption details:

1. Energy consumption details:

The energy consumption details required for the audit is collected, the brief format of the same is given in table 5-12.

S. No.	**Type**	**Units**		**Value**	**Cost in Rs.**
1	Electricity	kWh	2019		
			2020		
2	LPG	Cylinders			
3	Diesel	Litres (Month wise consumption for the last two years)			
4	Others resources (Please specify)				
5	Total connected load	kW			
6	Contract demand	kVA			
7	Maximum demand recorded	kVA			
8	Average power factor				
9	Energy charges	Rs./kWh			
10	Demand charges	Rs./kVA			
	*** Attach Electricity Bill Copy of last 2 years**				

Table 5-12: Details of Energy consumption

2. Solar Energy details:

The solar energy details required are collected from table 5-13.

S. No.	**Building No./ Name**	**Solar water Heater**			**Solar PV System**		
		Capacity	Working / Not working	Year of Installation	Capacity	Working / Not working	Year of Installation

Table 5-13: Details of Solar Energy

3. Solar Street lights details:

a. Quantity -
b. Capacity -
c. Year of Installation –

4. Electrical Equipment details:

Electrical Equipment like transformers DGs UPS Capacitor Bank, AC, Computers, water coolers, fans, exhaust fans are obtained from the table 5-14.

S. No.	Description	Details	
1.	Number of Transformers Installed	Nos.	
2.	Number of Electrical Panels / Electrical Panel Rooms	Nos.	
3.	Whether Diesel Generator Set Backup Power is Available	Yes / No	
4..	How many number of DG Sets available in the campus (If S.No.3 is Yes)	Nos.	
5.	Whether UPS is available for labs, computers and/or any equipment	Yes / No	
6.	Number of UPS installed with location and capacity (If S.No.5 is Yes)	Nos.	
7.	Whether Capacitor Banks is installed in the electrical panel rooms	Yes / No	
8..	Whether Air Conditioning Units have been installed in the campus	Yes / No	
9.	Type of AC units (split, cassette or packaged) available, capacity and installed location (If S.No.8 is Yes)	Nos.	
10.	Total number of computers available in the campus	Nos.	
11.	Type of computer monitors available (CRT, LCD, LED)	Nos.	
12.	Whether water coolers are installed in the academic blocks	Yes/No	

S. No.	Description	Details	
13.	Type of lamps (Fluorescent Tube Light, CFL, LED, Incandescent, Sodium / Mercury lamps, etc.,) installed in the campus	Nos.	
14.	Type of fans (ceiling, wall mount, standing, exhaust, etc.,) installed in the campus	Nos.	
15.	Whether exhaust fans are installed in hostel / kitchen.(If Yes, share the quantity and installed location)	Yes /No	
16.	Any other electrical equipment's in college buildings.		

Table 5-14: Details of Electrical Equipment

5. List of energy saving initiatives implemented
6. List of energy saving initiatives in plan for future

5.1.4. Waste management details:

Waste management includes the activities and actions required to manage waste from its inception to its final disposal. The various data/ information required for the assessment of waste management is as collected from the following set of questionnaires.

1. Basic information

Basic information for waste management is collected from table 5-15.

S. No.	Description	Yes/ No
1	Whether wet and dry garbage segregation is done inside the campus?	
2	Whether garbage is given to external agencies / municipal agencies?	

Table 5-15: Basic details of waste management

2. Types of Waste generated

Types of waste generated in the college are obtained from table 5-16.

S. No.	Description	Yes / No	Remarks
1	E-Waste (Computers, electrical and electronic parts)		
2	Hazardous / Chemical Waste		
3	Solid Waste (Damaged furniture, paper waste, paper plates)		
4	Dry Leaves		
5	Food Waste		
6	Waste Water (Washing, urinals, bathrooms)		
7	Glass Waste (Broken glass wares from the labs)		
8	Unused Materials		
9	Plastic Waste (Pen, Refill, Plastic water bottles and other plastic containers, wrappers etc.)		

Table 5-16: Types of waste generated

3. Segregation of waste

Segregation of waste information at different locations with quantity is gathered from table 5-17.

S. No.	Location	Bio-degradable	Non-Biodegradable	E-waste	Quantity, kgs/month
1	Office				
2	Labs				
3	Cafeteria / Kitchen				
4	College				

Table 5-17: Segregation of waste

4. Waste generation management

Waste generation management of the college was collected from table 5-18

S. No.	Description	Yes / No	Remarks
1	Composting / Vermicomposting		
2	Recycling		
3	Reusing		
4	Other ways		

Table 5-18: Waste Disposal methods

5.1.5. Green campus management details:

1. Total number of plants and trees

The total number of plantations, garden area, and many more are collected as per the set of questionnaires given in table 5-19

S. No	Description	Details
1	Total number of plant species identified	
2	Total number of plants on the campus	
3	Total number of Trees on the campus	
4	Garden area inside the college –	
5	Total number of medicinal plants /trees on the campus	
6	Total number of vegetables and fruits plantation in the campus	
7	Whether display boards are given to plants and trees for identification	

8	Does Institute celebrate World environment day?	
9	Does Institute celebrate World water day?	
10	Does Institute celebrate World ozone day?	
11	Does Institute celebrate World Earth day?	
12	Total number of aquatic water plants	

Table 5-19: List of plantation details

2. List of plants/ trees

List of plants/ trees with their scientific names obtained from table 5-20.

S. No.	Common/Local Name	Scientific name	No. of Trees/Plants

Table 5-20: List of plants/trees in campus

5.1.6. Carbon footprint management details:

The carbon emission from various activities such as transport, diesel generator usage, LPG consumption, and electricity consumption were collected, as per table 5-21.

S. No	Description	Details
1	Whether college provides transport facility for staff and students (Yes/No)	
2	Number (or Percentage) of staff using transport services provided by college	
3	Number (or Percentage) of students using transport services provided by college	
4	Number (or Percentage) of Staff using public transport	
5	Number (or Percentage) of Staff using Bike	
6	Number (or Percentage) of Staff using Car	
7	Number (or Percentage) of students using Public transport	
8	Number (or Percentage) of students using Car	
9	Number (or Percentage) of students using Bike	
10	Number (or Percentage) of students using Bicycles	
11	Average consumption of diesel per month	
12	Average electricity consumption per month	
13	Average LPG consumption per month	

Table 5-21: Details of Carbon footprint management

5.1.7. Photos required for Audit:

1. General Photos

In various sections, different types of photos are required to validate the existence of things, and hence they are collected from table 5-22.

S. No	Description	Details
1	Photos of student's NSS activities	
2	Photos of Safety policy	
3	Photos of the training program on the use of fire extinguishers	
4	Photos of environmental policies adopted by college	
5	Photos of MoUs for Waste management	

6	Photos of any other policies adopted by college		
7	Photos of water test report	Drinking Water	
		STP processed water	
		Bore-well water	
		Other water Sources (Like Tanker water and any other)	
8	Photos of use of Energy efficient devices like fan, bulbs etc.		
9	Photos of LCD/LED monitors used in Labs		
10	Photos of dry and wet waste collection bins		
11	Photos of celebrating World Environment Day		
12	Photos of celebrating World Water Day		
13	Photos of celebrating World Earth Day		
14	Photos of celebrating World Ozone Day		

Table 5-22: List of photos

QUALITY AUDIT REPORT

ON

WATER AUDIT

OF

THE OXFORD COLLEGE OF ENGINEERING

10TH MILESTONE, BOMMANAHALLI, HOSUR ROAD,

BANGALORE - 560 068

2016 - 17 TO 2020 - 21

ECO ENERGIME ENGINEERS LLP

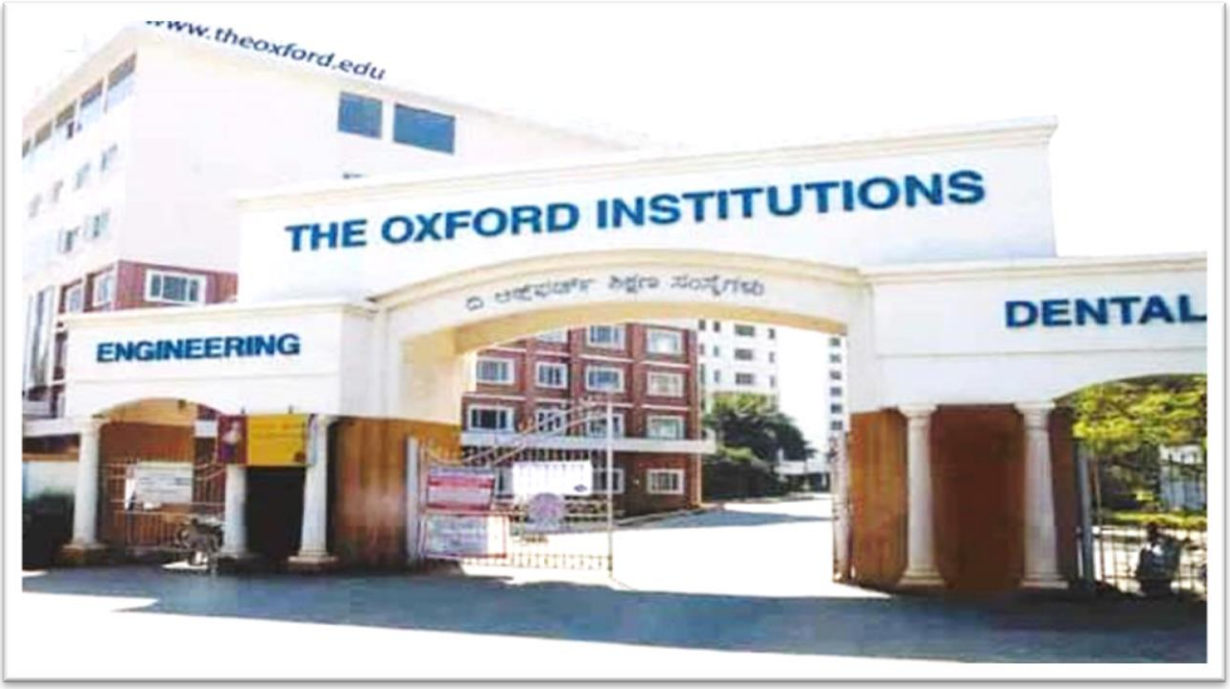
ENHANCING RESOURCE EFFICIENCY

QUALITY AUDIT REPORT

OF

'THE OXFORD COLLEGE OF ENGINEERING'

10TH MILESTONE, BOMMANAHALLI, HOSUR ROAD, BANGALORE - 560 068



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We would be happy to provide any further clarifications, if required, to facilitate the implementation of the recommendations.

We received full co-operation and support from the concerned personnel/ staff members of the college. We would like to thank:

Chairman – The Oxford Educational Institutions

The Oxford College of Engineering

And other Staff in personnel who have given full co-operation and support. They took a keen interest and gave valuable inputs during the course of study.

Certificate

of Completion

This is to certify that

The Oxford College of Engineering, Bommanahalli, Bengaluru

has successfully completed

Water Audit

The study was conducted by

Eco Energime Engineers LLP, Bengaluru.

Start Date : 12.10.2020
End Date : 16.10.2020

Date Of Issue : 24.11.2020
Valid Till : 23.11.2021

Aparna Reddy
Director
EEELLP

A.Govindaraj
Director
EEELLP

Smart Solutions for Sustainable Tomorrow

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Our special thanks are due to Principal & Team of colleagues for giving us necessary inputs to carry out this very vital exercise. We would like to thank all the head of the departments and staff members who were actively involved while collecting the data and conducting field measurements.

DISCLAIMER

The Audit Team has prepared this report for The Oxford College of Engineering, Bengaluru based on the input data submitted by the representatives of college complemented with the best judgment capacity of the expert team.

While all reasonable care has been taken in its preparation, details contained in this report have been compiled in good faith based on information gathered.

It is further informed that the recommendations are arrived following best judgments and no representation, warranty or undertaking, express or implied is made and no responsibility is accepted by Audit Team in this report or for any direct or consequential loss arising from any use of the information, statements or forecasts in the report

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ABBREVIATION AND ACRONYMS

1.	A	:	Amperes
2.	AC	:	Air Conditioner
3.	APFC	:	Automatic Power Factor Controller
4.	AMF	:	Automatic Mains Failure
5.	BBMP	:	Bruhat Bengaluru Mahanagara Palike
6.	BESCOM	:	Bangalore Electricity Supply Company
7.	BWSSB	:	Bangalore Water Supply and Sewerage Board
8.	CC Camera	:	Closed Circuit Camera
9.	DG	:	Diesel Generators
10.	EE Fan	:	Energy Efficient Fan
11.	E-Waste	:	Electronic Waste
12.	FTL	:	Fluorescent Tube Light
13.	GHG	:	Green House Gas
14.	Hz	:	Hertz
15.	HP	:	Horse Power
16.	HT	:	High Tension
17.	I	:	Current
18.	ICT	:	Information and Communications Technology
19.	IQAC	:	Internal Quality Assurance Cell
20.	ISO	:	International Organization for Standardization
21.	kgs	:	Kilograms
22.	kL	:	Kilo Liters
23.	kV	:	kilo volt
24.	kVA	:	kilo volt ampere
25.	kVAr	:	Reactive kilo volt ampere
26.	kW	:	Kilo Watt
27.	kWh	:	kilo Watt hour
28.	kWp	:	kilo Watt peak
29.	LCD	:	Liquid Crystal Display
30.	LED	:	Light Emitting Diode
31.	LT	:	Low Tension
32.	mA	:	Milli Amperes
33.	MoU	:	Memorandum of Understanding
34.	NA	:	Not Applicable
35.	NAAC	:	National Assessment and Accreditation Council
36.	NSS	:	National Service Scheme
37.	OHT	:	Over Head Tank
38.	Prim/Sec	:	Primary/Secondary
39.	PF	:	Power factor
40.	Ph.D.	:	Doctor of Philosophy

41.	PV	:	Photo Voltaic
42.	RCC	:	Reinforced Cement Concrete
43.	RO	:	Reverse Osmosis
44.	RR. No.	:	Revenue Register Number.
45.	Sq. Ft.	:	Square Feet
46.	Sq.m.	:	Square Meter
47.	SRTPV	:	Solar Roof Top Photo Voltaic
48.	TL	:	Tube Light
49.	TR	:	Ton of Refrigeration
50.	TV	:	Television
51.	V	:	Volts
52.	W	:	Watts
53.	Wi-Fi	:	Wireless Fidelity
54.	Wp	:	Watt peak
55.	#	:	Number

1. INTRODUCTION

The Oxford College of Engineering was started in the year 2000, is one of the most prestigious institutions in Bengaluru that provides quality teaching and training in professional UG courses in 10 streams of Engineering in, Computer Science, AIML, Electronics and Communication, Electrical and Electronics, Mechanical, Civil, Bio-Technology, Mechatronics & Automobile. College also offers 10 Postgraduate programs in Technology (M. Tech), Computer Application (MCA) and Business Administration (MBA), and 11 Research centers recognized by VTU to offer Ph.D. programs. College is affiliated with the Visvesvaraya Technological University (VTU) and approved by the All-India Council for Technical Education (AICTE). The college also has been accredited by the NBA, and IAO quality-assessed organizations. The Institute name is also included in the NIRF & AICTE CII Survey of Industry Linked Technical Institute- 2020. Institution is categorized in Band promising in ARIIA ranking in the year 2021. The college is set in a sprawling 11.5 acres campus in the prestigious IT corridor, ideal for education in a serene environment with over 85,000 square meters of built-up area spread over 2 blocks, with enormous investment for academic purposes. The college has well equipped with state-of-the-art infrastructure facilities to carry out various real-time projects, research, and consultancy activities in recent technologies. All the Departments have undertaken many research/consultancy projects funded both by multinationals and government agencies. The college has a good number of research publications in various reputed journals and patents. College has a good number of R&D projects sponsored by AICTE, VGST, VTU, IEEE, ICMR BRNS, NIF, NRB(DRDO) & BIRAC. It has a history of excellent placement track record in various multinational companies' offers with high salary packages.

VISION

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

MISSION

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

QUALITY POLICY

To equip the students with highest standard of education, knowledge and ethics. To prepare them to meet the challenges of life with full confidence. Aim at all round development of the personality to be useful citizens.

Campus Area and Built-up area

The area of the campus (built up and total) area is given in table 1-1.

S. No.	Description	Units	Details
1	Engineering Campus total area	Acres	11.5
2	Built up area	Sq. mt.	85,000

Table 1-1: College Area

Committee and Cells

The Oxford College of Engineering (TOCE) has various functional committees and cells. They are listed below,

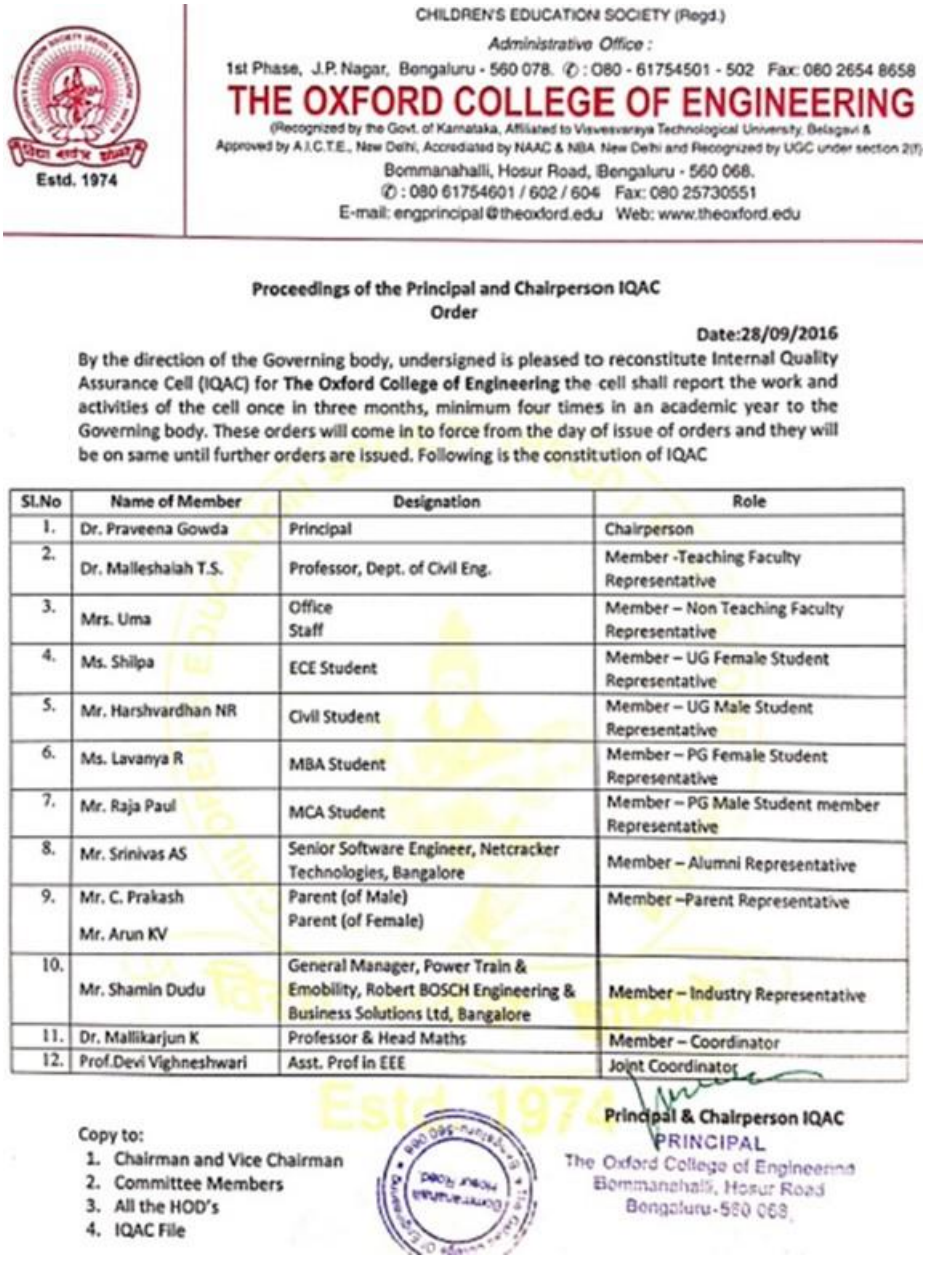
- VTU/AICTE Committee
- Planning & Accreditation Committee
- Library Committee
- Research and Development Committee
- Training & Placement Committee
- Faculty Development Committee
- Purchase & Budget Committee
- College Magazine/Calendar /Newsletter Committee
- Professional Societies / Chapters
- Cultural Association
- Alumni Association

- Sports Committee
- NSS
- Students Grievances Redressal Committee
- Discipline Committee
- Women's Grievance Redressal Committee
- Anti-sexual Harassment Committee
- Entrepreneurship & Incubation cell
- Anti-Ragging Committee
- Website, Server & Internet Committee
- Public Relation Committee
- Hostel & Canteen Committee
- Prevention of Caste Based Discrimination Cell
- College Internal Complaints Committee
- Internal Task Force Team - COVID 19 Coordination Committee
- Internal Quality Assurance Cell (IQAC)
- Exam Cell
- Disability Recourse Centre
- IPR Cell
- IA Answer Scripts Evaluation Review Committee
- IA Question Paper Scrutiny Committee

Internal Quality Assurance Cell (IQAC)

The college management constitutes the Internal Quality Assurance Cell including Principal, teaching faculty, non-teaching faculty, UG students (Male & Female), PG students (Male & Female), alumni, parent and industry representatives every year.

The list of Internal Quality Assurance Cell members for the academic year 2016-2017 is shown in figure 1-1.



CHILDREN'S EDUCATION SOCIETY (Regd.)
Administrative Office :
1st Phase, J.P. Nagar, Bengaluru - 560 078. ✆ : 080 - 61754501 - 502 Fax: 080 2654 8658

THE OXFORD COLLEGE OF ENGINEERING

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✆ : 080 61754601 / 602 / 604 Fax: 080 25730551
E-mail: engprincipal@theoxford.edu Web: www.theoxford.edu

Estd. 1974

Proceedings of the Principal and Chairperson IQAC
Order

Date:28/09/2016

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Sl.No	Name of Member	Designation	Role
1.	Dr. Praveena Gowda	Principal	Chairperson
2.	Dr. Malleshaiah T.S.	Professor, Dept. of Civil Eng.	Member -Teaching Faculty Representative
3.	Mrs. Uma	Office Staff	Member – Non Teaching Faculty Representative
4.	Ms. Shilpa	ECE Student	Member – UG Female Student Representative
5.	Mr. Harshvardhan NR	Civil Student	Member – UG Male Student Representative
6.	Ms. Lavanya R	MBA Student	Member – PG Female Student Representative
7.	Mr. Raja Paul	MCA Student	Member – PG Male Student member Representative
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9.	Mr. C. Prakash Mr. Arun KV	Parent (of Male) Parent (of Female)	Member –Parent Representative
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11.	Dr. Mallikarjun K	Professor & Head Maths	Member – Coordinator
12.	Prof.Devi Vighneshwari	Asst. Prof in EEE	Joint Coordinator

Principal & Chairperson IQAC
PRINCIPAL
The Oxford College of Engineering
Bommanahalli, Hosur Road
Bengaluru-560 068.

Copy to:
1. Chairman and Vice Chairman
2. Committee Members
3. All the HOD's
4. IQAC File

Figure 1-1: List of IQAC members 2016-2017

The list of Internal Quality Assurance Cell members for the academic year 2017-2018 is shown in figure 1-2.

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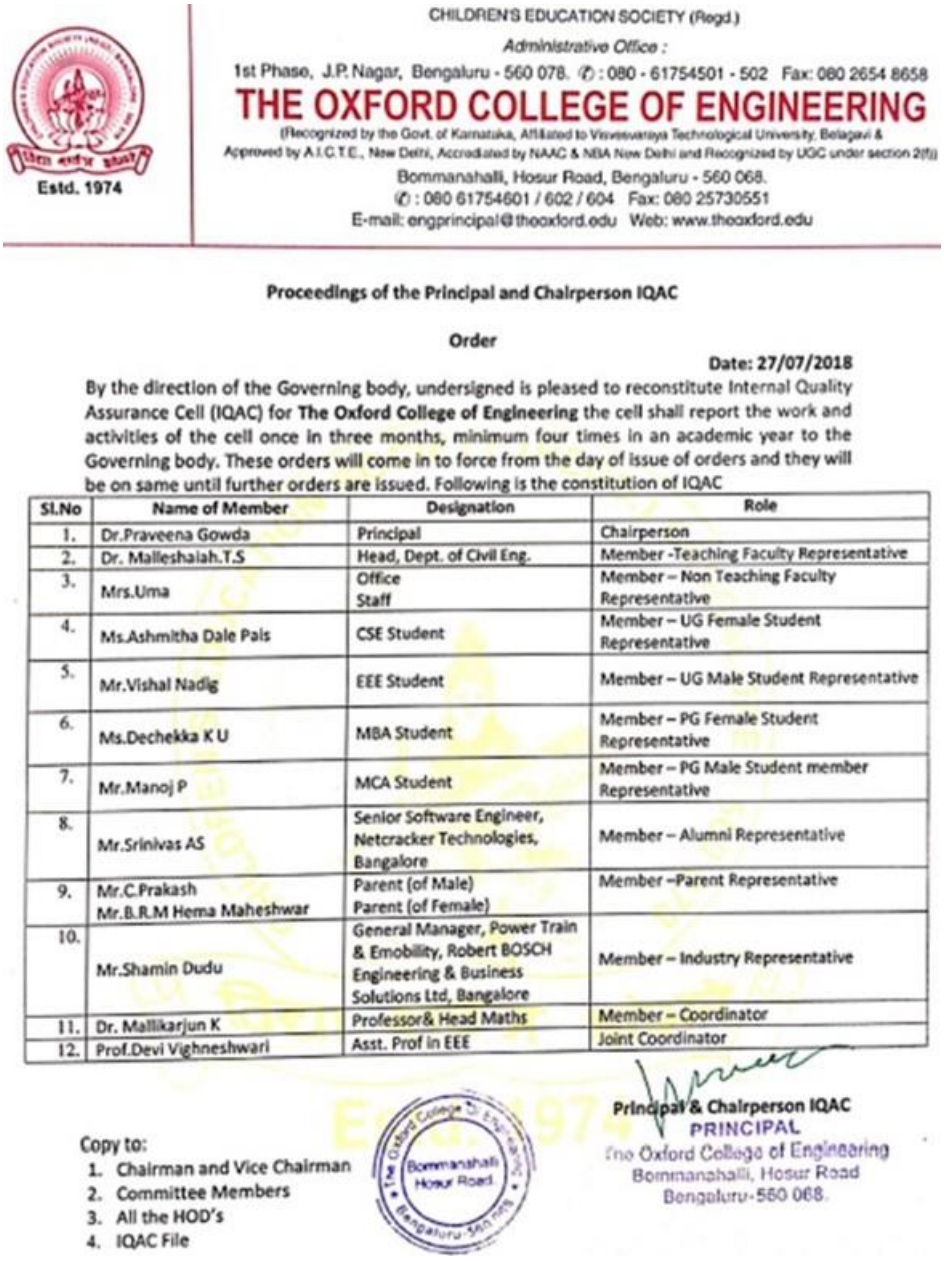
Figure 1-2: List of IQAC members 2017-2018

The list of Internal Quality Assurance Cell members for the academic year 2018-2019 is shown in figure 1-3.



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4.	Ms.Ashmitha Dale Pais	CSE Student	Member – UG Female Student Representative
5.	Mr.Vishal Nadig	EEE Student	Member – UG Male Student Representative
6.	Ms.Dechekka K U	MBA Student	Member – PG Female Student Representative
7.	Mr.Manoj P	MCA Student	Member – PG Male Student member Representative
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Figure 1-3: List of IQAC members 2018-2019

The list of Internal Quality Assurance Cell members for the academic year 2019-2020 is shown in figure 1-4.

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Figure 1-4: List of IQAC members 2019-2020

The list of Internal Quality Assurance Cell members for the academic year 2020-2021 is shown in figure 1-5.

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The Oxford College of Engineering Bommanahalli Hosur Road

Principal & Chairperson IQAC

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Bengaluru-560 068

Figure 1-5: List of IQAC members 2020-2021

Overview of Quality Audit:

Quality Audit helps college / facility to:

- Understand the usage of electricity, water and other natural resources
- Identify opportunities to conserve various natural resources
- Identify various technological improvements
- Evaluate the techno-commercial of identified conservative measures
- Create awareness among the students and staff
- Disseminate the commitment of management towards saving nature
- Develop a culture among students, staff and management to be socially responsible

2. PRE – AUDIT PHASE

A Pre-audit meeting is a prerequisite for the audit, it helps to meet and discuss about the schedule and documents required during the audit. The pre-audit meeting was conducted at The Oxford College of Engineering. During the meeting, introduction of team members, scope and objectives of the audit were discussed.

Management Commitment

The Management of the college has shown great commitment towards Quality Audit during the pre-audit meeting. They were ready to encourage all green activities. It is decided to promote all activities that are environment friendly such as awareness programmes on the environment, campus farming, planting more trees on the campus etc., after the Quality Auditing.

College administration is vital to the process of realizing campus sustainability, and college policy is an essential instrument for any substantial change in the campus environment.

Scope and Goals of Quality Auditing

A clean and healthy environment aids effective learning and provides conducive learning environment. There are various efforts around the world to address environmental education issues. Quality auditing is one among them for educational institutions.

Once a baseline is established, the data can serve as a point of departure for further action in campus greening. Existing data will allow the college to compare its programs and operations with those of peer institutions, identify areas in need of improvement, and prioritize the implementation of future projects.

This data will also provide a basis for calculating the economic benefits of resource conservation projects, by establishing the current rates of resource use and their associated costs. This audit initiative focused initially on educating colleges and universities through workshops, guidebooks, fact sheets and ensuring compliance through inspections and self-audits.

3. ON-SITE AUDIT PHASE

3.1. Scope / Target Areas of Quality Auditing

3.1.1. Water Audit

Water Audit addresses water consumption, water sources, appliances and fixtures. Aquifer depletion and water contamination are taking place at unprecedented rates. It is therefore essential that any environmentally responsible institution should examine its water use practices.

3.1.2. Energy Audit

Energy Audit addresses energy consumption, energy sources, energy monitoring, lighting, appliances, and vehicles. Energy use is clearly an important aspect of campus sustainability.

3.1.3. Waste Management Audit

Waste Audit addresses waste production and disposal, plastic waste, paper waste, food waste, and recycling. Municipal solid waste has a number of adverse environmental impacts, most of which are well known and not in need of elaboration.

3.1.4. Green Campus Management Audit

Green campus initiatives are becoming an integral part of modern day's university systems. Green campus Audit helps in maintaining the air and water clean. It regulates the climatic conditions and provides a healthy and comfortable environment for living.

3.1.5. Environment Footprint Audit

Environment Footprint Audit addresses the usage of fossil fuels (coal, diesel, petrol and gas). The mode of commute to and from college each day has an impact on the environment through the emission of greenhouse gases into the atmosphere by the burning of fossil fuels.

3.2. Audit Methodology and Approach

The methodology and approach adopted for the study involve various steps that include:

- Review of Document and records
- Review of Policies
- Review of MoU
- Review of various measures implemented
- Site Walkthrough
- Data Collection
- Interviews

3.2.1. Review of Document and Records

The various documents and records such as:

- Electricity bills
- Water bills
- Equipment registers
- List of appliances
- Internal Quality Audit document
- Purchase document
- Cash payment receipts
- Equipment service report
- Maintenance and service payment receipts

were reviewed and, relevant data and inputs required for analysis have been collected.

3.2.2. Review of Policies

College has various policies that include safety policy and Anti-ragging policy.

A. Safety Policy:

All the students, teaching staff, non-teaching staff, maintenance and house-keeping staff have been given training to use fire extinguishers in emergency situations of fire and explosion. Fire hydrant system is available at the campus. Also, fire extinguishing cylinders have been installed in each floor and in laboratory areas. Fire order statements and use of fire extinguisher has been posted at each block. Fire alarm is also installed at the premises. Photos of fire order and fire alarm are shown in figure 3-1 and 3-2.

Figure 3-1: Fire order displayed at college premises

Figure 3-2: Fire alarm panel at engineering old block

B. Anti-Ragging policy:

Ragging in all its forms shall be totally banned in the entire institution, including its departments, constituent units, all its premises (academic, hostel, sports, canteen, etc.) whether located within the campus or outside and in all means of transportation of students whether public or private. **'Say No to Ragging'** poster is placed in each block of the campus and a sample photo is as shown in the figure 3-3.

Figure 3-3: Anti-ragging poster

3.2.3. Review of various measures implemented

During the Quality Audit study, it was observed the college has taken various initiatives in conserving natural resources that include:

- Internal Quality Assurance Cell including Staff, Students, Alumni, parents and industrial members.
- Installation of Solar Roof Top Photo Voltaic (SRTPV) system for power generation.
- Wheeling to grid is done.
- Installation of LED fixtures to reduce electricity consumption
- Installation of LCD/LED monitors for all the desktops to conserve electricity
- Switching OFF lights and fans whenever not in use to save electricity
- Installation of RO plant to provide purified drinking water.
- Dual water piping system for washrooms and toilets, to use STP treated water for flushing
- Sewage treatment and using the treated final water for toilet flushing, gardening and cleaning purposes
- Rain water harvesting system is available in the campus.
- Regular testing of STP treated water quality parameters
- Dedicated watering system for greeneries.
- The use of sign boards in all the wash rooms were observed, to create awareness for water conservation
- Installation of waste segregation bins at all the rooms to separate the dry and wet waste
- Maintenance of logbooks and registers is done properly.
- Training is conducted on regular basis regarding usage of fire extinguisher, conservation of resources such as electricity, water, food and green campus.
- Maintenance team is available for electrical, plumbing, waste management and green campus management.

3.2.4. Site walk through

Site walk through was conducted with staff members, students and audit team members. Staff and students have shown very keen interest in the data collection process and methods to be followed in field data collection. The staff and students have given inputs and suggestions for resource conservation as well.

College Infrastructure

The Oxford College of Engineering campus has various blocks and departments. Each floor has state of the art class rooms, staff rooms, laboratories, libraries and many more. Details of infrastructure are as follows:

- Inhouse hostel for boys and girls
- Bank facility
- 24 hrs. atm in the campus
- Solar plant
- Rain water harvesting
- RO water facility
- Lifts & ramps
- Cafeteria
- Gymnasium
- Cricket stadium / basketball court / badminton court
- Wi-Fi facility in the campus
- CCTV security
- Telephone and fax facility
- Photocopying facility
- The oxford enterprises (stationery)
- Library

- Digital library
- Extended library hours
- Hospital facility
- Free dental treatment
- First aid, medical and counseling facility
- Scholarships
- Group insurance
- Placements
- Placements training
- English language coaching
- Add-on courses
- Cloud based ERP for students
- Transport
- Parking facility
- Cultural activities center
- Incubation Centre for research activity
- Staff room
- Smart class rooms
- Conference room
- Student common room
- Green campus

3.2.5. Inventory Collection

To understand the types of appliances used, inventory collection was carried out by the audit team members. The various types of appliances used are lights, fans, computers, projectors, printers, scanners etc., The consolidated list of inventories is given in table 3-1.

S. No.	Dept	Florescent Tube Light		LED		CFL	Fan		Computer		Exhaust Fans	Scanners	Printers	Xerox Machine	CC Camera	TV Screen	Projector	AC	Refridgerator
		40 W	MOR (36W)	18W Tube	12 W		Ceiling Fan	Wall mount Fan	LED /LCD Monito	CRT Monitors									
1	AUTO ENGG	64	0	12	0	0	26	6	5	0	0	1	2	0	0	0	1	0	
2	BT	86	0	0	0	0	42	0	10	9	2	2	2	2	8	0	1	2	4
3	Chemistry	0	0	17	0	0	12	0	0	0	0	0	0	0	0	0	0	0	
4	CSE	52	0	141	0	0	59	13	3	218	0	0	0	4	0	12	0	5	1
5	Civil	52	0	16	0	0	56	4	30	0	0	1	3	0	0	0	0	0	
6	ECE	81	0	0	0	0	44	11	48	0	3	0	4	0	7	0	3	1	
7	EEE	48	2	0	6	0	54	2	41	0	0	0	2	0	7	0	1	0	0
8	ISE	34	0	77	0	0	29	5	128	0	0	0	2	0	0	0	1	0	
9	Library	0	45	0	0	0	53	0	30	0	0	1	1	0	0	0	0	0	
10	Maths	16	0	0	0	0	14	1	5	0	0	0	7	0	0	0	0	0	
11	MBA	39	0	0	0	96	42	0	16	0	0	0	2	0	0	0	3	3	
12	MCA	51	0	0	0	0	31	0	242	0	0	0	2	0	3	0	0	9	
13	MECH	89	0	0	0	0	59	0	84	0	2	0	2	0	5	2	3	0	
14	MTE	24	0	0	0	0	19	0	3	0	0	0	1	0	4	0	1	0	
15	PHYSICS	39	0	0	0	0	27	1	2	0	0	0	1	0	6	0	0	0	
Total (College)		675	47	263	6	96	567	43	647	227	7	5	31	6	40	14	14	20	5
Total(Hostel)		413	0	71	0	0	431	0	1	0	0	0	1	0	0	0	0	0	0
Total (Overall)		1088	47	334	6	96	998	43	648	227	7	5	32	6	40	14	14	20	5

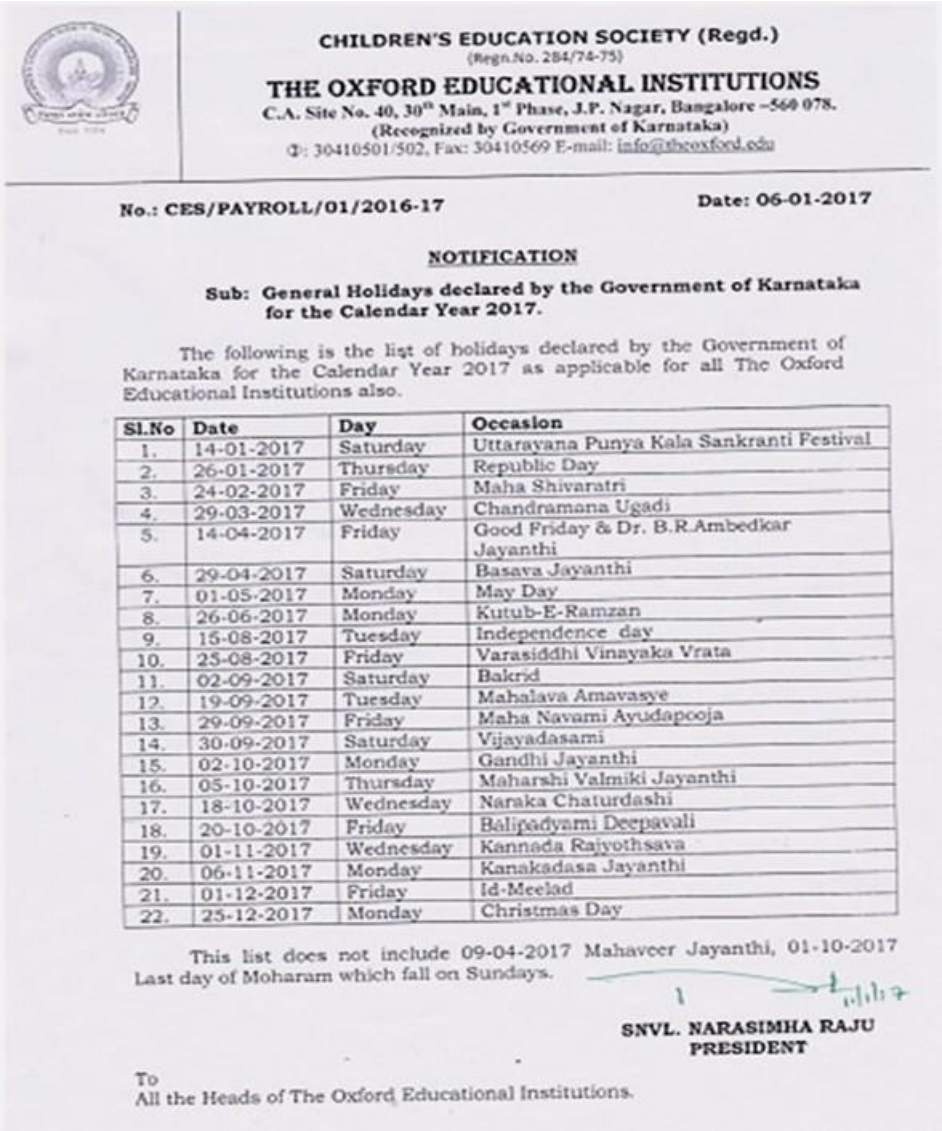
Table 3-1: Consolidated list of inventories

3.2.6. Interviews

To collect the various data, information and operating patterns, interviews were conducted with college staff (Principal, teaching staff, non-teaching staff) and students. The consolidated information from the interviews is given in the following sub-sections.

3.2.6.1. List of Holidays:

The lists of holidays were collected during the study and the same is given below. The list of holidays for the year 2017 is shown in figure 3-4.



CHILDREN'S EDUCATION SOCIETY (Regd.)
(Regn.No. 284/74-75)
THE OXFORD EDUCATIONAL INSTITUTIONS
C.A. Site No. 40, 30th Main, 1st Phase, J.P. Nagar, Bangalore –560 078.
(Recognized by Government of Karnataka)
✆: 30410501/502, Fax: 30410569 E-mail: info@theoxford.edu

No.: CES/PAYROLL/01/2016-17 Date: 06-01-2017

NOTIFICATION

Sub: General Holidays declared by the Government of Karnataka for the Calendar Year 2017.

The following is the list of holidays declared by the Government of Karnataka for the Calendar Year 2017 as applicable for all The Oxford Educational Institutions also.

Sl.No	Date	Day	Occasion
1.	14-01-2017	Saturday	Uttarayana Punya Kala Sankranti Festival
2.	26-01-2017	Thursday	Republic Day
3.	24-02-2017	Friday	Maha Shivaratri
4.	29-03-2017	Wednesday	Chandramana Ugadi
5.	14-04-2017	Friday	Good Friday & Dr. B.R.Ambedkar Jayanthi
6.	29-04-2017	Saturday	Basava Jayanthi
7.	01-05-2017	Monday	May Day
8.	26-06-2017	Monday	Kutub-E-Ramzan
9.	15-08-2017	Tuesday	Independence day
10.	25-08-2017	Friday	Varasiddhi Vinayaka Vrata
11.	02-09-2017	Saturday	Bakrid
12.	19-09-2017	Tuesday	Mahalaya Amavasye
13.	29-09-2017	Friday	Maha Navami Ayudapooja
14.	30-09-2017	Saturday	Vijayadasami
15.	02-10-2017	Monday	Gandhi Jayanthi
16.	05-10-2017	Thursday	Maharshi Valmiki Jayanthi
17.	18-10-2017	Wednesday	Naraka Chaturdashi
18.	20-10-2017	Friday	Balipadyami Deepavali
19.	01-11-2017	Wednesday	Kannada Rajyothsava
20.	06-11-2017	Monday	Kanakadasa Jayanthi
21.	01-12-2017	Friday	Id-Meelad
22.	25-12-2017	Monday	Christmas Day

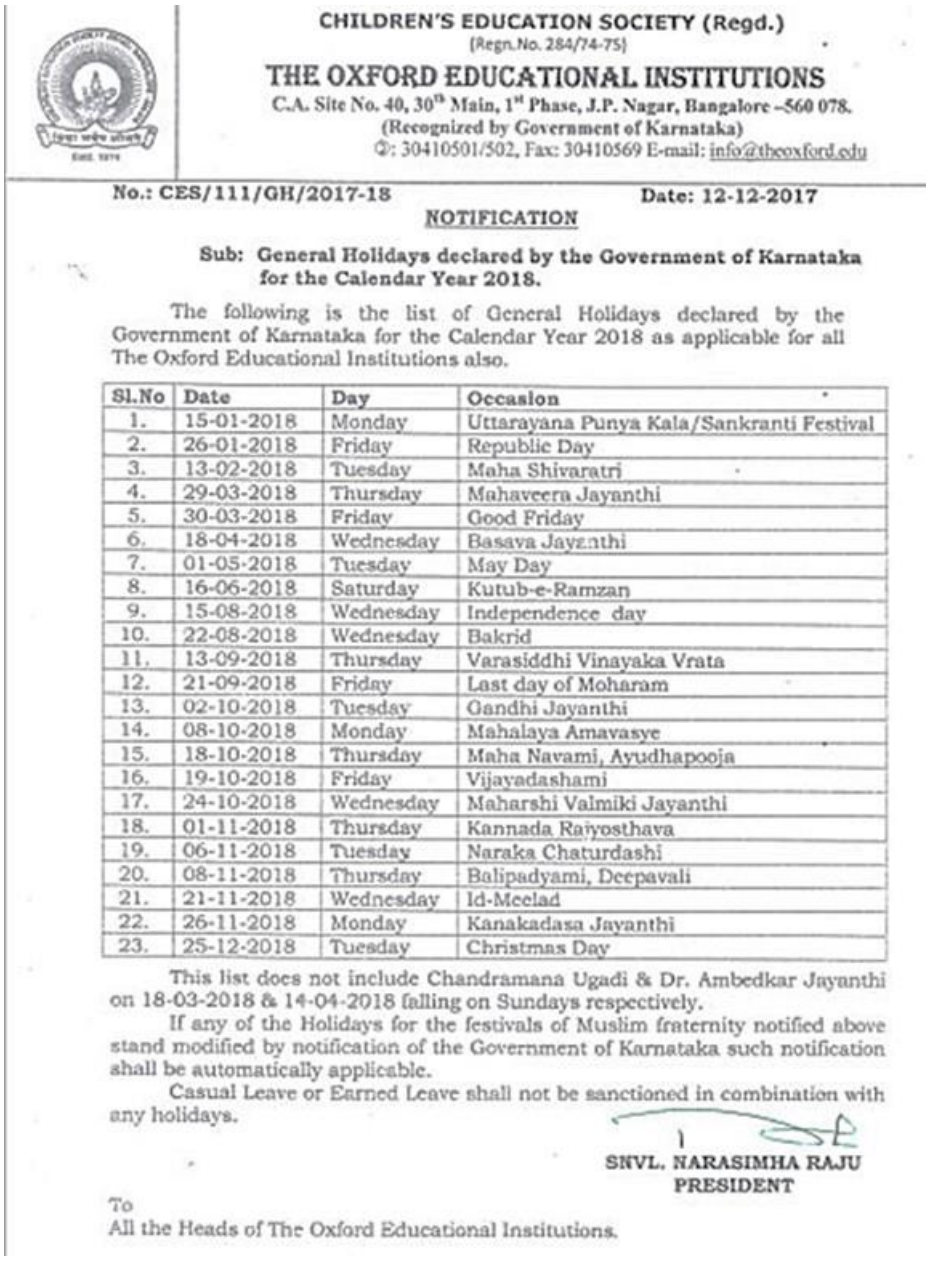
This list does not include 09-04-2017 Mahaveer Jayanthi, 01-10-2017 Last day of Moharam which fall on Sundays.

SNVL. NARASIMHA RAJU
PRESIDENT

To
All the Heads of The Oxford Educational Institutions.

Figure 3-4: List of Holidays-2017

The list of holidays for the year 2018 is shown in figure 3-5.



CHILDREN'S EDUCATION SOCIETY (Regd.)
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THE OXFORD EDUCATIONAL INSTITUTIONS
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(Recognized by Government of Karnataka)
✆: 30410501/502, Fax: 30410569 E-mail: info@theoxford.edu

No.: CES/111/GH/2017-18 Date: 12-12-2017

NOTIFICATION

Sub: General Holidays declared by the Government of Karnataka for the Calendar Year 2018.

The following is the list of General Holidays declared by the Government of Karnataka for the Calendar Year 2018 as applicable for all The Oxford Educational Institutions also.

Sl.No	Date	Day	Occasion
1.	15-01-2018	Monday	Uttarayana Punya Kala/Sankranti Festival
2.	26-01-2018	Friday	Republic Day
3.	13-02-2018	Tuesday	Maha Shivaratri
4.	29-03-2018	Thursday	Mahaveera Jayanthi
5.	30-03-2018	Friday	Good Friday
6.	18-04-2018	Wednesday	Basava Jayanthi
7.	01-05-2018	Tuesday	May Day
8.	16-06-2018	Saturday	Kutub-e-Ramzan
9.	15-08-2018	Wednesday	Independence day
10.	22-08-2018	Wednesday	Bakrid
11.	13-09-2018	Thursday	Varasiddhi Vinayaka Vrata
12.	21-09-2018	Friday	Last day of Moharam
13.	02-10-2018	Tuesday	Gandhi Jayanthi
14.	08-10-2018	Monday	Mahalaya Amavasye
15.	18-10-2018	Thursday	Maha Navami, Ayudhapooja
16.	19-10-2018	Friday	Vijayadashami
17.	24-10-2018	Wednesday	Maharshi Valmiki Jayanthi
18.	01-11-2018	Thursday	Kannada Rajyosthava
19.	06-11-2018	Tuesday	Naraka Chaturdashi
20.	08-11-2018	Thursday	Balipadyami, Deepavali
21.	21-11-2018	Wednesday	Id-Meelad
22.	26-11-2018	Monday	Kanakadasa Jayanthi
23.	25-12-2018	Tuesday	Christmas Day

This list does not include Chandramana Ugadi & Dr. Ambedkar Jayanthi on 18-03-2018 & 14-04-2018 falling on Sundays respectively.

If any of the Holidays for the festivals of Muslim fraternity notified above stand modified by notification of the Government of Karnataka such notification shall be automatically applicable.

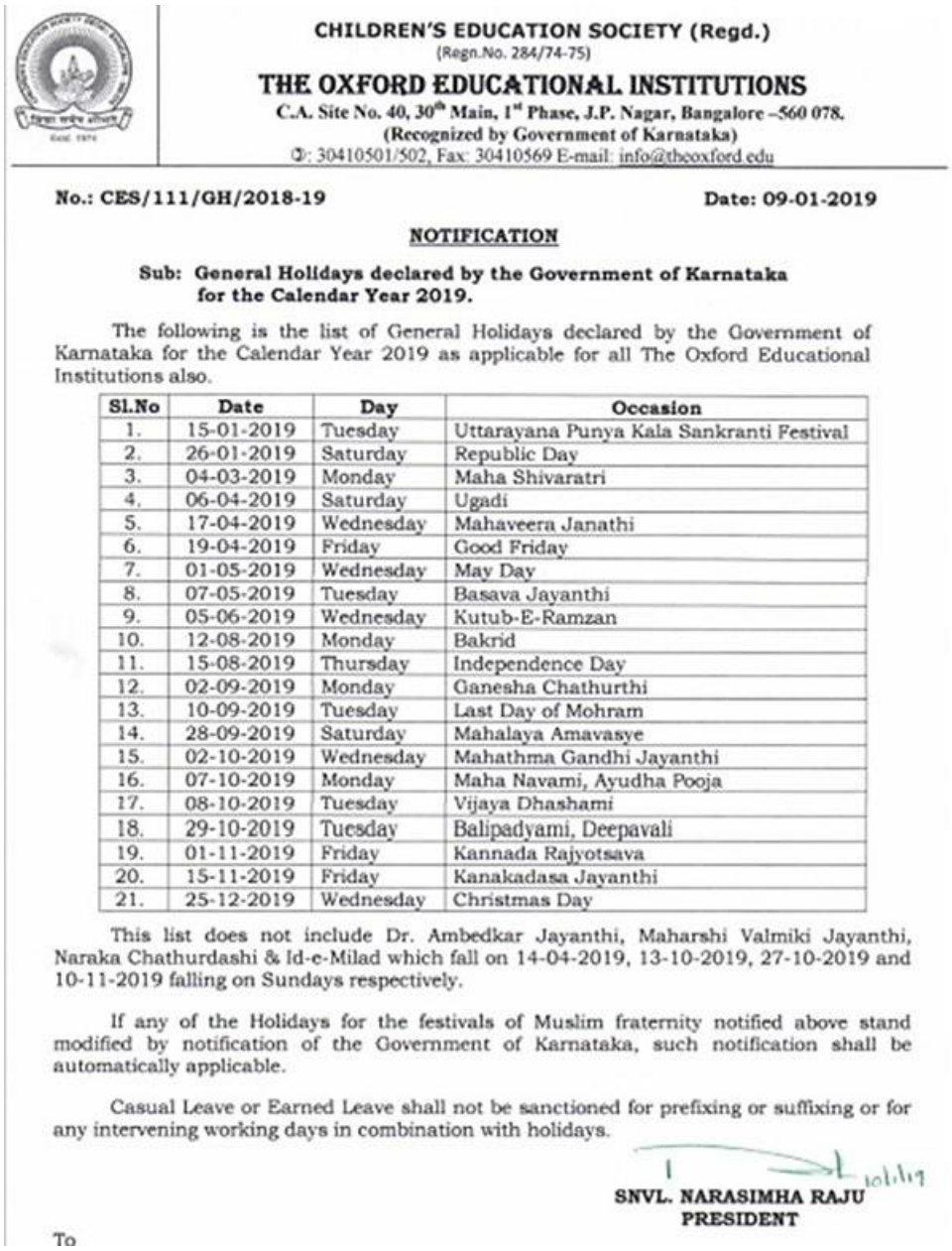
Casual Leave or Earned Leave shall not be sanctioned in combination with any holidays.

SNVL. NARASIMHA RAJU
PRESIDENT

To
All the Heads of The Oxford Educational Institutions.

Figure 3-5: List of Holidays-2018

The list of holidays for the year 2019 is shown in figure 3-6.



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✆: 30410501/502, Fax: 30410569 E-mail: info@theoxford.edu

No.: CES/111/GH/2018-19 **Date: 09-01-2019**

NOTIFICATION

Sub: General Holidays declared by the Government of Karnataka for the Calendar Year 2019.

The following is the list of General Holidays declared by the Government of Karnataka for the Calendar Year 2019 as applicable for all The Oxford Educational Institutions also.

Sl.No	Date	Day	Occasion
1.	15-01-2019	Tuesday	Uttarayana Punya Kala Sankranti Festival
2.	26-01-2019	Saturday	Republic Day
3.	04-03-2019	Monday	Maha Shivaratri
4.	06-04-2019	Saturday	Ugadi
5.	17-04-2019	Wednesday	Mahaveera Janathi
6.	19-04-2019	Friday	Good Friday
7.	01-05-2019	Wednesday	May Day
8.	07-05-2019	Tuesday	Basava Jayanthi
9.	05-06-2019	Wednesday	Kutub-E-Ramzan
10.	12-08-2019	Monday	Bakrid
11.	15-08-2019	Thursday	Independence Day
12.	02-09-2019	Monday	Ganesha Chathurthi
13.	10-09-2019	Tuesday	Last Day of Mohram
14.	28-09-2019	Saturday	Mahalaya Amavasye
15.	02-10-2019	Wednesday	Mahathma Gandhi Jayanthi
16.	07-10-2019	Monday	Maha Navami, Ayudha Pooja
17.	08-10-2019	Tuesday	Vijaya Dhashami
18.	29-10-2019	Tuesday	Balipadyami, Deepavali
19.	01-11-2019	Friday	Kannada Rajyotsava
20.	15-11-2019	Friday	Kanakadasa Jayanthi
21.	25-12-2019	Wednesday	Christmas Day

This list does not include Dr. Ambedkar Jayanthi, Maharshi Valmiki Jayanthi, Naraka Chathurdashi & Id-e-Milad which fall on 14-04-2019, 13-10-2019, 27-10-2019 and 10-11-2019 falling on Sundays respectively.

If any of the Holidays for the festivals of Muslim fraternity notified above stand modified by notification of the Government of Karnataka, such notification shall be automatically applicable.

Casual Leave or Earned Leave shall not be sanctioned for prefixing or suffixing or for any intervening working days in combination with holidays.

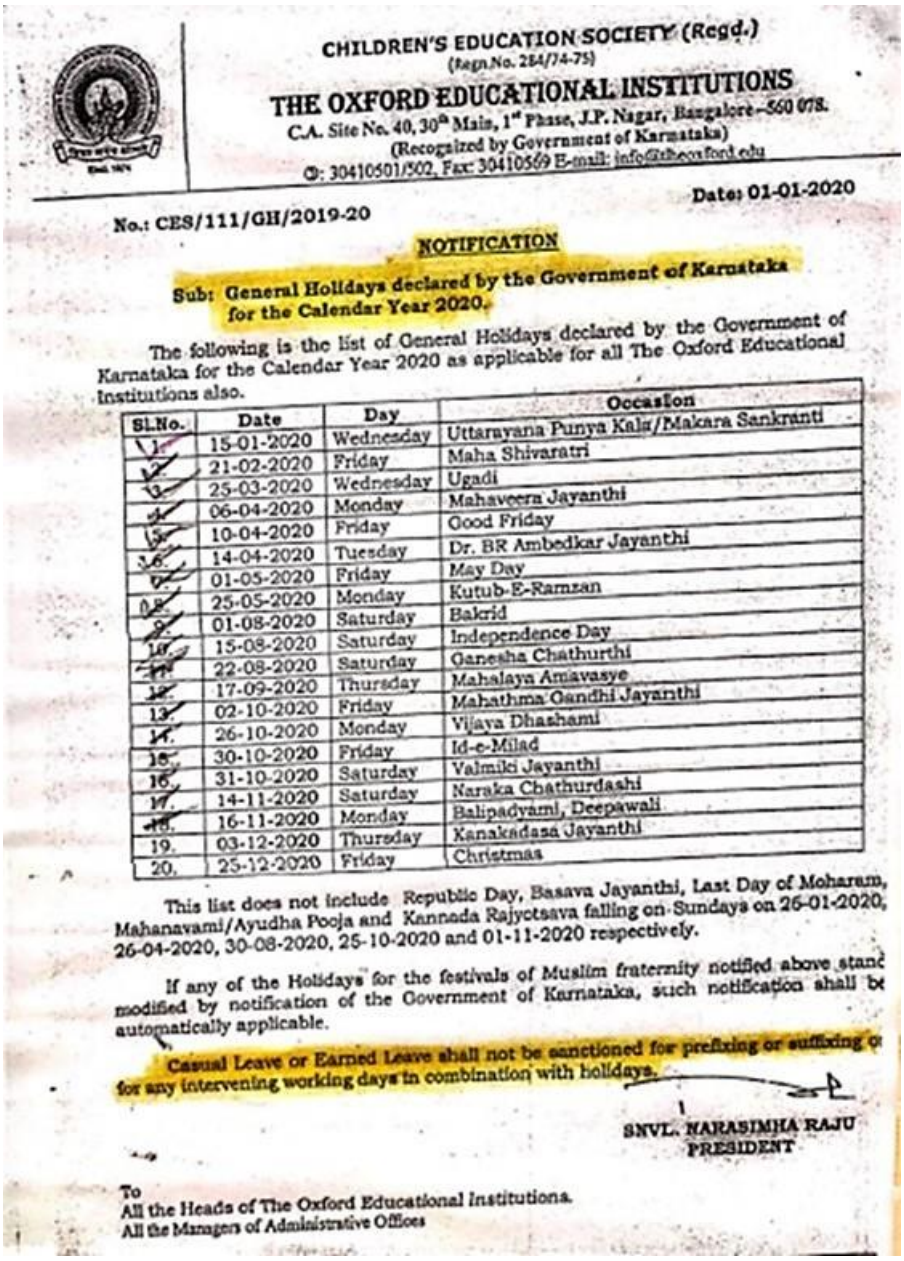
10.1.19

SNVL. NARASIMHA RAJU
PRESIDENT

To

Figure 3-6: List of Holidays-2019

The list of holidays for the year 2020 is shown in figure 3-7.



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Ph: 30410501/502, Fax: 30410569 E-mail: info@theoxford.edu

No.: CES/111/GH/2019-20

Date: 01-01-2020

NOTIFICATION

Sub: General Holidays declared by the Government of Karnataka for the Calendar Year 2020.

The following is the list of General Holidays declared by the Government of Karnataka for the Calendar Year 2020 as applicable for all The Oxford Educational Institutions also.

Sl.No.	Date	Day	Occasion
1.	15-01-2020	Wednesday	Uttarayana Punya Kala/Makara Sankranti
2.	21-02-2020	Friday	Maha Shivaratri
3.	25-03-2020	Wednesday	Ugadi
4.	06-04-2020	Monday	Mahaveera Jayanthi
5.	10-04-2020	Friday	Good Friday
6.	14-04-2020	Tuesday	Dr. BR Ambedkar Jayanthi
7.	01-05-2020	Friday	May Day
8.	25-05-2020	Monday	Kutub-E-Ramzan
9.	01-08-2020	Saturday	Bakrid
10.	15-08-2020	Saturday	Independence Day
11.	22-08-2020	Saturday	Ganesha Chathurthi
12.	17-09-2020	Thursday	Mahalaya Amavasye
13.	02-10-2020	Friday	Mahathma Gandhi Jayanthi
14.	26-10-2020	Monday	Vijaya Dhashami
15.	30-10-2020	Friday	Id-e-Milad
16.	31-10-2020	Saturday	Valmiki Jayanthi
17.	14-11-2020	Saturday	Naraka Chathurdashi
18.	16-11-2020	Monday	Balipadyami, Deepawali
19.	03-12-2020	Thursday	Kanakadasa Jayanthi
20.	25-12-2020	Friday	Christmas

This list does not include Republic Day, Basava Jayanthi, Last Day of Moharam, Mahanavami/Ayudha Pooja and Kannada Rajyotsava falling on Sundays on 26-01-2020, 26-04-2020, 30-08-2020, 25-10-2020 and 01-11-2020 respectively.

If any of the Holidays for the festivals of Muslim fraternity notified above stand modified by notification of the Government of Karnataka, such notification shall be automatically applicable.

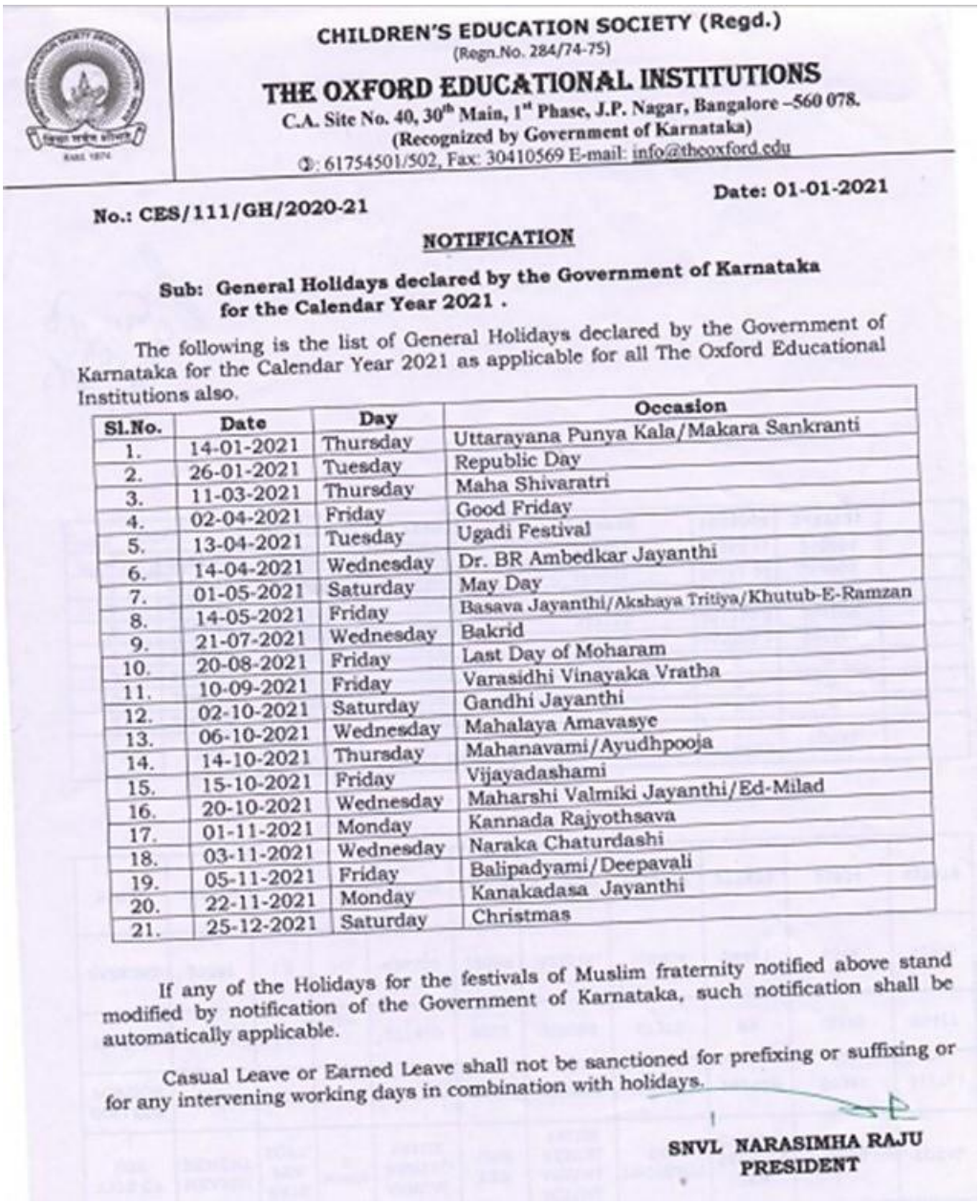
Casual Leave or Earned Leave shall not be sanctioned for prefixing or suffixing or for any intervening working days in combination with holidays.

SNVL. NARASIMHA RAJU
PRESIDENT

To
All the Heads of The Oxford Educational Institutions.
All the Managers of Administrative Offices

Figure 3-7: List of Holidays-2020

The list of holidays for the year 2021 is shown in figure 3-8.



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No.: CES/111/GH/2020-21

Date: 01-01-2021

NOTIFICATION

Sub: General Holidays declared by the Government of Karnataka for the Calendar Year 2021 .

The following is the list of General Holidays declared by the Government of Karnataka for the Calendar Year 2021 as applicable for all The Oxford Educational Institutions also.

Sl.No.	Date	Day	Occasion
1.	14-01-2021	Thursday	Uttarayana Punya Kala/Makara Sankranti
2.	26-01-2021	Tuesday	Republic Day
3.	11-03-2021	Thursday	Maha Shivaratri
4.	02-04-2021	Friday	Good Friday
5.	13-04-2021	Tuesday	Ugadi Festival
6.	14-04-2021	Wednesday	Dr. BR Ambedkar Jayanthi
7.	01-05-2021	Saturday	May Day
8.	14-05-2021	Friday	Basava Jayanthi/Akshaya Tritiya/Khutub-E-Ramzan
9.	21-07-2021	Wednesday	Bakrid
10.	20-08-2021	Friday	Last Day of Moharam
11.	10-09-2021	Friday	Varasidhi Vinayaka Vratha
12.	02-10-2021	Saturday	Gandhi Jayanthi
13.	06-10-2021	Wednesday	Mahalaya Amavasye
14.	14-10-2021	Thursday	Mahanavami/Ayudhpooja
15.	15-10-2021	Friday	Vijayadashami
16.	20-10-2021	Wednesday	Maharshi Valmiki Jayanthi/Ed-Milad
17.	01-11-2021	Monday	Kannada Rajyothsava
18.	03-11-2021	Wednesday	Naraka Chaturdashi
19.	05-11-2021	Friday	Balipadyami/Deepavali
20.	22-11-2021	Monday	Kanakadasa Jayanthi
21.	25-12-2021	Saturday	Christmas

If any of the Holidays for the festivals of Muslim fraternity notified above stand modified by notification of the Government of Karnataka, such notification shall be automatically applicable.

Casual Leave or Earned Leave shall not be sanctioned for prefixing or suffixing or for any intervening working days in combination with holidays.

SNVL NARASIMHA RAJU
PRESIDENT

Figure 3-8: List of Holidays-2021

3.2.6.2. Tentative Schedule of College

The tentative schedule of the college is 09.00 AM to 4:15 PM.

The library timing is 09:00 AM to 10:00 PM.

The details of the class sessions are given in table 3-2.

S. No.	Session	Timings
1	1st Hour	09:00 TO 9:55AM
2	2nd Hour	09:55 TO 10:50 AM
3	Short Break	10:50 TO 11:00 AM
4	3rd Hour	11:00 TO 11:55 AM
5	4th Hour	11:55 TO 12:50 PM
6	Lunch	12:50 TO 01:30 PM
7	5th Hour	1:30 TO 2:25 PM
9	6th Hour	2:25 TO 3:20 PM
10	7th Hour	3:20 TO 4:15 PM

Table 3-2: Tentative College Schedule

3.2.6.3. Staff and Students of College:

The number of staff including teaching, non-teaching, and house-keeping is given in the table 3-3. The number of students includes both boys and girls.

S. No.	Year	Teaching Staff	Non-Teaching staff	Total Staff	Total Students
1	2017	303	122	425	3572
2	2018	285	95	380	3044
3	2019	269	92	361	3124
4	2020	240	68	308	2728
5	2021	222	57	279	2722

Table 3-3: Number of staff and students

4. WATER AUDIT

4.1. Facility description

The water audit study involved carrying out various observations and analysis, to realistically assess usage of water and potential for water conservation.

Tanker water is the only source of water, for facilitating the water supply requirement of the entire campus. Three tankers are available. The tankers run throughout the day to bring water. The capacity of each tanker is 12kL.

Other sources of water such as BWSSB and borewell water are not available.

Figure 4-1, shows the tanker filling water to the sump.

Figure 4-1: Tanker filling water to the Sump

Figure 4-2, shows the water inlet of sump.

Figure 4-2: Water inlet of sump

The tanker water is filled into the sump. The capacity of sump is 240 kL. The sump has two sections i.e., sump for firefighting system (120 kL) and sump for water distribution (120 kL) to the campus. First, the water is filled to the firefighting sump and from there the water distribution sump gets filled. The water in firefighting section is kept in reserve all the time.

Figure 4-3, shows the underground sump.

Figure 4-3: Underground sump

From sump, the water is distributed to all the RCC (Reinforced Cement Concrete) overhead tanks using three number of pumps. The capacity of each pump is 10HP and they are installed in pump room.

The pumps used for water distribution is shown in figure 4-4.

Figure 4-4: Pumps for water distribution

The water distribution to engineering new block, engineering old block, and girl's hostel block is done manually using valve mechanism.

The valve mechanism is shown in figure 4-5.

Figure 4-5: Valve mechanism at pump room

The location, type, capacity, quantity and water source of sump and overhead tanks are given in table 4-1.

S. No.	Location	Tank Type	Capacity, kL	Quantity	Source of water
1	Sump for tanker water	RCC	240	1	From Tanker
2	New Building- Terrace - Overhead Tank	RCC	24	2	From Sump
3	Old Building - Terrace - Overhead Tank	RCC	24	2	From Sump
4	Girls Hostel - Terrace - Overhead Tank	RCC	36	1	From Sump/ Treated STP water

Table 4-1: Details of sump and overhead tanks

Based on the source, usage, type and recycling, water is classified as following types in the college campus that include:

- Raw Water
- Drinking Water
- Hot Water
- Rain Water
- Sewage Water
- Treated Water (from Sewage Treatment Plant)

Details of the various types of water usages are discussed in detail, in the following sections.

4.1.1. Raw Water System

The schematic of raw water distribution system is given in figure 4-6.

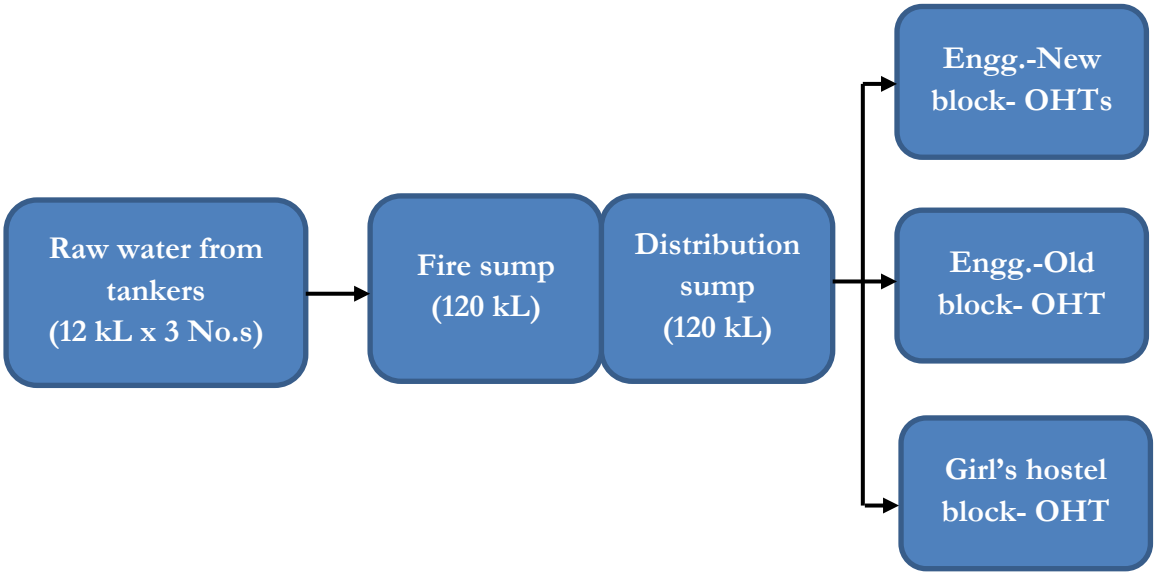


Figure 4-6: Schematic of Raw Water Distribution System

The raw water is brought using tankers (12 kL x 3No.s.) and the water is filled in the sump. In underground sump, 120 kL of raw water is kept in reserve for firefighting system. Another 120kL of raw water is stored in the distribution sump.

From distribution sump, the raw water is distributed to the overhead tanks located in terrace of engineering new block, engineering old block and girl's hostel block. The pumping of raw water from sump to overhead tanks is done using 3 No.s. of 10HP pumps in pump room.

Engineering - New block:

There are two RCC overhead tanks at terrace of engineering new block. The capacity of each tank is 24kL. In each tank, 12kL of raw water is kept in reserve for firefighting system. Whereas, remaining 12kL of raw is ditributed to utility. First, the firefighting tank gets filled and then from there, the water gets filled in distribution tank.

The raw water is distributed to staff toilets, student toilets, handwash, and labs.

The overhead tanks at terrace of engineering new block are shown in figure 4-7 and 4.-8.

Figure 4-7: Engineering new block - OHT 1

Figure 4-8: Engineering new block - OHT 2

Engineering - Old block:

One RCC overhead tank is available at terrace of engineering old block. The capacity of tank is 24kL. In tank, 12kL of raw water is kept in reserve for firefighting system. Whereas, remaining 12kL of raw is ditributed to utility. First, firefighting tank gets filled and then from there, the water gets filled in distribution tank.

The raw water is distributed to staff toilets, student toilets, handwash, and labs. Also, the input for RO plant is taken from this OHT. The overheads tank of engineering old block in shown in figure 4-9.

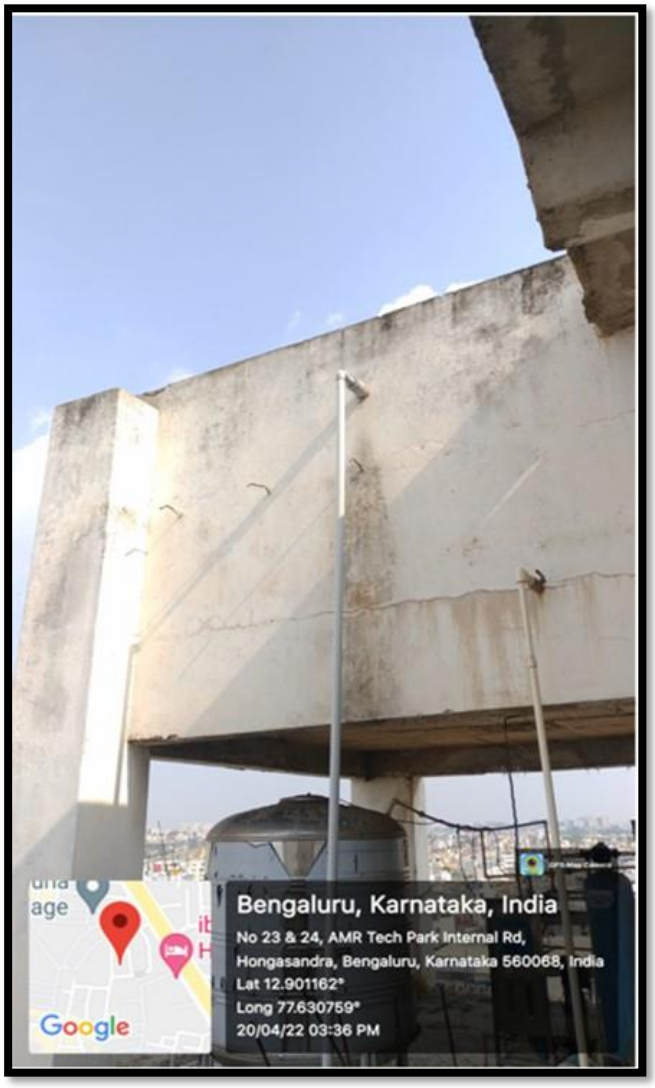


Figure 4-9: Engineering old block - OHT

Girl's hostel block:

One overhead tank is available at terrace of girl's hostel block. Total capacaity of the tank is 36 kL. The tank is divided into three sections. The capacity of each section in tank is 12 kL. One section of tank with 12 kL raw water is kept in reserve for firefighting system. Other section with 12 kL is used for distribution to utility points like handwash, toilets, bathing, dishwash and cloth washing. Whereas, another section is filled with 12 kL of STP treated water. This water is used for toilet flushing through dual piping system. The overhead tank at terrace of girl's hostel block is shown in figure 4-10.

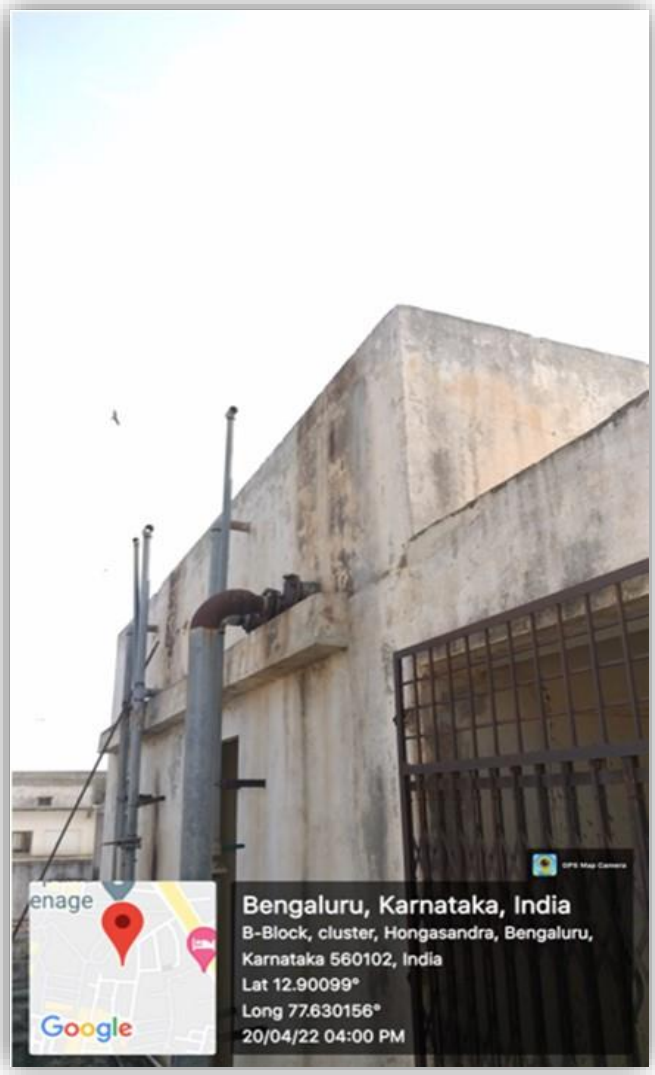


Figure 4-10: Girl's hostel block - OHT

4.1.1. Drinking Water System

To provide drinking water, RO (Reverse Osmosis) plants are installed at terrace of the engineering old block and terrace of girl's hostel block. The schematic of drinking water system is shown in figure 4-11.

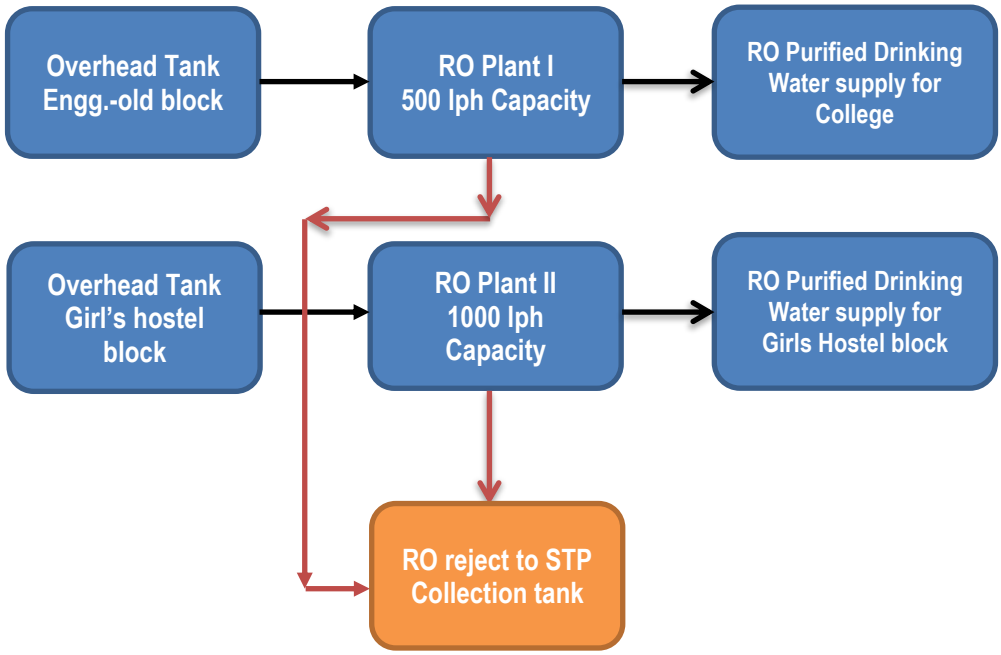


Figure 4-11: Schematic of Drinking water system

RO Plant I - at engineering old block:

To provide drinking water for engineering new and old blocks, RO plant I is installed at terrace of engineering old block. The input raw water for RO plant I is taken from RCC overhead tank of engineering old block.

The permeate rate is 500 lph (litres per hour). The processed RO water is stored in the RO tank (2 kL). From RO tank, the drinking water is distributed to the consumption points of

college campus. In each floor RO tap is available for providing RO drinking water. The RO drinking water is supplied for both new and old buildings of the Engineering campus.

The RO reject water is sent to collection tank of STP.

The RO plant installed at terrace of engineering old block is shown in figure 4-12.

Figure 4-12: RO plant I - Engineering old block

The sample image of RO drinking water consumption point in the campus is shown in figure 4-13.

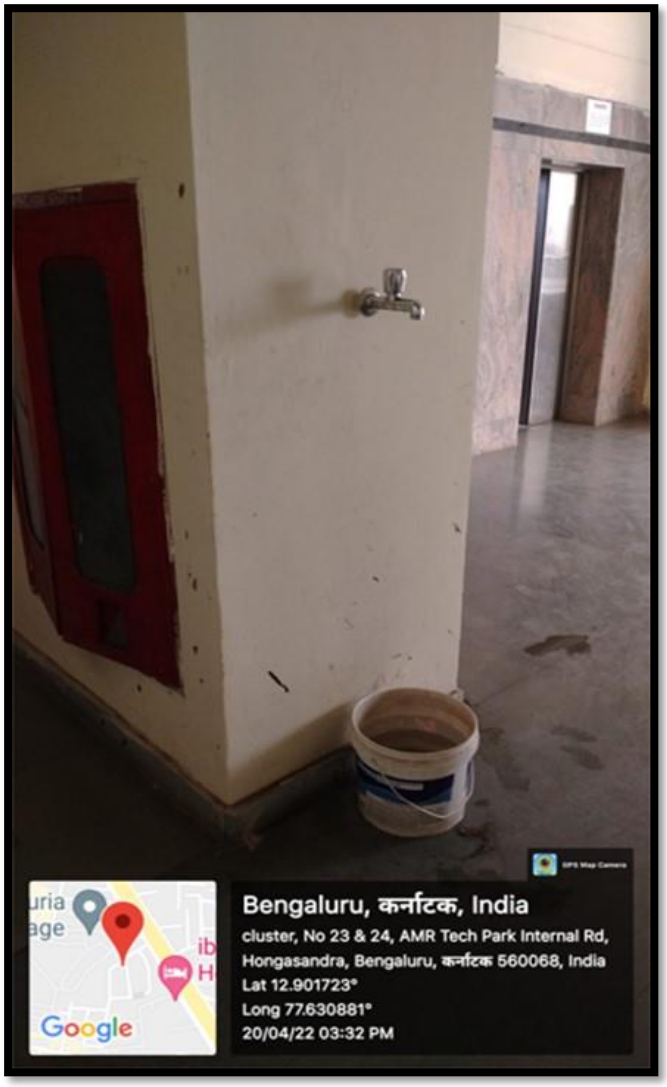


Figure 4-13: RO water consumption points at college

RO Plant II - at girl's hostel block:

To provide drinking water for girl's hostel block, RO plant II is installed at terrace of girl's hostel block. The input raw water for RO plant II is taken from RCC overhead tank of girl's hostel block.

The permeate rate is 1000 lph (litres per hour). The processed RO water is stored in the RO tank (1.5 kL). From RO tank, the drinking water is distributed to the consumption points of girl's hostel. In each floor RO tap is available for providing RO drinking water. The RO drinking water is supplied for each floor and dining hall of girl's hostel block.

The RO reject water is sent to collection tank of STP.

The RO plant installed at terrace of engineering old block is shown in figure 4-14.

Figure 4-14: RO plant II - Girl's hostel block

The sample image of RO drinking water consumption point in the girl's hostel corridor is shown in figure 4-15.

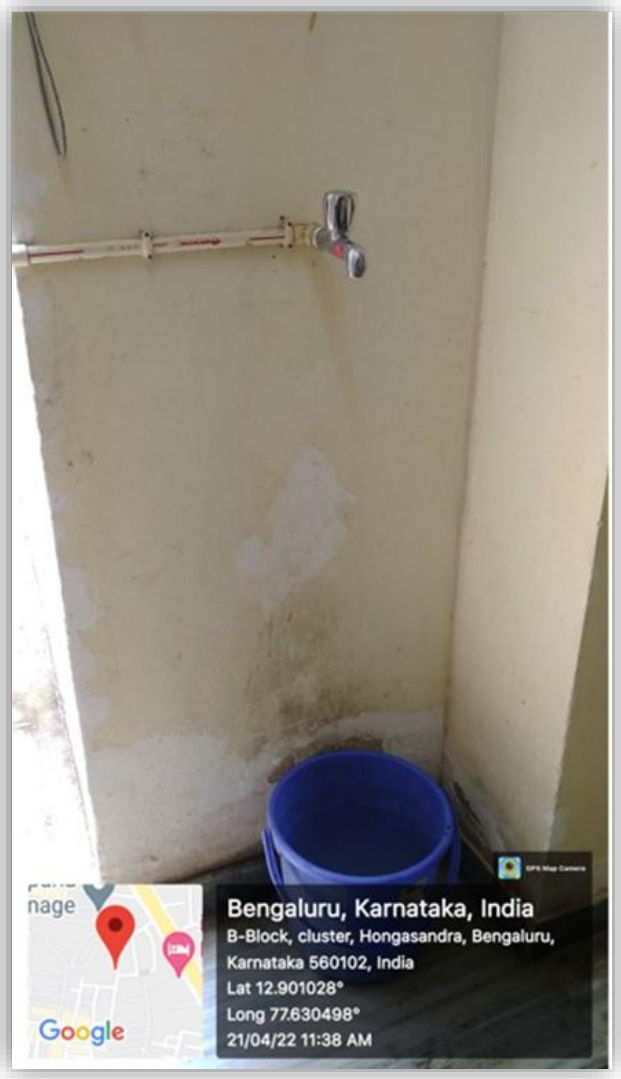


Figure 4-15: RO water consumption points at girl's hostel corridor

The sample image of RO drinking water consumption point in the girl's hostel dining hall is shown in figure 4-16.

Figure 4-16: RO water consumption at girl's hostel dining hall

4.1.2. Hot Water System

Hot water is mainly used for bathing purposes in the girl's hostel. To provide hot water facility solar water heater system is used. Three number of solar water heaters are installed at terrace. The capacity of each solar water heater is 3 kL. The input for solar water heaters is taken from overhead tank of girl's hostel. The hot water produced is distributed to all floors through a dedicated pipeline.

The solar water heaters installed at the terrace of girl's hostel is shown in figure 4-17 and figure 4-18.

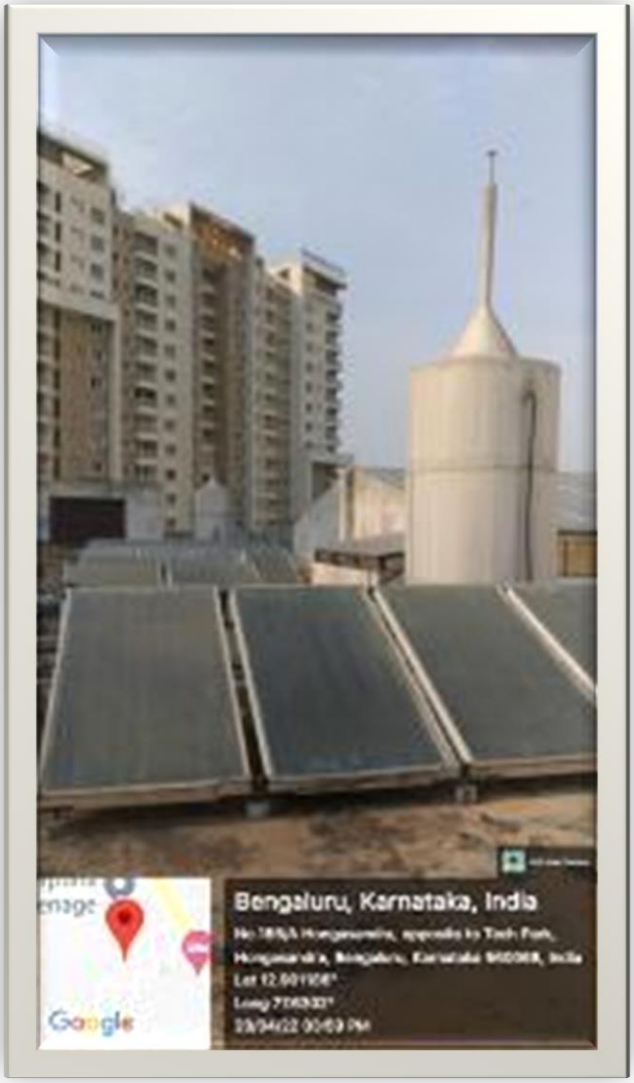


Figure 4-17: Solar water heaters 1 & 2 at girl's hostel terrace

Figure 4-18: Solar water heater 3 at girl's hostel terrace

The sample image of hot water tap provision at hostel bathrooms is shown in figure 4-19.

Figure 4-19: Tap for hot water provision

4.1.3. Rain Water Harvesting System

The rain water harvesting system is available in the campus. The schematic of rain water harvesting system is shown in figure 4-20.

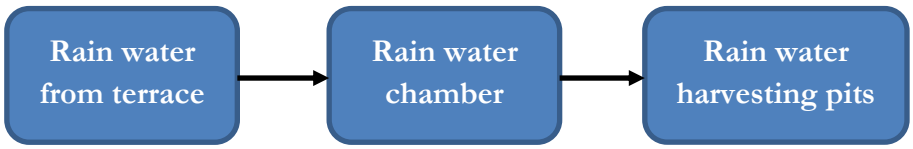


Figure 4-20: Schematic of rain water harvesting

The rain water from terrace of the buildings are brought down through a dedicated pipeline to the rain water chambers. Then, from rain water chambers the rain water is sent to the rain water harvesting pits through underground pipeline. There are two rain water harvesting pits available.

The sample image of pipeline for rain water from terrace of the engineering new block is shown in figure 4-21.

Figure 4-21: Pipeline for rain water from terrace

The rain water chamber is shown in figure 4-22.

Figure 4-22: Rain water chamber

The rain water harvesting pits are shown in figure 4-23 and 4-24. The pits are located near the STP area.

Figure 4-23: Rain water harvesting pit 1

Figure 4-24: Rain water harvesting pit 2

4.1.4. Sewage Water System

The sources of waste water in the college campus are as follows,

- Washrooms
- Toilets
- Kitchen
- Hostel
- Labs
- RO reject
- Canteen

The schematic of Sewage Treatment Plant (STP) is shown in figure 4-25.

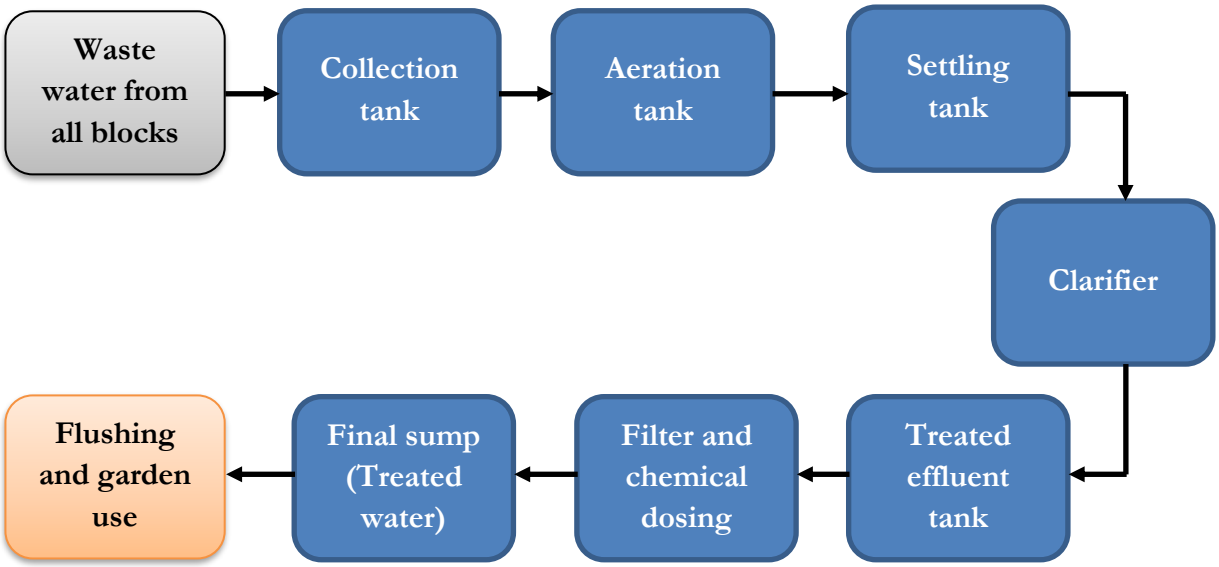


Figure 4-25: Schematic of STP

The capacity of the Sewage Treatment Plant (STP) is 300 kL per day. The STP is actually operated for 100 kL per day. Waste water from the college and hostel premises are collected and treated at sewage treatment plant.

The plumbing system (waste water collection, waste water transfer to STP, STP treated water storage and STP treated water to land scaping) is very well designed, the pipes are laid underground, and access / chambers are provided to regulate and control the flow of water.

The treated water from the STP is used for toilet flushing at engineering new block and girl's hostel. Treated STP water is supplied through a dedicated line for watering the garden. The STP area and collection tank is shown in figure 4-26.

Figure 4-26: STP area

The STP area and collection tank is shown in figure 4-27.

Figure 4-27: STP -Collection tank

The aeration tank and clarifier are shown in figure 4-28.

Figure 4-28: Aeration tank

The clarifier section is shown in figure 4-29.

Figure 4-29: Clarifier section

The treated effluent tank is shown in figure 4-30.

Figure 4-30: Treated effluent tank

The filtering tank is shown in figure 4-31.

Figure 4-31: Filter and chemical dosing tank

The chemical dosing tank is shown in figure 4-32.

Figure 4-32: Chemical dosing tank

The final sump for storing treated water is shown in figure 4.33.

Figure 4-33: Final sump for treated STP water

Sludge drying unit:

The sludge drying unit is established near STP collection tank. The sludge drying unit has six tanks in which the sludge is let to dry naturally. The water from the sludge is sent to collection tank. The dry sludge is then removed and decomposed. The decomposed sludge along with the dry plant waste is used as manure for trees and plant.

The sludge drying bed is shown in figure 4-34.

Figure 4-34: Sludge drying bed

The sludge decomposer pit is shown in figure 4-35.

Figure 4-35: Sludge decomposer pit

4.2. Best Practices Implemented for Water Conservation

4.2.1. Dual piping system

Dual piping system is implemented in engineering new block and girl's hostel block.

Engineering new block:

The treated STP water is used for toilet flushing in new engineering block. For this purpose, pneumatic pressure pump system is installed at the STP room. The STP water is connected through a dedicated pipeline for toilet flushing. Three pneumatic pumps are used to pump water for flushing line. Whenever flush button is pressed the pneumatic pumping system delivers water for flushing line.

The pneumatic pressure tank for dual piping system is shown in figure 4-36.

Figure 4-36: Pneumatic pressure tank for dual piping system

The pneumatic pressure pumps for dual piping system are shown in figure 4-37.

Figure 4-37: Pneumatic pressure pumps for dual piping system

The dual piping system flushing button is shown in figure 4-38.

Figure 4-38: Dual piping system - Flushing button

Girl's hostel block:

The toilets in girl's hostel have been provided with dual piping system. The dual piping system consists of raw water piping network and STP treated water piping network. The STP treated water is pumped to the overhead tank of girl's hostel. The capacity of pump is 10 HP. The overhead tank in girl's hostel is capable of storing 12 kL of STP treated water. The STP treated water is used for toilet flushing through a dedicated pipeline.

The pump used for pumping STP treated water to the girl's hostel overhead tank is shown in figure 4-39.

Figure 4-39: Pump for treated STP water

The flushing tank connected to dual piping system is shown in figure 4-40.

Figure 4-40: Dual piping system - Flushing tank

4.2.2. STP treated water for garden use

The treated STP water is used for watering the trees and garden. For this purpose, dedicated pipeline is provided. Taps are provided at various locations to facilitate the watering of garden.

The tap near STP area for providing STP treated water to garden is shown in figure 4-41.

Figure 4-41: STP treated water tap for garden use- near STP area

The tap near engineering new block for providing STP treated water to garden is shown in figure 4-42.

Figure 4-42: STP treated water tap for garden use- near engineering new block

The institution has installed STP with capacity of 300 kLPD and the quantity of STP water treated per day is 100 kL/Day. The quantity of water reused and cost savings per annum is given in table 4-2.

S. No.	Description	Unit	Values
1	STP capacity	kL/Day	300
2	Quantity of STP water treated per day	kL/Day	100
3	Assumed quantity of water reused @ 40% utilization factor	kL/Day	40
4	No. of working days per year	Days	250
5	Annual Quantity of water reused (saved)	kL/Annum	10000
6	Average water cost	Rs./Litre	0.086
7	Annual cost savings achieved	Rs. lakh/year	8.6

Table 4-2: Annual quantity of water reused and cost savings by installation of STP

4.2.3. Regular testing of STP treated water

Testing water quality on a regular basis is an important part of maintaining a safe and reliable source. This will help ensure that the water source is properly protected from potential contamination, and that appropriate treatment is selected and operating properly. The STP treated water is tested regularly before it is used.

The sample STP treated water test report for the year 2017 is shown in figure 4-43.

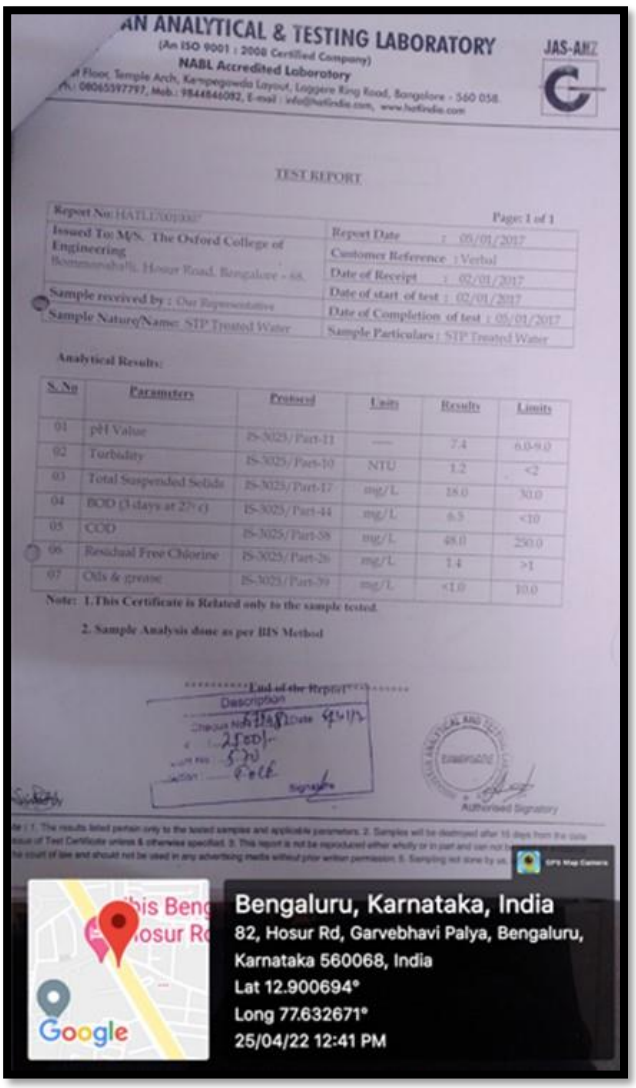


Figure 4-43: STP treated water test report - 2017

The sample invoice of STP treated water test report for the year 2018 is shown in figure 4-44.

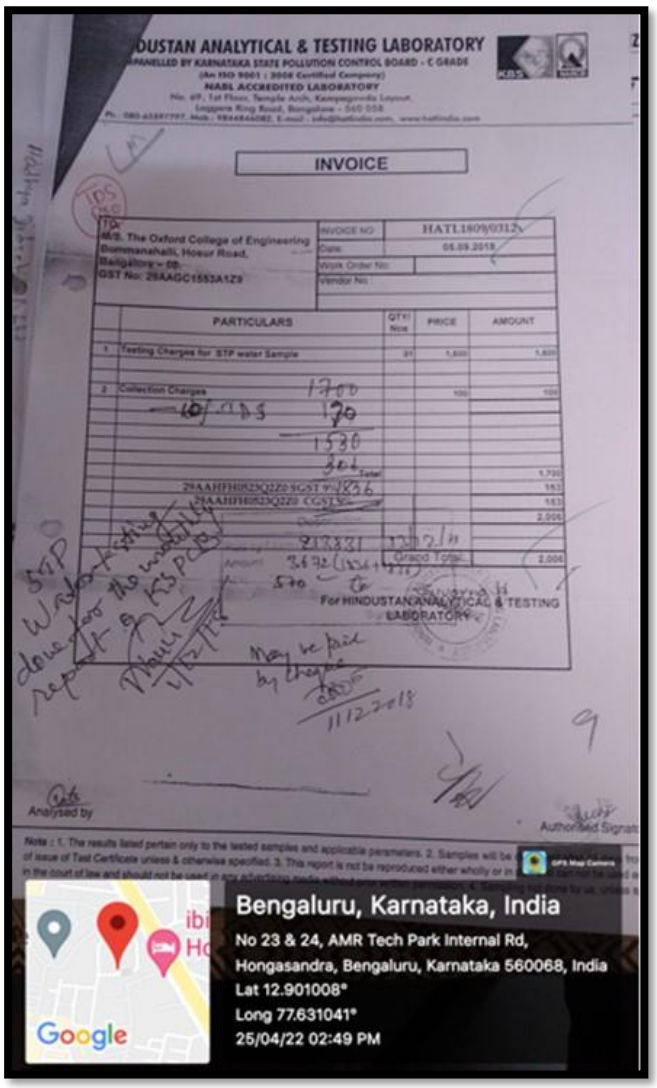
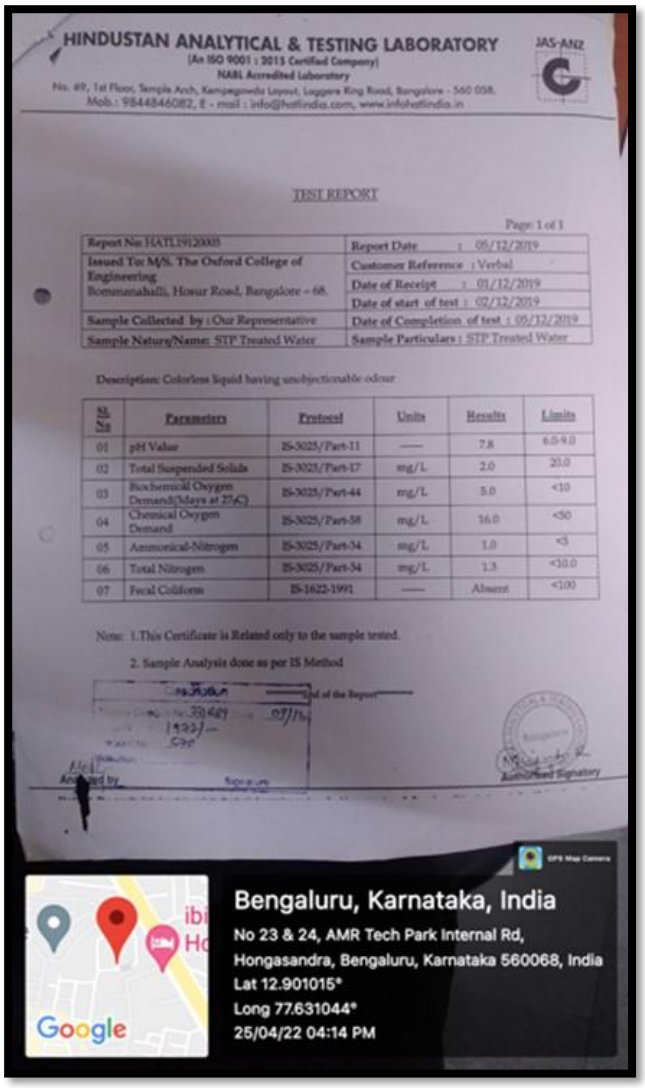


Figure 4-44: STP treated water test - Invoice- 2018

The sample STP treated water test report for the year 2019 is shown in figure 4-45.



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Mob.: 9844846082, E - mail : info@hatlindia.com, www.infohatlindia.in

TEST REPORT

Page: 1 of 1

Report No: HATL1912003	Report Date : 05/12/2019
Issued To: M/S. The Oxford College of Engineering, Bommanahalli, Hosur Road, Bangalore – 68.	Customer Reference : Verbal
	Date of Receipt : 01/12/2019
	Date of start of test : 02/12/2019
Sample Collected by : Our Representative	Date of Completion of test : 05/12/2019
Sample Nature/Name: STP Treated Water	Sample Particulars : STP Treated Water

Description: Colorless liquid having unobjectionable odour

Sl. No	Parameters	Protocol	Units	Results	Limits
01	pH Value	IS-3025/Part-11	——	7.8	6.0-9.0
02	Total Suspended Solids	IS-3025/Part-17	mg/L	2.0	20.0
03	Biochemical Oxygen Demand(3days at 27oC)	IS-3025/Part-44	mg/L	3.0	<10
04	Chemical Oxygen Demand	IS-3025/Part-58	mg/L	16.0	<50
05	Ammonical-Nitrogen	IS-3025/Part-34	mg/L	1.0	<5
06	Total Nitrogen	IS-3025/Part-34	mg/L	1.3	<10.0
07	Fecal Coliform	IS-1622-1991	——	Absent	<100

Note: 1.This Certificate is Related only to the sample tested.
2. Sample Analysis done as per IS Method

End of the Report

Authorised Signatory

Figure 4-45: STP treated water test report - 2019

The sample STP treated water test report for the year 2020 is shown in figure 4-46.

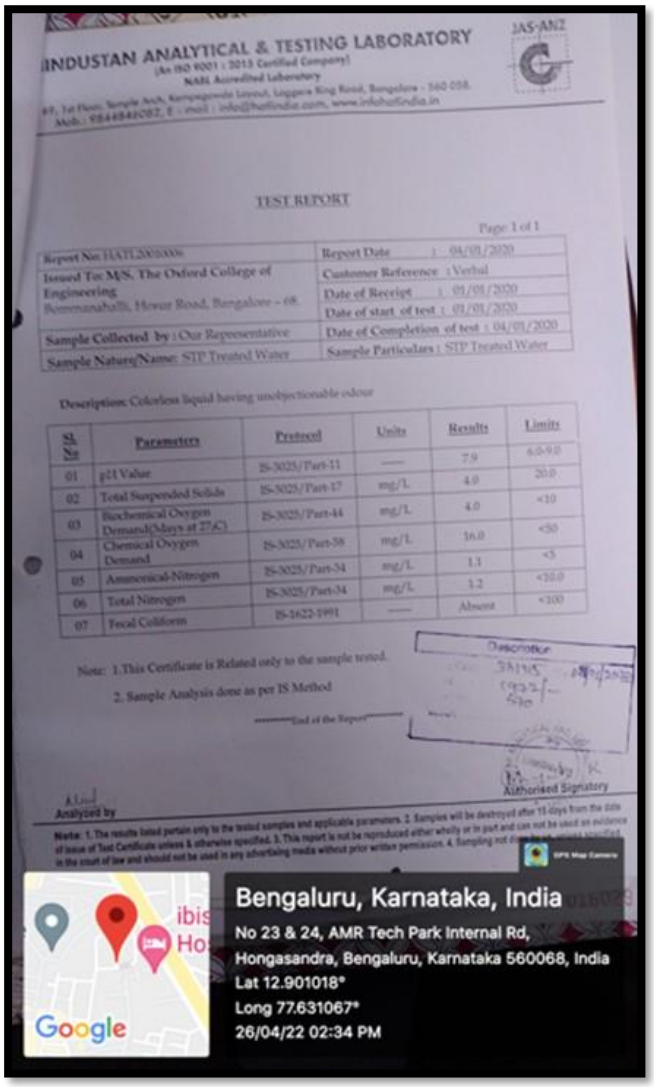
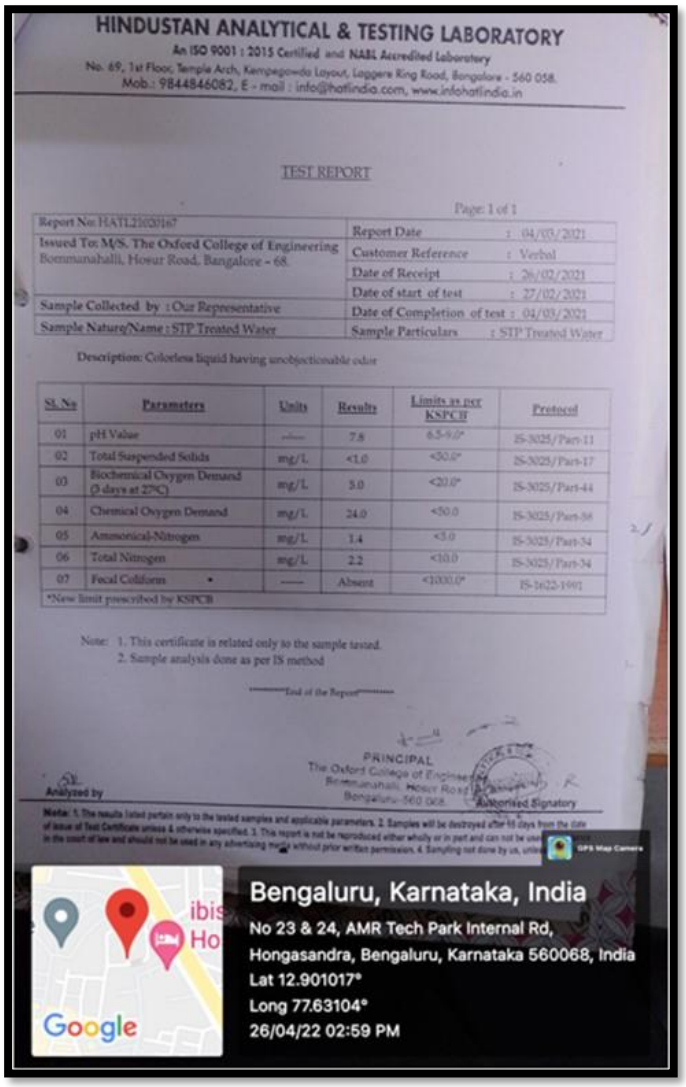


Figure 4-46: STP treated water test report - 2020

The sample STP treated water test report for the year 2021 is shown in figure 4-47.



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TEST REPORT

Page: 1 of 1

Report No: HATL2102067	Report Date : 04/03/2021
Issued To: M/S. The Oxford College of Engineering, Bommanahalli, Hosur Road, Bangalore - 68.	Customer Reference : Verbal
	Date of Receipt : 26/02/2021
	Date of start of test : 27/02/2021
Sample Collected by : Our Representative	Date of Completion of test : 04/03/2021
Sample Nature/Name : STP Treated Water	Sample Particulars : STP Treated Water

Description: Colorless liquid having unobjectionable odor

Sl. No	Parameters	Units	Results	Limits as per KSPCB	Protocol
01	pH Value	----	7.8	6.5-9.0*	IS-3025/Part-11
02	Total Suspended Solids	mg/L	<1.0	<50.0*	IS-3025/Part-17
03	Biochemical Oxygen Demand (3 days at 27°C)	mg/L	5.0	<20.0*	IS-3025/Part-44
04	Chemical Oxygen Demand	mg/L	24.0	<50.0	IS-3025/Part-58
05	Ammonical-Nitrogen	mg/L	1.4	<5.0	IS-3025/Part-34
06	Total Nitrogen	mg/L	2.2	<10.0	IS-3025/Part-34
07	Fecal Coliform	----	Absent	<1000.0*	IS-1622-1991

*New limit prescribed by KSPCB

Note: 1. This certificate is related only to the sample tested.
2. Sample analysis done as per IS method

----------End of the Report----------

PRINCIPAL
The Oxford College of Engineering
Bommanahalli, Hosur Road
Bangalore-560 068

Analyzed by

Authorised Signatory

Note: 1. The results listed pertain only to the tested samples and applicable parameters. 2. Samples will be destroyed after 15 days from the date of issue of Test Certificate unless & otherwise specified. 3. This report is not be reproduced either wholly or in part and can not be used in the court of law and should not be used in any advertising media without prior written permission. 4. Sampling not done by us, unless

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Figure 4-47: STP treated water test report - 2021

STP log sheet:

The STP log sheet is maintained properly. For each shift of operation, relevant information/data is entered in the log sheet by the STP operator.

The sample image of STP log sheet for the year 2017 is shown in figure 4-48.

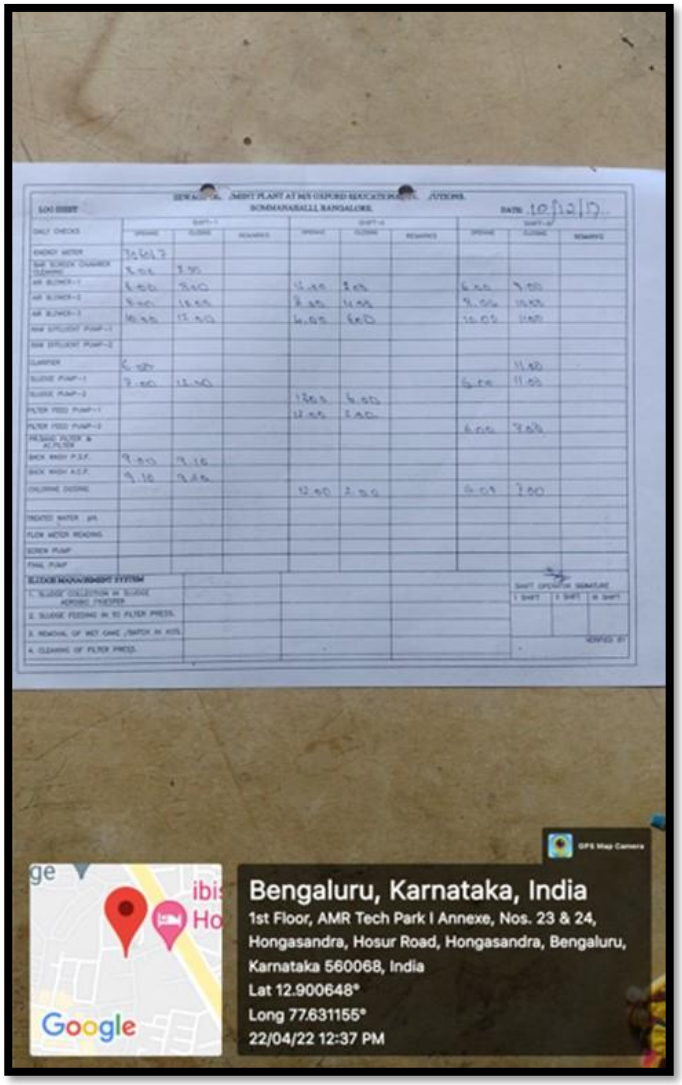

Figure 4-48: STP - Log sheet - 2017

The sample image of STP log sheet for the year 2018 is shown in figure 4-49.

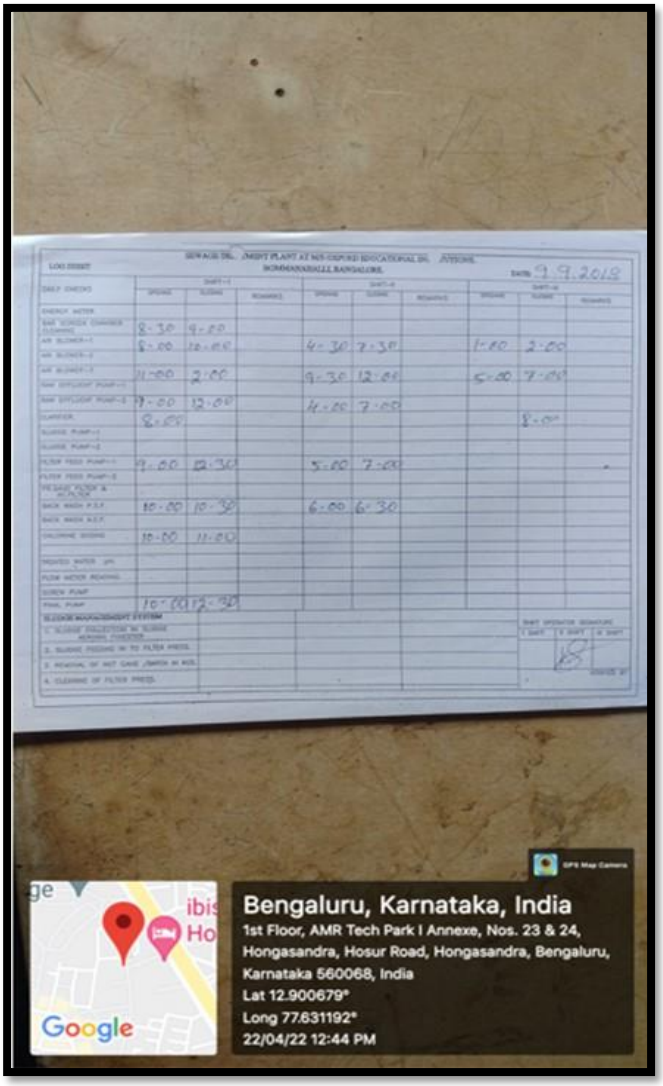

Figure 4-49: STP - Log sheet - 2018

The sample image of STP log sheet for the year 2019 is shown in figure 4-50.

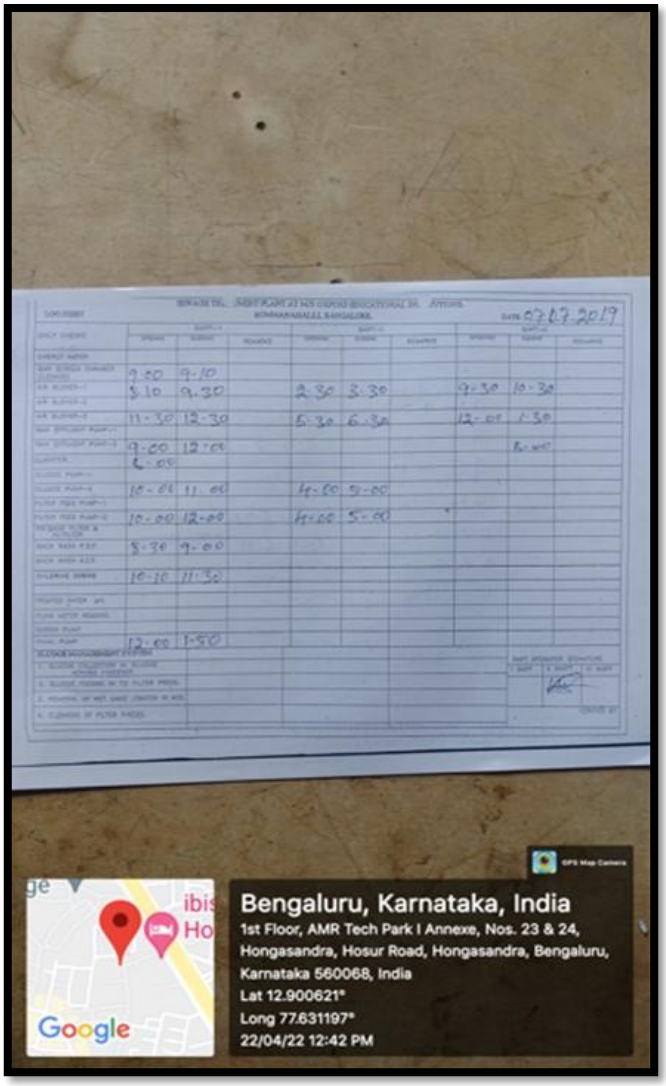

Figure 4-50: STP - Log sheet - 2019

The sample image of STP log sheet for the year 2020 is shown in figure 4-51.

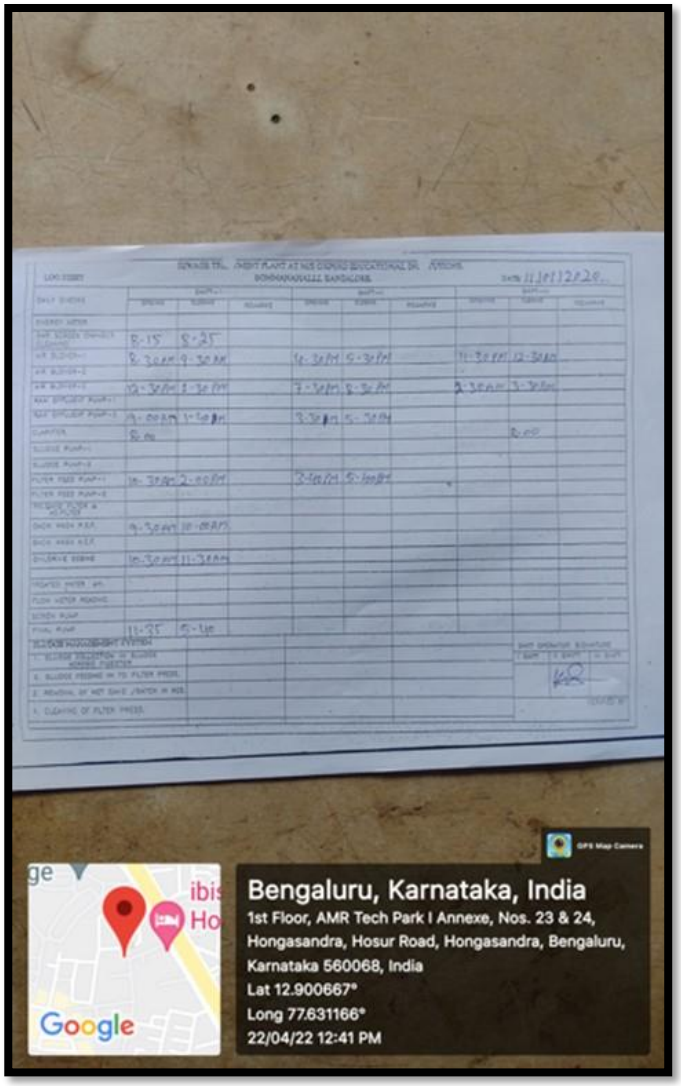

Figure 4-51: STP - Log sheet - 2020

The sample image of STP log sheet for the year 2021 is shown in figure 4-52.

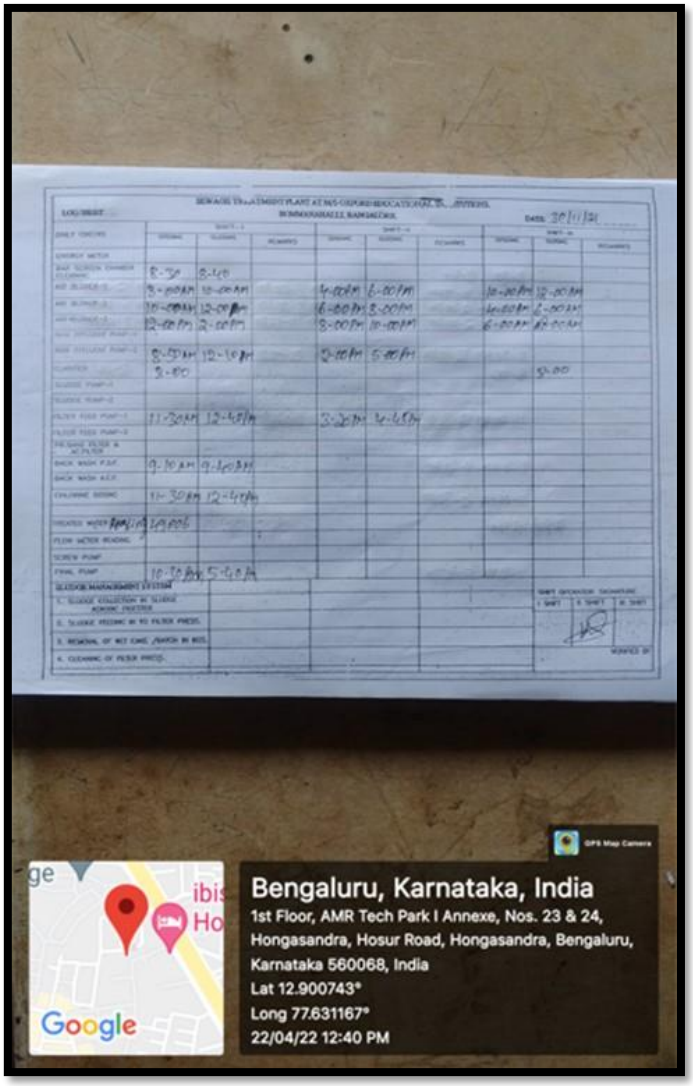

Figure 4-52: STP - Log sheet - 2021

STP maintenance activity:

The STP is maintained properly. If any problem occurs, then immediate attention is given and the problem is rectified.

The sample image of STP maintenance activity bill for the year 2017 is shown in figure 4-53.

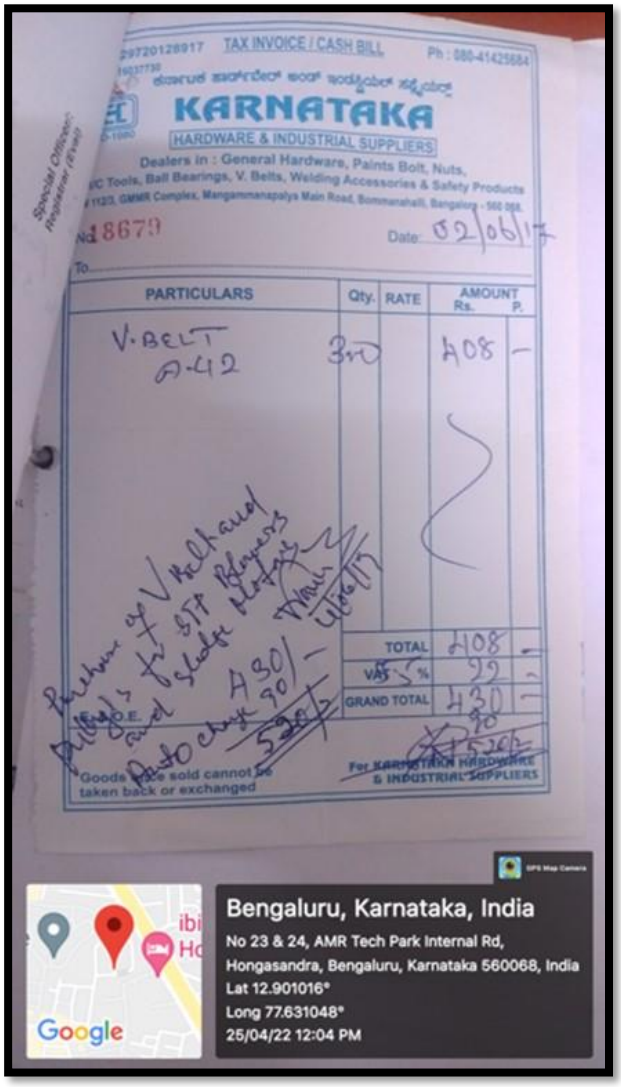

Figure 4-53: STP maintenance activity bill - 2017

The sample image of STP maintenance activity bill for the year 2019 is shown in figure 4-54.

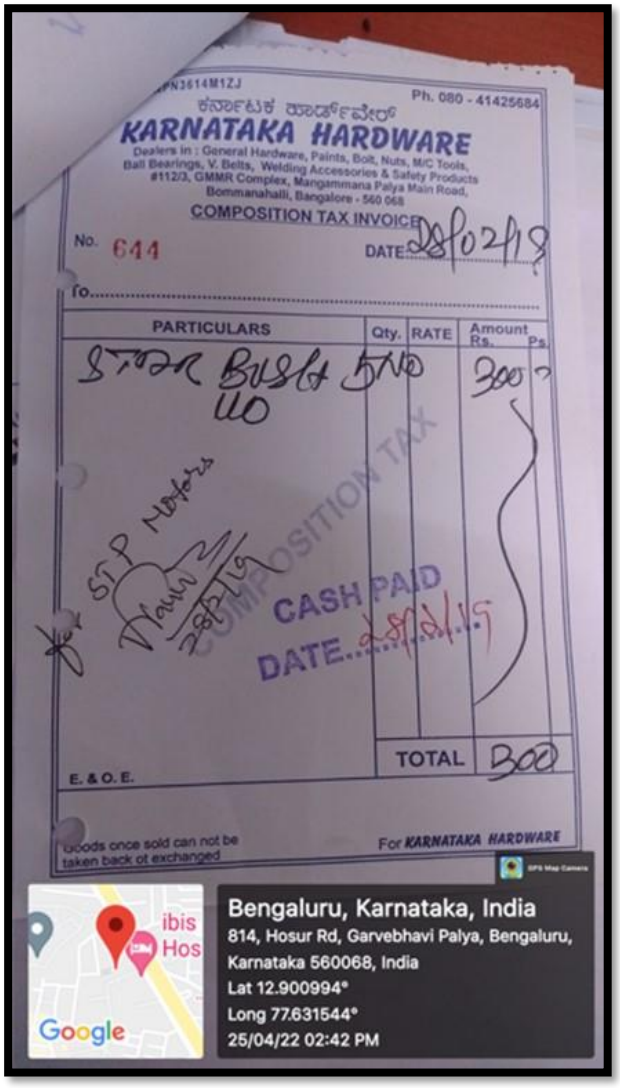

Figure 4-54: STP maintenance activity bill - 2019

The sample image of STP maintenance activity bill for the year 2020 is shown in figure 4-55.

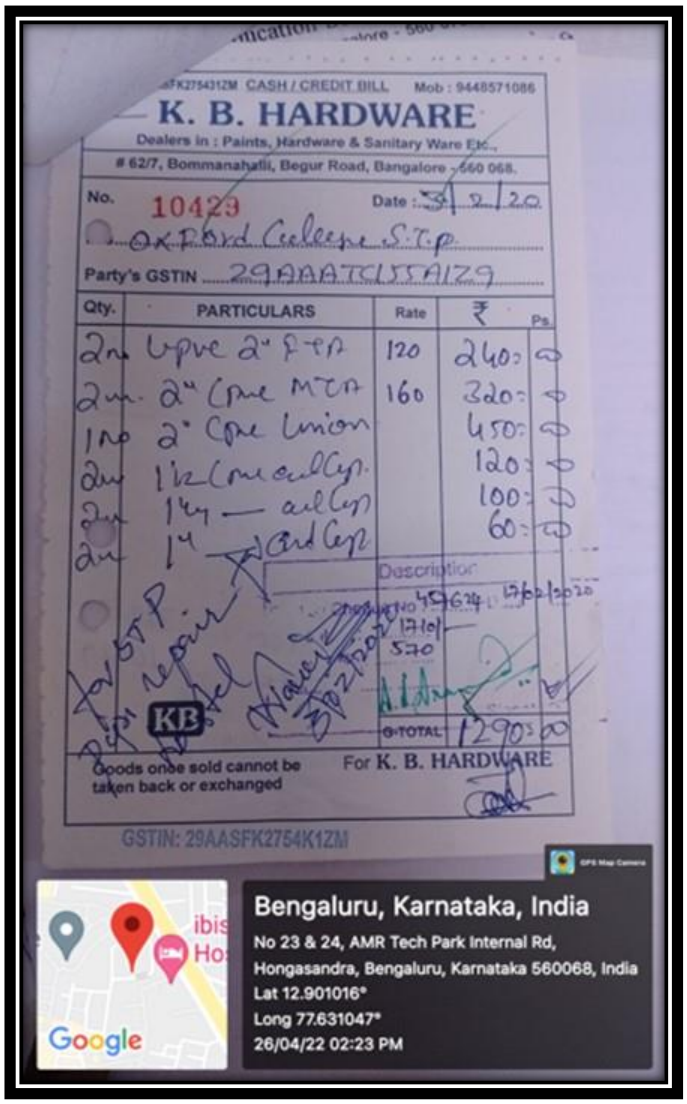

Figure 4-55: STP maintenance activity bill - 2020

The sample image of STP maintenance activity bill for the year 2021 is shown in figure 4-56.

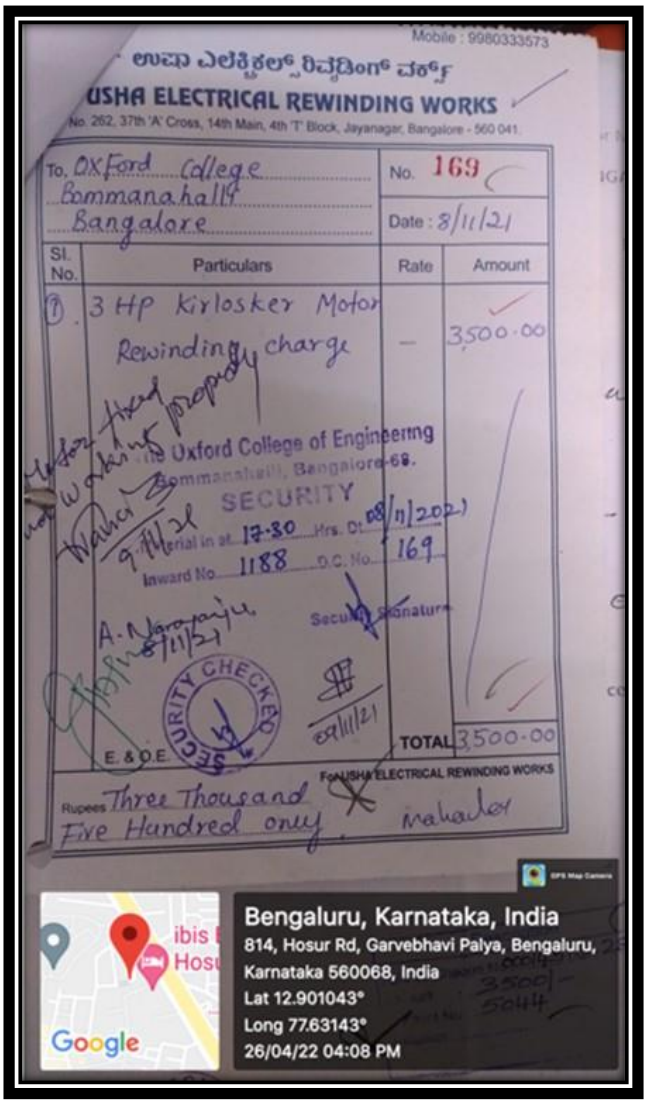

Figure 4-56: STP maintenance activity bill - 2021

4.2.4. Rain Water Harvesting

Rainwater harvesting is the simple process or technology used to conserve rainwater by collecting, conveying, purifying and storing of rainwater for later use.

The benefits of rainwater harvesting system are listed below.

- Helps in reducing the water bill.
- Decreases the demand for water.
- Reduces the need of bore well water
- Promotes both water and energy conservation
- Improves the quality and quantity of groundwater
- It is an excellent source of water for landscape irrigation

The college has a rain water harvesting system. It is located near STP area.

4.2.5. Regular maintenance of drinking water system

The drinking water system is well maintained and monitored regularly. If any fault occurs in RO plants, then immediate attention is given and it is rectified.

The image of sample bill for purchase of 2000 litres stainless steel tank to store RO processed water at engineering new block is shown in figure 4-57.

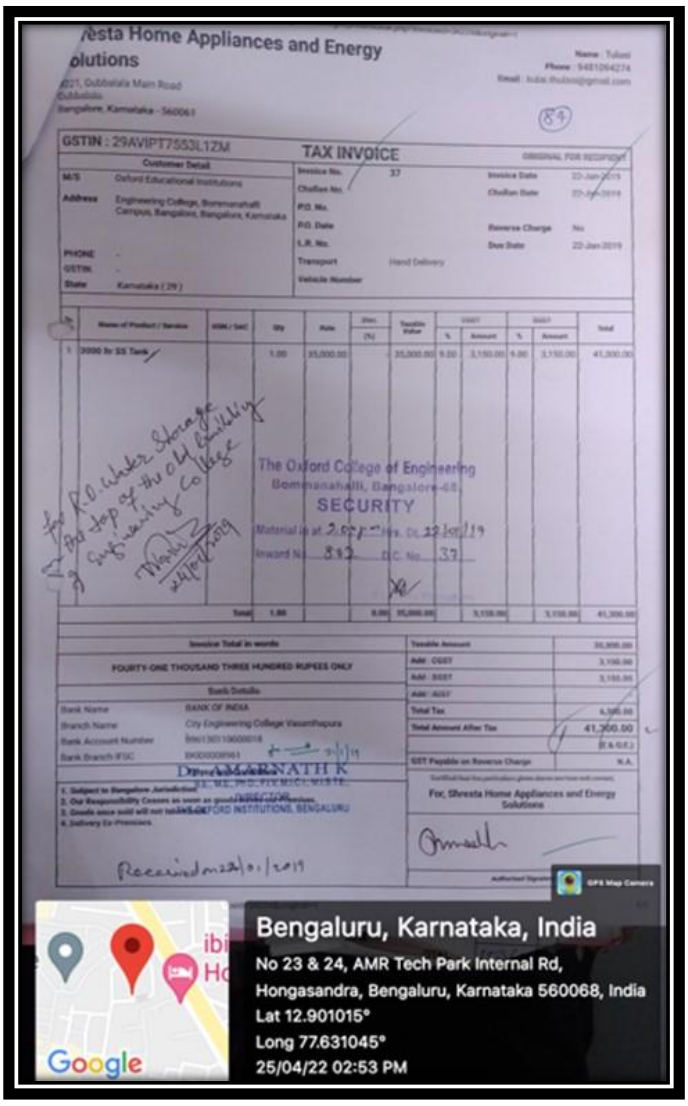

Figure 4-57: Sample bill - 2000 litres SS RO tank

The image of sample bill for RO plant maintenance activity at girl's hostel and engineering old block is shown in figure 4-58.

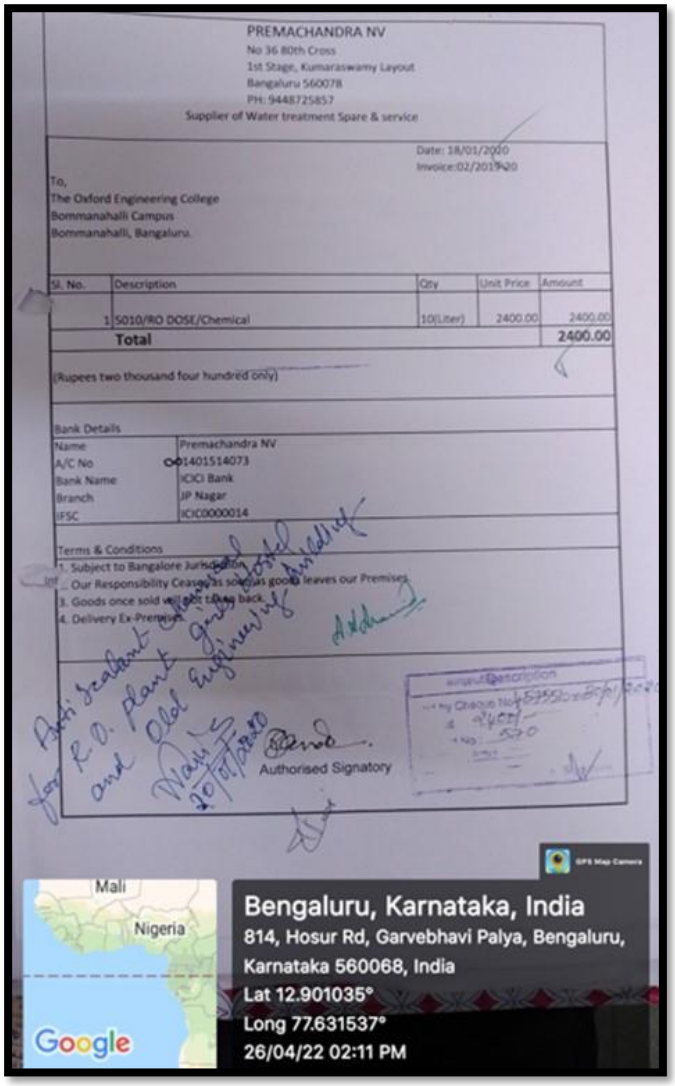

Figure 4-58: Sample bill - RO plant maintenance activity

The image of sample bill for RO plant maintenance activity after lockdown at girl's hostel and engineering old block is shown in figure 4-59.

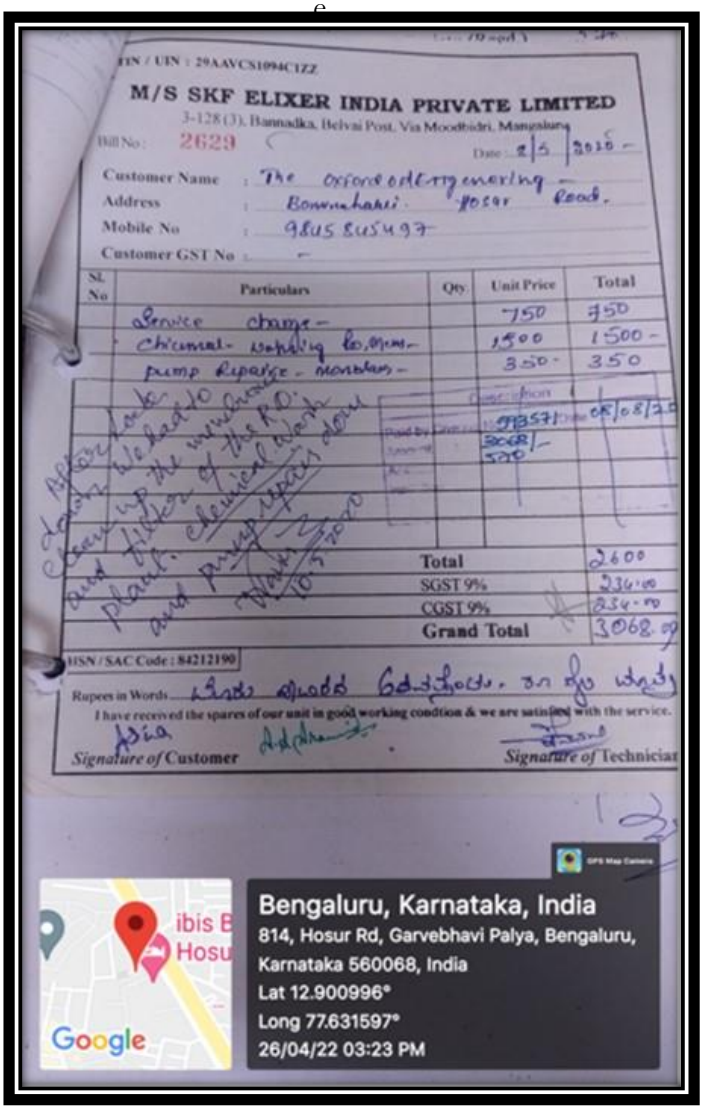

Figure 4-59: Sample bill - RO plant maintenance - After lockdown

4.2.6. Regular checking of water distribution system

The water distribution system is checked regularly. Every week the plumbing department personnel checks all plumbing fixtures for any leakage and damages.

If any leakage or damage is found, then immediate attention is given. The leakage arresting and damage rectification are done immediately.

4.2.7. Awareness signboards

In order to create awareness regarding water conservation, signboards indicating 'Do not waste water' 'Water is precious' are made available at appropriate locations.

Sign boards at dining hall and handwash area at girl's hostel are shown in figure 4-60 and figure 4-61.

Figure 4-60: Awareness signboards - At dining hall

Figure 4-61: Awareness signboards - At handwash area

4.2.8. Awareness programs

Lake Cleaning Activity - Special Camping Program - 2018:

During the NSS special camping program at Agara lake area. The lake cleaning activity was carried out. 50 Student volunteers with 2 faculty members were part of the program on **30th November, 2018**. The team went to Agara Lake by 10.00AM. The team involved in clearing cleaning the area which was overgrown with bushes and other sorts of wild plants. It took the whole day to clear the area of weeds and plastics which was strewn all over. The image of lake cleaning activity is shown in figure 4-62.

Figure 4-62: Lake Cleaning Activity - 2018

SWACHHATA PAKHWADA- 2019:

NSS unit of The Oxford College of Engineering, Bangalore organized 1-day 'Swachhata Pakhwada' with the theme of 'Jal Shakti Abhiyan' in the campus on **September 11th, 2019**.

As part of the 'Jal Shakti Abhiyan', the college has formed a team of volunteers from department of Civil Engineering to study and monitor the status of the following water conservation activities:

- Water conservation
- Renovation of traditional and other water bodies/tanks
- Ensuring all water cycling plant is functional.

Also, the team has organized awareness campaign on Water conservation, functioning of water cycling plant to first year engineering students in the campus. The sample image during the campaign is shown in figure 4-63.

Figure 4-63: Swachhata Pakhwada -2019

Awareness Campaign on Sewage Treatment Plant:

The workshop was on Sewage treatment plant by Mr. Somashekar R and Mr. Satish Kumar and has been conducted in the Department of civil engineering on 20th, August, 2019. Total of 5 Faculty members and 82 students from Civil Department took participation in this workshop. They have addressed students on different steps involved in wastewater treatment and recycling of wastewater. Mr. Somashekar R explained about advance treatment techniques in brief to the students.

At the end they have addressed the students regarding the importance of Recycling of water and reusing of treated wastewater in civil engineers' life.

The image taken during the campaign is shown in figure 4-64.

Figure 4-64: Awareness Campaign on Sewage Treatment Plant -2019

Save Water-Save Life Campaign

To create awareness among citizens of Bangalore regarding saving water, and utilizing waste water, Department of MBA in association with NSS unit of The Oxford college of Engineering has organized "**Save Water-Save Life Campaign**" on 17th July 2021 at Salarpuria Greenage Apartments, Bommanahalli.

The sample image of volunteers creating awareness during 'Save Water- Save Life' campaign is shown in figure 4-65.

Figure 4-65: Volunteers creating awareness about Save Water- Save Life -2021

4.2.9. Maintenance Team

The maintenance team performs regular monitoring of the water distribution system which involves general monitoring of the system, identifying and arresting of leakages, keep track of water requirement and ensuring availability of required water quantity, maintain and provide for the safe condition and operation of entire water distribution systems.

Proper operation and maintenance of sewage treatment plant ensures it will perform as designed to treat and safely dispose of sewage from the establishment and maximizes the efficiency of waste water treatment system.

During the audit, walk through survey was carried out to observe the maintenance of the water distribution system, log registers, preventive maintenance etc., The entire water distribution system is maintained clean and tidy. The water storing sumps, pumping sections, distribution lines, toilets, wash rooms and other water consumption points is found to be well maintained. The list of maintenance team members for plumbing department is given in table 4-3.

S. No.	Name	Designation
1	Mr. Kalingakumar Seth	STP Operator
2	Mr. Ashok babu T M	Plumber
3	Mr. Sahanuralamlaskar	Plumber

Table 4-3: Details of maintenance staffs-Plumbing department

4.3. Recommendations

4.3.1. Aerator for taps

The aerator is a small attachment that either fits onto the end of the tap or can be inserted inside of the existing spout. These water saving devices will control the amount of water that flows through the tap without affecting the water pressure as they mix the water with air which will save water and money.

The aerators will separate a single flow of water into many tiny streams which introduces the air in to the water flow. Also, as there is less space for the water to flow through, the water flow is reduced, resulting in water savings. As the water pressure is maintained, most people don't notice a difference in the amount of water coming out of an aerated faucet yet benefit from the water efficiency.

Tap aerators are of most use to those with older taps which run on average around 15 litres of water per minute. Adding an aerator to an older tap can reduce this to as little as 6 litres of water per minute.

The biggest water saving benefit is achieved in the bathroom / hand wash / kitchen sinks where you are often turning the taps on and off to wash your hands and for other uses.

The aerator tap is shown in figure 4-66.

Figure 4-66: Aerators for taps

Tap aerators can save as much as up to half your water usage through this way. When you are using aerated water, you are unlikely to notice the difference except for saving water resulting in lower bills.

4.3.2. Waterless Urinals

Traditional water-based urinals are one of the major waters consuming area in any facility. Apart from the normal water usage, the cost for handling raw water to the urinals is an added expenditure. Also, maintaining the water taps and flushes for urinals will add to maintenance cost as well.

To overcome these challenges and as part of water conservation measure, implementation of waterless urinals can be incorporated in the campus.

Waterless urinals may look similar to regular flush urinals, but they use no water and have no flush valves. The sample image of waterless urinals is shown in figure 4-67.

Figure 4-67: Waterless urinals

The advantages of water less urinals are as follows:

- Saves water
- Reduces water bill
- Reduces maintenance cost
- Reduces water handling cost (electricity cost for pumping raw water)
- Reduces usage of chemicals
- Improves overall bathroom hygiene

4.3.3. Water Flow Meters

For engineering campus, tankers are used as source of water. Water is pumped daily from the sump and distributed to overhead tanks available in each block for usage. The record for overall inwards quantity of tanker water is maintained.

However, data regarding the quantity of water used in each block per day is not accounted. With the presence of flow meters, it is possible to measure quantity of water used per day. Installing water flow meters at each block will quantify the water used in individual blocks.

Measurement is the first step towards conservation of water. Hence, water usage has to be measured by installing proper water flow meters at appropriate locations in each block.

5. ANNEXURES

5.1. Data Collection Questionnaire

A questionnaire is a checklist used as the primary tool for the collection of data / information in a systematic manner that enables to perform the audit.

5.1.1. General information of the college:

General information of the college needs to be collected to get an overview of the campus for the walk-through purpose. It includes a set of questionnaires as given below.

1. Previous NAAC Grading's:

Previous NAAC Grading's of the college was collected from table 5-1.

S. No.	Phase	Grade	CGPA/Percentage	Year of Acc.	Acc. Period
1	I				
2	II				
3	III				

Table 5-1: NAAC grading's Table

2. Internal Quality Audit Team: 2020 – 2021

Table 5-2 depicts the format for the collection of Internal Quality Audit team.

S. No.	Name	Designation	Role
1			
2			
3			

Table 5-2: Internal Quality Audit team

3. General Information of the college

General information of the college includes an address of college and head office, contact person details, year of establishment etc., as given in table 5-3.

S. No.	Description	Details	
1.	Name of the College and address:		
1.a	Head office address :		
2.	Telephone/Fax No		
3.	Co-ordinating officer:	Name:	
		Mob:	
		Email:	
4.	Year of Establishment:		
5.	Hostel (Available/Not Available)		
6.	No. of Working days/year		
7.	Brief description of Campus		

Table 5-3: General information of the college

4. College Infrastructure

Infrastructure details of the college were gathered from table 5-4.

S. No.	Description	Details
1	Block Name	Class rooms
		Labs
		Staff rooms
		Wash rooms
2		
3		

Table 5-4: Detail Infrastructure of the college

5. Details of Student clubs
6. Details of cells that support students
7. Tentative Schedule of a working day:

a. No. of working days per year:
b. List of holidays:

8. Total area of the campus

9. Details of List of Departments and Courses (Faculty wise)

The total number of department, laboratories, conference hall, Libraries, Auditorium, and Cafeteria are obtained from table 5-5.

S. No.	Description	Details
1	Department	
2	Laboratories	
3	Conference Hall	
4	Libraries	
5	Auditorium	
6	Cafeteria	

Table 5-5: Details of the departments

10. Number of staff

Teaching, non-teaching, supporting staff with a male and female breakup is obtained from table 5-6

S. No.	Teaching Staff	Non-teaching Staff	Support Staff (Security, House Keeping)

	Male	Female	Male	Female	Male	Female

Table 5-6: Details of the Staff

11. Number of Students

Number of students is collected from table 5-7.

S. No.	Boys	Girls
1		

Table 5-7: Details of the Students

12. Additional infrastructure details have been collected from table 5-8.

S. No.	Description	Details	
1.	Number of blocks available for boys hostel	Nos.	
2.	Number of rooms available for boys hostel	Nos.	
3.	Number of blocks available for girls hostel	Nos.	
4.	Number of rooms available for girls hostel	Nos.	
5.	Whether Laundry is available in the hostel	Yes / No	
6.	If Yes List the Electrical Equipment in Laundry Section of the hostel (like Washing machine, Dry Cleaning Machine, Iron)		
7.	Whether gym/ indoor sports hall is available in hostel	Yes / No	
8.	Whether Solar PV based Power Generation is available in campus (academic or hostel block)	Yes / No	
9.	Whether lifts available in academic block	Yes / No	
10.	Whether Kitchen is available in the academic block	Yes / No	
11.	Whether any food counter (outside caterers) available in academic block	Yes / No	

12.	Whether any commercial shops available in academic block	Yes / No	
13.	Any more information or additional details of academic block you would like to share – kindly elaborate here		

Table 5-8: Details of the departments

5.1.2. Water Audit details:

1. General information

General information required for water management analysis is collected from table 5-9.

S. No.	Description	Details
1	Source of water	
2	Types of water	
3	No of Wells	
4	No of motors used	
5	No of bore wells	
6	Rating of the motors in HP	
7	Depth of each bore-well	
8	Water level of bore well	
9	Number of water tanks (overhead & underground tanks)	
10	Capacity of overhead tank	
11	Capacity of underground tank	
12	Quantity of water pumped every day	
13	Any water wastage of water /why?	
14	Water usage for gardening	
15	Waste water sources	
16	Use of waste water	
17	Faith of waste water from labs	
18	Whether waste water from labs mixed with ground water?	
19	Any treatment method available for lab water?	
20	Whether any green chemistry method practiced in labs?	
21	Total number of water coolers	
22	Whether Rain water harvesting system available?	
23	Whether Sewage Treatment Plant (STP) is available?	
24	List of equipment installed in STP (If S.No.23 is Yes)	
25	Whether Solar Hot Water System is available in the campus	

S. No.	Description	Details
26	Number of units and amount of water harvested	
27	Any leaky taps in the campus	
28	Amount of water lost per day	
29	Any water management plan used?	
30	Any water-saving techniques followed?	
31	Are there any signs reminding peoples to turn off the water?	
32	No. of water flow meters available	
33	Method of water consumption monitoring	
34	Breakup of daily water consumption	
35	Attach Month wise water bill for last 2 years	
36	Please attach recent water quality test reports for Bore well water, Drinking Water and STP processed water.	
37	What are the sources of hot water	
38	What are the usage areas of hot water	

Table 5-9: Water management details

2. STP information

STP details are collected from table 5-10

S. No.	Description	Details
1.	Number of STP plants installed	
2.	Capacity of STP	
3.	Technology of STP	
4.	Year of Installation	
5.	Schematic / Layout of STP	
6.	Water flow meters installed	
7.	Quantity of Sludge	
8.	Disposal of Sludge	

Table 5-10: Details of STP

3. RO Plant information

RO Plant details are obtained from table 5-11.

S. No.	Location	Quantity	Capacity
1.			
2.			

3.			

Table 5-11: Details of RO Plant

5.1.3. Energy consumption details:

1. Energy consumption details:

The energy consumption details required for the audit is collected, the brief format of the same is given in table 5-12.

S. No.	Type	Units		Value	Cost in Rs.
1	Electricity	kWh	2019		
			2020		
2	LPG	Cylinders			
3	Diesel	Litres (Month wise consumption for the last two years)			
4	Others resources (Please specify)				
5	Total connected load	kW			
6	Contract demand	kVA			
7	Maximum demand recorded	kVA			
8	Average power factor				
9	Energy charges	Rs./kWh			
10	Demand charges	Rs./kVA			
	*** Attach Electricity Bill Copy of last 2 years**				

Table 5-12: Details of Energy consumption

2. Solar Energy details:

The solar energy details required are collected from table 5-13.

S. No.	Building No./ Name	Solar water Heater			Solar PV System		
		Capacity	Working / Not working	Year of Installation	Capacity	Working / Not working	Year of Installation

Table 5-13: Details of Solar Energy

3. Solar Street lights details:

a. Quantity -
b. Capacity -
c. Year of Installation –

4. Electrical Equipment details:

Electrical Equipment like transformers DGs UPS Capacitor Bank, AC, Computers, water coolers, fans, exhaust fans are obtained from the table 5-14.

S. No.	Description	Details	
1.	Number of Transformers Installed	Nos.	
2.	Number of Electrical Panels / Electrical Panel Rooms	Nos.	
3.	Whether Diesel Generator Set Backup Power is Available	Yes / No	
4..	How many number of DG Sets available in the campus (If S.No.3 is Yes)	Nos.	
5.	Whether UPS is available for labs, computers and/or any equipment	Yes / No	
6.	Number of UPS installed with location and capacity (If S.No.5 is Yes)	Nos.	
7.	Whether Capacitor Banks is installed in the electrical panel rooms	Yes / No	
8..	Whether Air Conditioning Units have been installed in the campus	Yes / No	
9.	Type of AC units (split, cassette or packaged) available, capacity and installed location (If S.No.8 is Yes)	Nos.	
10.	Total number of computers available in the campus	Nos.	
11.	Type of computer monitors available (CRT, LCD, LED)	Nos.	
12.	Whether water coolers are installed in the academic blocks	Yes/No	

S. No.	Description	Details	
13.	Type of lamps (Fluorescent Tube Light, CFL, LED, Incandescent, Sodium / Mercury lamps, etc.,) installed in the campus	Nos.	
14.	Type of fans (ceiling, wall mount, standing, exhaust, etc.,) installed in the campus	Nos.	
15.	Whether exhaust fans are installed in hostel / kitchen.(If Yes, share the quantity and installed location)	Yes /No	
16.	Any other electrical equipment's in college buildings.		

Table 5-14: Details of Electrical Equipment

5. List of energy saving initiatives implemented
6. List of energy saving initiatives in plan for future

5.1.4. Waste management details:

Waste management includes the activities and actions required to manage waste from its inception to its final disposal. The various data/ information required for the assessment of waste management is as collected from the following set of questionnaires.

1. Basic information

Basic information for waste management is collected from table 5-15.

S. No.	Description	Yes/ No
1	Whether wet and dry garbage segregation is done inside the campus?	
2	Whether garbage is given to external agencies / municipal agencies?	

Table 5-15: Basic details of waste management

2. Types of Waste generated

Types of waste generated in the college are obtained from table 5-16.

S. No.	Description	Yes / No	Remarks
1	E-Waste (Computers, electrical and electronic parts)		
2	Hazardous / Chemical Waste		
3	Solid Waste (Damaged furniture, paper waste, paper plates)		
4	Dry Leaves		
5	Food Waste		
6	Waste Water (Washing, urinals, bathrooms)		
7	Glass Waste (Broken glass wares from the labs)		
8	Unused Materials		
9	Plastic Waste (Pen, Refill, Plastic water bottles and other plastic containers, wrappers etc.)		

Table 5-16: Types of waste generated

3. Segregation of waste

Segregation of waste information at different locations with quantity is gathered from table 5-17.

S. No.	Location	Bio-degradable	Non-Biodegradable	E-waste	Quantity, kgs/month
1	Office				
2	Labs				
3	Cafeteria / Kitchen				
4	College				

Table 5-17: Segregation of waste

4. Waste generation management

Waste generation management of the college was collected from table 5-18

S. No.	Description	Yes / No	Remarks
1	Composting / Vermicomposting		
2	Recycling		
3	Reusing		
4	Other ways		

Table 5-18: Waste Disposal methods

5.1.5. Green campus management details:

1. Total number of plants and trees

The total number of plantations, garden area, and many more are collected as per the set of questionnaires given in table 5-19

S. No	Description	Details
1	Total number of plant species identified	
2	Total number of plants on the campus	
3	Total number of Trees on the campus	
4	Garden area inside the college –	
5	Total number of medicinal plants /trees on the campus	
6	Total number of vegetables and fruits plantation in the campus	
7	Whether display boards are given to plants and trees for identification	

8	Does Institute celebrate World environment day?	
9	Does Institute celebrate World water day?	
10	Does Institute celebrate World ozone day?	
11	Does Institute celebrate World Earth day?	
12	Total number of aquatic water plants	

Table 5-19: List of plantation details

2. List of plants/ trees

List of plants/ trees with their scientific names obtained from table 5-20.

S. No.	Common/Local Name	Scientific name	No. of Trees/Plants

Table 5-20: List of plants/trees in campus

5.1.6. Carbon footprint management details:

The carbon emission from various activities such as transport, diesel generator usage, LPG consumption, and electricity consumption were collected, as per table 5-21.

S. No	Description	Details
1	Whether college provides transport facility for staff and students (Yes/No)	
2	Number (or Percentage) of staff using transport services provided by college	
3	Number (or Percentage) of students using transport services provided by college	
4	Number (or Percentage) of Staff using public transport	
5	Number (or Percentage) of Staff using Bike	
6	Number (or Percentage) of Staff using Car	
7	Number (or Percentage) of students using Public transport	
8	Number (or Percentage) of students using Car	
9	Number (or Percentage) of students using Bike	
10	Number (or Percentage) of students using Bicycles	
11	Average consumption of diesel per month	
12	Average electricity consumption per month	
13	Average LPG consumption per month	

Table 5-21: Details of Carbon footprint management

5.1.7. Photos required for Audit:

1. General Photos

In various sections, different types of photos are required to validate the existence of things, and hence they are collected from table 5-22.

S. No	Description	Details
1	Photos of student's NSS activities	
2	Photos of Safety policy	
3	Photos of the training program on the use of fire extinguishers	
4	Photos of environmental policies adopted by college	
5	Photos of MoUs for Waste management	

6	Photos of any other policies adopted by college		
7	Photos of water test report	Drinking Water	
		STP processed water	
		Bore-well water	
		Other water Sources (Like Tanker water and any other)	
8	Photos of use of Energy efficient devices like fan, bulbs etc.		
9	Photos of LCD/LED monitors used in Labs		
10	Photos of dry and wet waste collection bins		
11	Photos of celebrating World Environment Day		
12	Photos of celebrating World Water Day		
13	Photos of celebrating World Earth Day		
14	Photos of celebrating World Ozone Day		

Table 5-22: List of photos