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Deemed to be University

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Since 1990

SDG 12

RESPONSIBLE CONSUMPTION AND PRODUCTION

Sustainable Development Goal 12 (SDG 12) focuses on ensuring sustainable consumption and production patterns. It aims to promote resource and energy efficiency, sustainable infrastructure, and provide access to a better quality of life for all.

Responsible consumption and production are essential for reducing future economic, environmental and social costs, strengthening economic competitiveness and reducing poverty. The world is currently consuming resources at an unsustainable rate, depleting natural resources faster than they can be replenished. Addressing this challenge is crucial to maintaining the balance of our ecosystems and ensuring a sustainable future.

The University supports in promoting resource efficiency and renewable eco-friendly technologies, reduce food waste, reduce the release of hazardous chemicals and wastes to minimize their adverse effects on human health and the environment and educating and raising awareness among people about sustainable practices is vital for successful implementation.

Santosh University thus promotes SDG 12 through education, research and community engagement by incorporating courses and modules on sustainable consumption and production into existing curricula raises awareness among students. Research Initiatives are taken for interdisciplinary research by promoting research projects that focus on sustainable practices in healthcare and other relevant fields. Engaging with local communities through awareness programs and initiatives focused on sustainable lifestyle practices are initiated through campaigns and projects within the university to promote recycling, energy conservation, and resource management.

Achieving SDG 12 requires concerted efforts from individuals and Santosh University has the potential to significantly contribute to this goal by fostering a culture of sustainability through education, research and community involvement preparing future leaders to drive the change towards responsible consumption and production. By taking steps today we ensure a prosperous and sustainable future for generations to come.

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SDG 12.1

RESEARCH ON RESPONSIBLE CONSUMPTION AND PRODUCTION

Scopus 20 | Empowering discovery since 2004

Santosh (Deemed to be) University

No.1, Santosh Nagar, Ghaziabad, UP, India 60172682

501
Documents

341
Authors

Set document alert Give feedback

Documents Structure Collaborators

New
Sustainable Development Goals 2023

New: See at one glance Sustainable Development Goals mapped to this organisation

Sustainable Development Goals (SDGs) are specific research areas that are helping to solve real-world problems. Elsevier data science teams have built extensive keyword queries, supplemented with machine learning, to map documents to SDGs with very high precision. Times Higher Education (THE) is using Elsevier SDG data mapping as part of its Impact Rankings. More about SDGs

Back

3 documents for ***Responsible consumption and production***

Review

Exploring Cutting-Edge Approaches in Anaerobic Digestion and Anaerobic Digestate Management

Mariappan, I., Prabhakaran, R., Vivekanand, V., ...Regurajan, R., Subramanian, V.

ChemBioEng Reviews, 2024

Article • *Open access*

How to Dispose Biomedical Waste In Orthodontic Practice: A Review

Saini, N., Rajiv Ahluwalia,, Sharma, K., Garg, H., Ankit,

Journal of Contemporary Orthodontics, 2020

Article • *Open access*

Effects of frequent glove change on outcomes of orthopaedic surgical procedures - A multicenter study on surgical gloves

Palo, N., Dash, S.K., Panigrahi, R., ...Sharma, S., Priyadarshi, A.

Journal of Clinical and Diagnostic Research, 2017

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SDG 12.2

OPERATIONAL MEASURES

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Policy For Disposal of E-Waste

Policy for Disposal of E-Waste

Santosh Deemed to be University, Ghaziabad, Delhi NCR

Definitions

"Electronic waste" is defined as discarded computers, office electronic equipment, entertainment device electronics, mobile phones, printers, UPS, television sets and refrigerators. This definition includes used electronics which are destined for reuse, resale, salvage, recycling, or disposal.

Composition of E-Waste

Electrical and Electronic equipment contains metallic and non-metallic elements, alloys and compounds such as Copper, Aluminium, Gold, Silver, Palladium, Platinum, Nickel, Tin, Lead, Iron, Sulphur, Phosphorous, Arsenic etc.

Sources of E-Waste in the University

IT and telecommunication equipment

- Centralized data processing
- Mainframes Minicomputers
- Personal computers
- Personal computers (CPU with input and output devices)
- Copying equipment
- Laptop (CPU and CPU with input and output devices)
- Notebook, Notepad, Printing including cartridge
- Electrical and electronic typewriters
- Pocket and desk calculators

And such other products and equipment for the collection, storage, processing, presentation or communication of information by electronic means

- Used terminals and systems
- Facsimile
- Telex/ telephones
- Pay telephones
- Cordless telephones
- Cellular telephones
- Answering systems

Consumer electrical and electronics

- Television sets (including LCD & LED)
- Refrigerator
- Washing Machine
- Air -conditioners
- Fans
- Tubes lights /CFL lights
- Radios
- Mobile Phone

Method of Disposal of E-Waste

The University on detailed discussion of the various aspects decided that the E-waste shall be disposed of through some external/ outsourced Agencies with proper recognition/ approval from Government for handling/ disposal of the E-waste materials of Educational/ Health Care Institutions. The University may sign a MoU for a period of at least 3 years with the third party i.e., external/outsourced agencies who will design appropriate methods in handling these E-waste materials available in the Institution.

Association Tenure/ Duration of the Contract

The Association tenure for External Agencies with the University shall be 3 years from the date of signing the contract/ Agreement/ the date external agency invited for the disposal of E-waste. The term period of company for Association shall be extended for one more term for 3 years with prior consent/ approval from both the parties with the same/ revised conditions as per the mutual understanding between the company and the University.

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enquiry@santosh.ac.in +91-7838554401 / 04 / 10 / 86 www.santosh.ac.in

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Biomedical Waste Management Policy

Waste management policy at SMCH has been implemented in accordance with the rules of DelhiState Pollution Control Board and Biomedical Waste Management and Handling (Secondamendment) Rules, 2000.

Environmental Protection Act, 1986

The Government of India (GOI) enacted the Environmental Protection Act, 1986, (EPA) under Article 253 of the Constitution. The purpose of this Act is to serve as an "umbrella" legislation designed to provide a framework for central government coordination for the activities of various established central and state authorities. As this is an "umbrella" and all-encompassing legislation, this is relevant to the health sector activities as well. There are rules / notifications that have been brought out under this Act, which are directly relevant to the health sector.

Bio-Medical Waste Management Rules, 2016

Under the Environmental Protection Act, the Bio- Medical Waste Management Rules were introduced. These Rules are directly relevant to the health sector. The salient features of these Rules are as follows:

- Bio-medical waste means waste that is generated during the diagnosis, treatment or immunization of human beings or animals or in research activities pertaining thereto or in the production or testing of biological.
- It is the duty of every occupier of an institution generating bio-medical waste which includes a hospital, nursing home, clinic, dispensary, veterinary institution, animal house, pathological laboratory, blood bank by whatever name called to take all steps to ensure that such waste is handled without any adverse effect to human health and the environment.
- Bio-Medical waste shall not be mixed with other wastes.
- Bio-Medical waste shall be segregated into containers/bags at the point of generation in accordance with Schedule II of these Rules prior to its storage, transportation, treatmentand disposal. The containers shall be labelled according to Schedule III of these Rules.
- Bio-Medical waste shall be treated and disposed of in accordance with Schedule I of these Rules, which gives the categories of waste and methods for treatment and disposal. The Rules also require compliance with the standards prescribed in Schedule V, which gives standards for different treatment technologies.

Objectives

1. To prevent infection by maintaining good hygiene and sanitation.
2. To protect the patient, patient attendants and all health care personnel from avoidableexposure to infection.
3. To prevent environmental pollution.
4. To manage waste in a clean, healthy, economical and safe manner.

5. To minimize waste
   i. Segregation
   ii. Transport to site of temporary storage
   iii. Final disposal

1. Segregation

Segregation is done at source. A color code is followed and appropriately coded waste bags are placed in bins in all patient care areas. Labelling of all the bags with predesigned labels with information including hospital name, patient care unit name and date is done before usage of bags.
A liaison nurse has been designated to carry our surprise rounds in every unit of hospital and check for proper segregation and educating new staff then and there. Regular employee education programs are held at SMCH for constant sensitization of healthcare workers.

2. Transportation

• Waste from various patient care areas is removed twice a day or more frequently if necessary. All bags are tied at the mouth to avoid spillage during transport. The bags are then transported in larger moving carts carried by the house keeping department. The bags are transported to the central waste receiving terminal.
• Avoid the transport of too many bags at one time and contact of the bag with the body ofpersonnel
• Mixing of segregated wastes should NEVER be done. It the duty of unit in charge to ensurethat the bag from their unit is properly transported without mixing.

Disposal of Contaminated Needles and Syringes

Contaminated needles are burnt in needle destroyer and the trays are emptied in sharps container when use of needle destroyer is possible. Contaminated needle are disposed of by placing them uncapped into a puncture resistant container. Containers are closed and are handed over to the medical waste disposal contractors.

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Waste Management Committee

Waste Management committee is responsible for making Hospital specific action plan forhospital waste management and its supervision, monitoring and implementation.

Terms of Reference

- To seek a commitment from Management to comply with all relevant Legislation (DelhiState Pollution Control Board and Biomedical Waste Management Handling Rules)
- To conduct a waste audit and prepare a comprehensive report of current waste generation,segregation, handling, storage and disposal practices and costs
- To provide appropriate Personal Protective equipment and offer staff vaccinations
- To develop spill management strategies for all waste categories
- To implement an ongoing waste management training program which caters for all staff
- To promote waste management principles throughout hospital (signs, posters, noticeboards, bulletins, etc)
- To improve waste segregation
- To liaise with the corporation authorities and private waste contractors with regard to thetransport and disposal of waste external to the hospital.
- To conduct a Waste Management Audit annually and review the Waste Management Plan
- To conduct on-going audits of waste.
- Microbiologist/Clinician – Consultant for Bio-waste management (CBM)
- Liason Nurse to report to CBM and Infection Control Nurse
- Housekeeping in-charge

The Committee is represented at the Hospital Risk Management and Safety Committee,where progress reports are made at each meeting. Minutes of the meeting are maintained.

Meetings

The Group will meet quarterly as a part of HICC meeting or more frequently ifnecessary Record keeping on biomedical waste

Annual report- Every occupier/operator shall submit an annual report to the prescribed authority in below mention form by 31st January every year. The prescribed authority will send this information in a compiled form to the central pollution control board by 31st Marchevery year.

PREPARED BY **APPROVED BY**

SCHEDULE I

Biomedical wastes categories and their segregation, collection, treatment, processingand disposal options

Category Type of Waste Type of Bag or Container to be used Treatment and Disposaloptions (1) (2) (3) (4)

Category	Type of Waste	Type of Bag or Container to be used	Treatment and Disposal options
(1)	(2)	(3)	(4)
Yellow	**(a) Human Anatomical Waste:** Human tissues, organs, body parts and fetus below the viability period (as per the Medical Termination of Pregnancy Act 1971, amended from time to time).	Yellow coloured non-chlorinated plastic bags	Incineration or Plasma Pyrolysis or deep burial*
	(b)Animal Anatomical Waste : Experimental animal carcasses, body parts, organs, tissues, including the waste generated from animals used in experiments or testing in veterinary hospitals or colleges or animal houses.		
	(c) Soiled Waste: Items contaminated with blood, body fluids like dressings, plaster casts, cotton swabs and		Incineration or Plasma Pyrolysis or deep burial* In absence of above facilities, autoclaving or micro-waving/

	bags containing residual or discarded blood and blood components.		hydroclaving followed by shredding or mutilation or combination of sterilization and shredding. Treated waste to be sent for energy recovery.
	(d) Expired or Discarded Medicines: Pharmaceutical waste like antibiotics, cytotoxic drugs including all items contaminated with cytotoxic drugs along with glass or plastic ampoules, vials etc.	Yellow coloured non-chlorinated plastic bags or containers	Expired `cytotoxic drugs and items contaminated with cytotoxic drugs to be returned back to the manufacturer or supplier for incineration at temperature >1200 ^{0}C or to common bio-medical waste treatment facility or hazardous waste treatment, storage and disposal facility for incineration at >1200^{0}C Or Encapsulation or Plasma Pyrolysis at >1200^{0}C. All other discarded medicines shall be either sent back to manufacturer or disposed by incineration.
	(e) Chemical Waste: Chemicals used in production of biological and used or discarded disinfectants.	Yellow coloured containers or non-chlorinated plastic bags	Disposed of by incineration or Plasma Pyrolysis or Encapsulation in hazardous waste treatment, storage and disposal facility.
	(f) Chemical Liquid Waste : Liquid waste generated due to use of chemicals in production of biological and used or discarded disinfectants, Silver X-ray film developing liquid, discarded Formalin, infected secretions, aspirated body fluids, liquid from laboratories and floor washings, cleaning, house-keeping and disinfecting activities etc.	Separate collection system leading to effluent treatment system	After resource recovery, the chemical liquid waste shall be pre-treated before mixing with other wastewater. The combined discharge shall conform to the discharge norms given in Schedule-III.
	(g) Discarded linen, mattresses, beddings contaminated with blood or body fluid.	Non-chlorinated yellow plastic bags or suitable packing material	Non- chlorinated chemical disinfection followed by incineration or Plazma Pyrolysis or for energy recovery. In absence of above facilities, shredding or mutilation or combination of sterilization and shredding. Treated waste to be sent for energy recovery or incineration or Plazma Pyrolysis.

	(h) Microbiology, Biotechnology and other clinical laboratory waste: Blood bags, Laboratory cultures, stocks or specimens of micro-organisms, live or attenuated vaccines, human and animal cell cultures used in research, industrial laboratories, production of biological, residual toxins, dishes and devices used for cultures.	Autoclave safe plastic bags or containers	Pre-treat to sterilize with non-chlorinated chemicals on-site as per National AIDS Control Organisation or World Health Organisation guidelines thereafter for Incineration.
Red	**Contaminated Waste (Recyclable)** (a) Wastes generated from disposable items such as tubing, bottles, intravenous tubes and sets, catheters, urine bags, syringes (without needles and *fixed needle syringes*) and vaccutainers with their needles cut) and gloves.	Red coloured non-chlorinated plastic bags or containers	Autoclaving or micro-waving/ hydroclaving followed by shredding or mutilation or combination of sterilization and shredding. Treated waste to be sent to registered or authorized recyclers or for energy recovery or plastics to diesel or fuel oil or for road making, whichever is possible. Plastic waste should not be sent to landfill sites.
White (Translucent)	**Waste sharps including Metals:** Needles, syringes with fixed needles, needles from needle tip cutter or burner, scalpels, blades, or any other contaminated sharp object that may cause puncture and cuts. This includes both used, discarded and contaminated metal sharps	Puncture proof, Leak proof, tamper proof containers	Autoclaving or Dry Heat Sterilization followed by shredding or mutilation or encapsulation in metal container or cement concrete; combination of shredding cum autoclaving; and sent for final disposal to iron foundries (having consent to operate from the State Pollution Control Boards or Pollution Control Committees) or sanitary landfill or designated concrete waste sharp pit.
Blue	**(a) Glassware:** Broken or discarded and contaminated glass including medicine vials and ampoules except those contaminated with cytotoxic wastes.	Cardboard boxes with blue colored marking	Disinfection (by soaking the washed glass waste after cleaning with detergent and Sodium Hypochlorite treatment) or through autoclaving or microwaving or hydroclaving and then sent for recycling.

	(b) Metallic Body Implants	Cardboard boxes with blue colored marking	

***Disposal by deep burial is permitted only in rural or remote areas where there is no access to common bio-medical waste treatment facility. This will be carried out with prior approval from the prescribed authority and as per the Standards specified in Schedule-III. The deep burial facility shall be located as per the provisions and guidelines issued by Central Pollution Control Board from time to time.**

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SCHEDULE IV
[See rule 8(3) and (5)]
Part A

LABEL FOR BIO-MEDICAL WASTE CONTAINERS or BAGS

HANDLE WITH CARE

CYTOTOXIC HAZARDSYMBOL

HANDLE WITH CARE

Part B

LABEL FOR TRANSPORTING BIO-MEDICAL WASTE BAGS OR CONTAINERS

Day .....Month .....
Year .....
Date of generation .....

Waste category Number .....
Waste quantity.....

Sender's Name and Address
Phone Number .....
Fax Number.....
Contact Person .....

Receiver's Name and Address:
Phone Number .....
Fax Number .....
Contact Person .....

In case of emergency please contact :
Name and Address :
Phone No.

Note :Label shall be non-washable and prominently visible.

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SDG 12.3

PROPORTION OF RECYCLED WASTE

Waste Water Recycling

Original-White, Duplicate-Yellow, Triplicate-Green

GST I : 09AAYFS1705N1ZF

TAX INVOICE

Ph.: 0120-2801364
0120-4120354
Mob. : 9810062429

Shiv Shankar Trading Co.

DISTRIBUTORS :

G. I. & M. S. Steel Tube & Fitting & General Order Suppliers etc.

OPP. HANUMAN MANDIR, RAMTE RAM ROAD, GHAZIABAD

Serial No. of Invoice: 517 Date : 28/7/2022

State : UTTAR PRADESH State Code - 09

Mode of Transport : By road

Veh. No. : UP 14 JT 3944

G.R. No. : ..... Date : .....

Name of TPT : .....

P.O. No. : ..... Date : .....

State Code : ..... Place of Supply : .....

Details of Receiver (Billed to)

Name : Santosh Medical College

Address : Pratap Vihar, Ghaziabad

State and State Code : UP-09

Mobile Number : .....

GSTIN/Unique ID : URP

Details of Consignee (Shipped to)

Name : .....

Address : .....

State and State Code : .....

Mobile Number : .....

GSTIN/Unique ID: .....

S.No.	HSN Code	Description of Goods	Size	Qty	Unit	Rate	Taxable Value Rs.	P.
	3917	HDPP pipe	250m	6	NOS	12300	73800	00
	3917	PVC pipe	200m	5	NOS	5032	25160	--
	3917	——"——	110m	3	NOS	1500	4500	--
	3917	——"——	160m	2	NOS	3012	6024	00
	3917	CPVC pipe	25mm	20	NOS	410	8200	--
	3506	— Solvent	1 Ltr	2	NOS	1040	2080	00
	3506	PVC —	1 Ltr	2	NOS	240	480	--
		WASTE WATER RECYCLING LINE						
			TOTAL				120244	00

Material Received

BANK DETAILS :
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A/c. No. : 0180002100066129 | IFSC Code : PUNB0018000

Freight Charges		—
Total		—
SGST @ 9 %		10822 00
CGST @ 9 %		10822 00
IGST @ ..... %		
INVOICE TOTAL		141888 00

Invoice Total (In Words) : Rs. 141888-00

Tax to be charged on reverse charge bases: (Yes/No) .....

TERMS OF SALE

1) Goods once sold will not be taken back or exchanged
2) Seller is not responsible for any loss or damaged of goods in transit.
3) Buyer undertakes to submit prescribted ST declaration to sender on demand.
4) Disputes if any will be subject to seller court jurisdiction.

For SHIV SHANKAR TRADING CO.

Raj

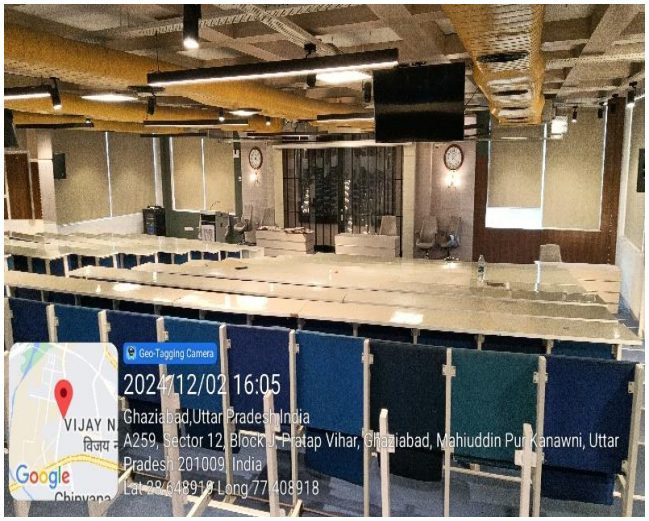
Authorised Signatory

Renewable energy facilities

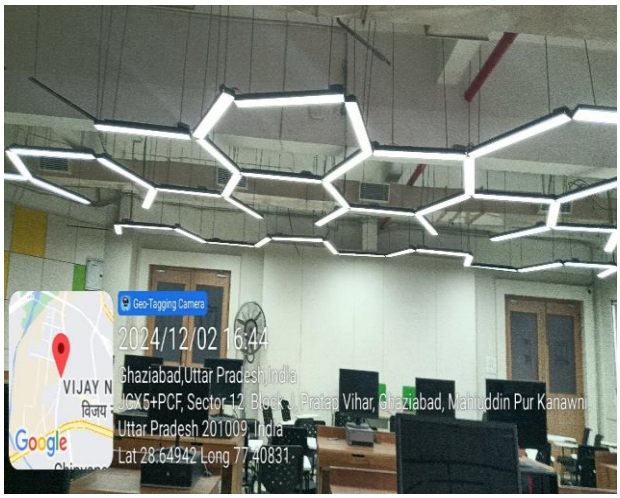
Santosh University conducts regular energy audits to assess the energy consumption of buildings and identify areas for improvement. These audits help pinpoint inefficiencies in insulation, heating, cooling, lighting, and appliances. The University implements several energy efficient technologies like upgrading ventilation and air conditioning systems to more energy-efficient models that optimize temperature control while minimizing energy waste, replaced traditional lighting with energy-efficient LED lights, which use significantly less energy and have a longer lifespan and Integrated smart energy management systems that use sensors, AI, or IoT technology to automatically adjust lighting, heating, and cooling based on occupancy and environmental conditions.

University has installed solar panels on buildings to generate renewable energy and reduce dependence on the grid. The University buildings are designed with energy-efficient standards and awarded as **Clean and Green Campus** and **Energy Efficient campus.**

SOLAR PANEL



SENSOR BASED LED LIGHT



LED BULBS

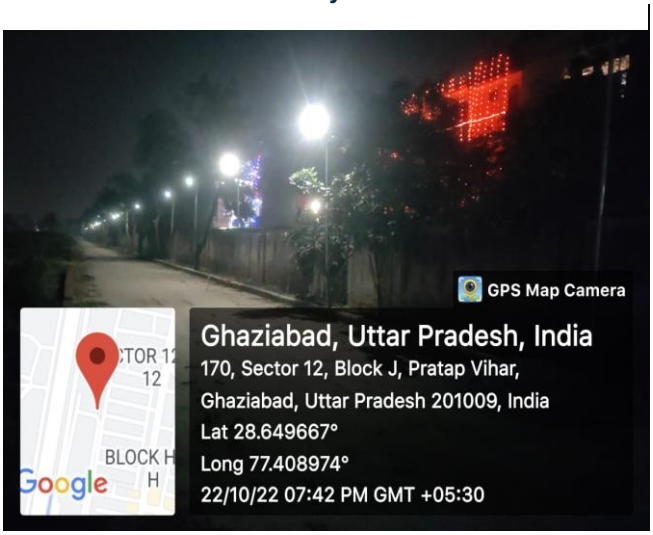
Power efficient items like AC

Santosh University follows several practices to reduce carbon reduction by limited entry of vehicles to campus, Battery Operated Vehicles etc. A biogas plant is installed for utilizing renewable energy which collects and process food wastes from mess and other areas and renew it as energy.

E-Vehicle

Battery Car

Biogas Plant

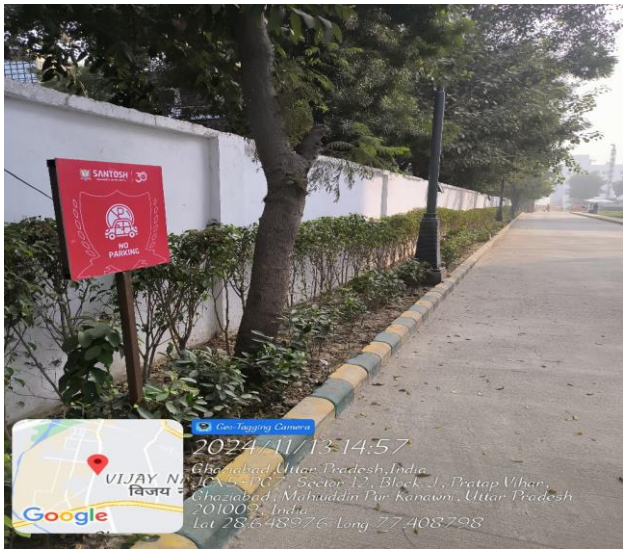


Solar Lights

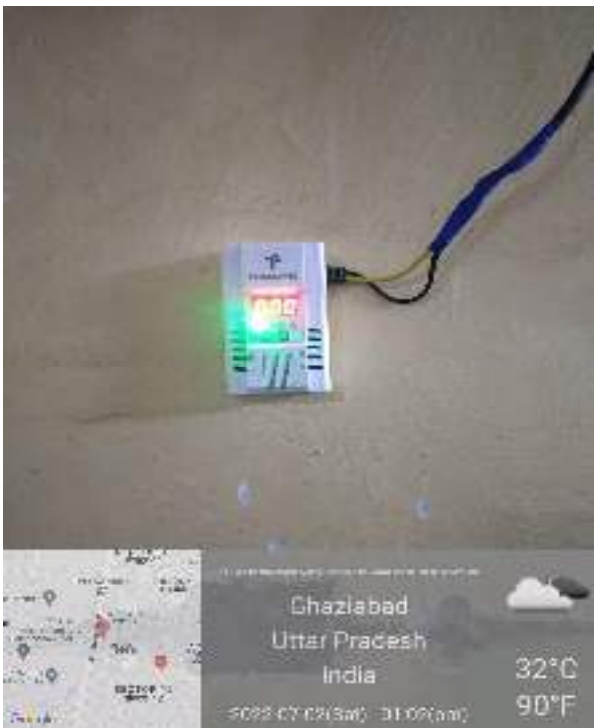
Plan to Reduce Energy Consumption

Santosh University is continuously taking variety of measures to maintain a clean and eco-friendly campus. It regularly monitors the campus facilities with a view of ensuring optimum utilization of energy consumption. Regular Green Audits were conducted with the help of external agencies to maintain the standards of University and to become energy efficient. The University has made a policy for restricted entry of vehicles into the campus to reduce energy usage and to reduce pollution. Battery operated vehicles are present in the campus for transportation of students and faculties inside the campus. Pedestrian pathways are made to ensure reduction of vehicle usage. University is declared as a No Plastic area. Solar Panels are used as an alternative energy source. Campus has its own waste management system to treat the garbage and waste water generated inside the campus.

The University also engages in Tree plantation drives so that the students of the university will be aware of the importance of greenery and also energy saving methods. The University conducts several outreach programmes and campaigns inside and outside the campus which promotes saving environment and energy savings.



ETP, STP AND SENSOR BASED EQUIPMENTS



Certificate of Registration

SANTOSH DEEMED TO UNIVERSITY

1, SANTOSH NAGAR, SECTOR 12, BLOCK-H, PRATAP VIHAR, GHAZIABAD, UTTAR PRADESH-201009, INDIA

has been assessed and Certified by Otabu Certification Pvt. Ltd.
as meeting the requirements of:

ISO 9001:2015

Quality Management System

For the following scope of activities:

PROVIDING TEACHING OF UNDERGRADUATE MBBS, BDS, PARAMEDIC COURSES BPT, BOT, BMLS, BMM AND B.SC. NURSING WITH POST GRADUATE COURSES MD, M.S., PHD., MDS

Issue No: 01
Date of Certification: 18 January 2023
1st Surveillance Due: 17 January 2024

Revision No( ) : NA
2nd Surveillance Due: 17 January 2025
Certificate Expiry: 17 January 2026
(subject to the company maintaining its system to the required standard)

Certificate Number: 0118Q158023

Validity of this certificate can be verified at www.otabucert.com

Dr. Anita Gupta
(Managing Director)

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Email:- info@otabucert.com website:-www.otabucert.com

Certificate of Registration

SANTOSH HOSPITAL

A unit of Santosh Medical College and Hospital Affiliated to Santosh Deemed to be University

NO. 1, AMBEDKAR ROAD, OPPOSITE OLD BUS STAND, GHAZIABAD, UTTAR PRADESH-201001, INDIA

has been assessed and Certified by Otabu Certification Pvt. Ltd.
as meeting the requirements of:

ISO 9001:2015
Quality Management System

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PROVIDING HEALTH CARE SERVICES FOR MEDICINE, GENERAL SURGERY, ORTHOPEDICS, ORAL AND MAXILLOFACIAL SURGERY, OBSTETRICS AND GYNAECOLOGY, PEDIATRICS, ENT, DERMATOLOGY, PSYCHIATRY, CARDIOLOGY, GASTROENTEROLOGY, OPHTHALMOLOGY AND EMERGENCY CARE SERVICES

Issue No: 01
Date of Certification: 18 January 2023
1st Surveillance Due: 17 January 2024

Revision No( ) : NA
2nd Surveillance Due: 17 January 2025
Certificate Expiry: 17 January 2026
(subject to the company maintaining its system to the required standard)

Certificate Number: 0118Q157923

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Dr. Anita Gupta
(Managing Director)

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Email:- info@otabucert.com website:-www.otabucert.com

Energy Audit Report

January 2023

Santosh Deemed to Be University

No.1, Santosh Nagar, Ghaziabad, NCR Delhi-201009

Audit Conducted By:

Professional Quality Management Services
SCO-21, 4th Floor, Feroze Gandhi Market Rd, Ludhiana,
Punjab 141001.

Table of Contents

1. Acknowledgement

We acknowledge the cooperation and support of the management and staff of Santosh Deemed to be University, in particular, the support and disposition of the Dr. Sanjeev Tomar (Faculty, Santosh Deemed to Be University), Mr. Kannan (Admin) & Mr. Arasumani Malaiappan (Assistant Maintenance Manager) Teaching/Supporting Staff of institute has been invaluable to the success of this report. We hereby assure you that, all information obtained in the course of this Audit exercise, as well as those contained in this report, will be remain confidential as per NDA (Non-Disclosure Agreement) clause.

2. Introduction

The National Assessment and Accreditation Council, New Delhi (NAAC) has made it mandatory from the academic year 2016–17 onwards that all Higher Educational Institutions should submit an annual Energy Audit Report. Moreover, it is part of Corporate Social Responsibility of the Higher Educational Institutions to ensure that they contribute towards the reduction of global warming through Carbon Footprint reduction measures. In view of the NAAC circular regarding energy auditing, the Institute Management decided to conduct an external Energy Evaluation by a competent Environment Auditor along with a Environment Audit Assessment Team headed by Dr. Sanjeev Tomar, Mr. Kannan and Mr. Arasumani Malaiappan.

3. Context

The National Assessment and Accreditation Council, New Delhi (NAAC) has made it mandatory from the academic year 2016–17 onwards that all Higher Educational Institutions should submit an annual Energy Audit Report. Moreover, it is part of Corporate Social Responsibility of the Higher Educational Institutions to ensure that they contribute towards the reduction of global warming through Carbon Footprint reduction measures.

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4. Energy Audit: Types and Methodology

Energy Audit is the key to a systematic approach for decision-making in the area of energy management. It attempts to balance the total energy inputs with its use, and serves to identify all the energy streams in a facility. It quantifies energy usage

according to its discrete functions. Industrial energy audit is an effective tool in defining and pursuing comprehensive energy management program.

As per the Energy Conservation Act, 2001, Energy Audit is defined as "the verification, monitoring and analysis of use of energy including submission of technical report containing recommendations for improving energy efficiency with cost benefit analysis and an action plan to reduce energy consumption.

5. Objective & Scope

The broad aims/benefits of the eco-auditing system would be

- Assessing present pattern of energy consumption in different cost centers of operations.
- Relating energy inputs and production output.
- Identifying potential areas of thermal and electrical energy economy.
- Highlighting wastage in major areas.
- Fixing of energy saving potential targets for individual cost centers.
- Implementation of measures of energy conservation and realization of savings.

6. Overview of Organization

In 1995, the Santosh Medical/Dental Colleges and Hospitals came up as one of the top institutions in India to study medicine and dentistry in Ghaziabad. The university has been offering an MBBS course since 1995 with a total intake of around 50 students per year. 2005 onwards, the course was recognized by the Ministry of Health and Family Welfare of the Government of India and the capacity of accepting a particular number of admissions was increased to 100. 20 years after its inception, the institute is considered as the best medical university, India. In the same manner, Santosh Dental College started in 1995 with an aim of imparting a higher-level education in dentistry. The institution offers a foundation course in

BDS since 1995 by accepting about 40 students annually. But the number of admissions went up higher to 100 per year after 2005. It is now one of the best universities for higher education. The degree offers to develop an understanding of the physical and biological process of oral healthcare. The college runs an MBBS course and undergraduate level and there are post graduate medical courses like MD, MS and M.Sc. and doctoral (PhD) courses. These courses are well-recognized by the Medical Council of India to offer degrees in 17 disciplines. In 2007, the Deemed University Status was conferred on the medical and dental college by the Ministry of HRD of the Government of India on the recommendation of University Grants Commission. Santosh Medical College and Hospital is among the best educational institutions and aims to achieve excellence in medicine practice with prime focus on serving the humanity. Established in 1995, Santosh Medical & Dental College and Hospital provides top class education in the field of medicine and dentistry. The educational institution rose to prominence stand amongst the best medical institute in India.

Following facility available at Santosh Deemed to be University as detailed:

6.1 Administrative Block

The administrative block of Santosh Deemed to be University is located on the 4th floor and houses the offices of the Chancellor, the Vice-Chancellor, the Dean (Medical), Dean (Academics), the Registrar, the Controller of Examination, Finance Controller, Quality Assurance & enhancement cell.

6.2 Central Library

The central library is located on the first and the second floor of the University and is spread over an area of 4000 sq. m. The library is open between 8 a.m. to 9 p.m. It has a huge collection of books, journals, and reference materials. It also offers facilities for photocopying and internet connectivity. There is also a separate room

for self-reading used by the students, the interns, and the residents of the University.

6.3 Lecture Theaters

Santosh Deemed to be University houses an adequate number of lecture theatres, which are comfortably spaced and equipped with student-lockers, audio-visual (AV) aids, projection microscopes, computers, and internet facilities, required for seamless learning. Most of the lecture theatres are supported by demonstration rooms, seminar rooms, and departmental library.

6.4 Laboratory

All laboratories in the Santosh Deemed to be University are equipped with microscopes, artificial lights, electrical points, washing facilities and preparation rooms. The University also have laboratories that are dedicated to some of the departments, such as Anatomy, Physiology, Biochemistry, Pharmacology, Pathology, Microbiology and Forensic Medicine. Apart from the general laboratory facilities, they are also furnished with some special equipment, such as MRI and CT machine, wherever required. The laboratories also have museums with specimens and models related to the different departments along with catalogues for easy referencing.

6.5 Auditorium

Santosh Deemed to be University houses one excellent auditoriums – Maharaja Hall, with a sitting capacity of more than 300 people each. The auditorium hosts various socio-cultural and academic events throughout the year.

6.6 Pharmaco Vigilance Center

The Government of India has identified Santosh Deemed to be University as the regional center for Pharmaco Vigilance Programs, located in the Pharmacology Department at Santosh Medical College.

6.7 Hostel

Santosh Deemed to be University provides separate hostel accommodations for boys and girls, assuring a high level of security for its residents. Hostel rooms are clean, spacious, and comfortable. The residents are provided with basic amenities such as internet connectivity, recreation rooms, common rooms, and an in-house mess. Students availing hostel facilities are free to interact with the in-house faculty members to create a congenial atmosphere. There is a common dining room with separate areas embarked for boys, girls, staff, and other residents.

6.8 Residential Quarters

There are 179 residential quarters allotted to the teaching and non-teaching staff of Santosh Deemed to be University, 58 quarters are allocated to the teaching faculty and 121 quarters are allocated to the non-teaching staff.

6.9 Canteen

There are two canteens providing food to the students, hospital staffs and visitors. There is also a separate canteen cum mess, which provides meals to the students availing the hostel facilities.

6.10 Medical Facilities

In-house medical facilities are available for the students, faculty, staffs and other members of Santosh Deemed to be University.

6.11 Sports & Recreation

The University conduct several numbers of recreational and sporting activities to keep the students healthy and fit throughout the years. Sports and recreational services include playground for outdoor games, facilities and amenities for indoor games and a gymnasium.

7. Scope of Improvement

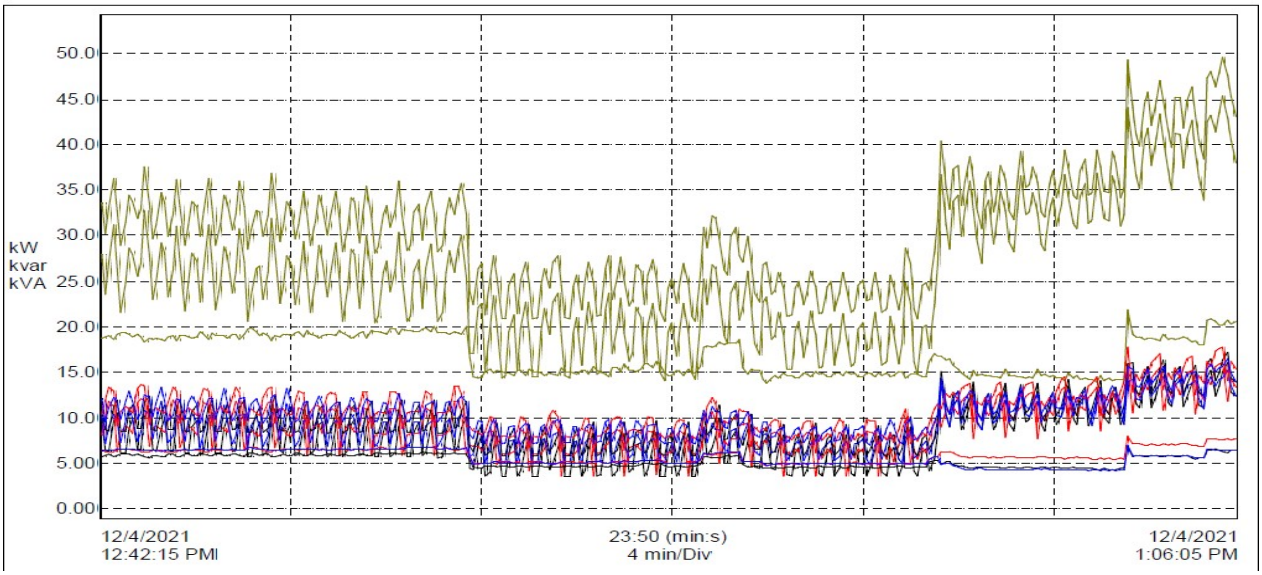
- Energy Policy to be adopted by the College Campus.
- Stack height of DG set should be as per DG Rules

- Display of Energy Saving Awareness posters should be there in the prominent areas of campus.

8. Instruments Used in Energy Audit

Master List Of EA Instruments					
Sr. no.	Instruments	Model	Instrument Number	OEM	Image of Instruments
1	Power Analyzer	ALM 30 ALM 35	00302929	KRYKARD INDIA	
2	Flow Meter	PT878	PT 7 6186 E	GE USA	
3	Thermal Imager	881 – 2	02214667	TESTO GERMANY	
4	Infrared Thermometer	62 Mini	14841880	FLUKE USA	
5	Digital Thermo Hygrometer	288 ATH	2027386	HTC CHINA	
6	Digital Anemometer	AM 4201	AE.09961	LUTRON CHINA	
7	Digital Lux Meter	LX 101	AE.09143	LUTRON CHINA	
8	Digital Multimeter	801 AUTO	201061078	MECO INDIA	
9	Digital Clampmeter	DT 3150	YC-209634	MECO INDIA	
10	Digital TDS Meter	CD 610	S358236	HANNA ITALY	

Name	Date	Time	AVG	MIN	MAX	Units	Duration	Units
N1 (var)	12/4/2021	12:42:15 PM	5.182	4.232	6.764	kvar	23:55	(min:s)
N2 (var)	12/4/2021	12:42:15 PM	5.846	4.683	7.993	kvar	23:55	(min:s)
N3 (var)	12/4/2021	12:42:15 PM	5.517	4.138	6.982	kvar	23:55	(min:s)
NT (var)	12/4/2021	12:42:15 PM	16.79	13.81	21.79	kvar	23:55	(min:s)
P1 (W)	12/4/2021	12:42:15 PM	7.922	3.495	15.98	kW	23:55	(min:s)
P2 (W)	12/4/2021	12:42:15 PM	8.925	3.580	16.09	kW	23:55	(min:s)
P3 (W)	12/4/2021	12:42:15 PM	8.823	4.803	15.18	kW	23:55	(min:s)
PT (W)	12/4/2021	12:42:15 PM	25.67	14.05	45.40	kW	23:55	(min:s)



9. Sound Decibel Monitoring

9.1 Dental College

S No.	Location	Sound Level (db)
1.	Basement Library	**50**
2.	Basement Library UG Section	**48**
3.	Basement Library PG Section	**51**
4.	Digital Library	**49**
5.	LAB Oral Pathology	**51**
6.	Basement IHC	**58**
7.	Basement Seminar Room	**65**
8.	Basement Department Library	**56**
9.	Ground Floor Billing Area	**64**

10.	Ground Floor X-Ray Room	**48**
11.	Ground Floor Department of OMDR	**49**
12.	Ground Floor Post Graduate Clinic	**59**
13.	Ground Floor Post Graduate Seminar Room	**66**
14.	Ground Floor Facility Room	**61**
15.	Ground Floor Dean Office	**68**
16.	Ground Floor Pantry	**67**
17.	Ground Floor HR Room	**54**
18.	1st Floor Lecture Theatre-3	**50**
19.	1st Floor OPG Room	**57**
20.	1st Floor Clinical PG Section Room	**68**
21.	1st Floor Paediatric Dentistry Room	**62**
22.	1st Floor HOD Room (Paediatric& Preventive	**60**
23.	1st Floor Oral Pathology	**56**
24.	2nd Floor HOD Room (Conservative Dentistry)	**58**
25.	Department of Oral Pathology	**60**
26.	Conservative & Operative Dentistry	**53**
27.	3rd Floor HOD Room (Department of Prosthodontics)	**54**
28.	Seminar Room	**61**
29.	Library	**48**
30.	UG Clinic (Prosthodontics)	**51**
31.	Casting Laboratory	**54**
32.	Post Graduate Clinic	**56**
33.	PG Lab	**51**
34.	Plaster Laboratory	**54**
35.	Mechanical Lab	**59**
36.	Ceramic Lab	**50**
37.	**Implant Prosthodontic Clinic Facility Room**	**53**

9.2Santosh Hospital

Sr. No	Location	Area	Sound Level (db)
1	Ground Floor	Casualty	50
2		Triage	48
3		Reception	51
4		Waiting Lounge	49
5		X-ray room	51
6		CT scan	58
7		Ultrasound	65
8	1st Floor	General medicine OPD	56
9		General surgery OPD	64
10		Pediatric OPD	48
11		Gynecology OPD	49
12		Orthopedic OPD	59
13	2nd Floor	Dental OPD	66
14		ENT OPD	61
15		Pathology Lab	68
16		Microbiology Lab	67
17		Blood Bank	54
18		Ophthalmology OPD	50
19		Psychiatry OPD	57
20	5th Floor	General Ward	68
21		Gynecology OT	62
22		Labor Room	60
23	6th Floor	Private Ward	56
24	7th Floor	Accommodation	58
25	8th Floor	ICU	60
26		**Operation Theatre**	53

9.3 Medical College

Sr. No	Location	Area	Sound Level (db)
1	Basement	Kitchen	50
2		Students Mess	48
3		Examination Hall	51
4	Ground Floor	Boys Common Room	49
5		Girls Common Room	51
6		Anatomy Museum	58
7		Histology lab	65
8		Anatomy Dissection hall-1	56
9		Anatomy Dissection hall-2	64
10		Tutor Room	48
11		Anatomy Assistant Professor Room	49
12		HOD Room Anatomy	59
13		Demonstration room	66
14		LT-1	61
15		LT-2	68
16		LT-3	67
17	First Floor	Santosh Central Library	54
18		Research Lab	50
19		Departmental Library cum Journal Room	57
20		Biochemistry Lab	68
21		Demonstration room	62
22		Professor and HOD Room (Biochemistry)	60

23		Department of Physiology	**56**
24		Department Library cum Seminar Room	**58**
25		Mammalian Lab	**60**
26		Hematology Lab	**53**
27		Demonstration room	**50**
28		Clinical Physiology	**48**
29	2nd Floor	Associate professor and HOD room (pathology)	**51**
30		Tutor room	**49**
31		Associate professor (3 room)	**51**
32		Clinical pathology lab	**58**
33		Research lab	**65**
34		Department library cum seminar room	**56**
35		Demonstration room (forensic medicine)	**64**
36		Museum (forensic medicine)	**48**
37	3rd Floor	Clinical pharmacology lab	**49**
38		Computer assisted lab	**59**
39		Non-teaching staff room	**66**
40		Research lab	**61**
41		Departmental library cum seminar room	**68**
42		Tutor room	**67**
43		Associate professor Room	50
44		HOD room	48
45		Tutor room (microbiology)	51
46		HOD room	49
47		Assistant professor room	51

48		Microbiology lab	58
49		Professor room	65
50		Empty room (3)	56
51		Demonstration room	64
52		Research lab	48
53		Museum	49
54		Library room	59
55		Seminar room	66
56		Staff room	61
57	4th Floor	Administrative offices	68
58		Account department	67
59		Central Research Facility	54
60		IQAC	50

10. Illumination System

10.1 Luminary Details

The building maintenance cell had already changed all the old high energy consuming light with the energy efficient LED lights. We have measured lux area wise for the sample basis.

10.2 Area wise lux level

Dental College

S No.	Location	Lux Level	
		Max.	Min.
1.	Basement Library	126	**138**
2.	Basement Library UG Section	131	**140**
3.	Basement Library PG Section	160	**171**

4.	Digital Library	152	**170**
5.	LAB Oral Pathology	158	**174**
6.	Basement IHC	161	**170**
7.	Basement Seminar Room	164	**174**
8.	Basement Department Library	144	**150**
9.	Ground Floor Billing Area	141	**144**
10.	Ground Floor X-Ray Room	145	**154**
11.	Ground Floor Department of OMDR	151	**160**
12.	Ground Floor Post Graduate Clinic	170	**181**
13.	Ground Floor Post Graduate Seminar Room	127	**138**
14.	Ground Floor Facility Room	122	**130**
15.	Ground Floor Dean Office	134	**143**
16.	Ground Floor Pantry	160	**167**
17.	Ground Floor HR Room	159	**172**
18.	1st Floor Lecture Theatre-3	160	**170**
19.	1st Floor OPG Room	164	**170**
20.	1st Floor Clinical PG Section Room	170	**180**
21.	1st Floor Pediatric Dentistry Room	164	**172**
22.	1st Floor HOD Room (Pediatric Dentistry)	150	**162**
23.	1st Floor Oral Pathology	171	**183**
24.	2nd Floor HOD Room (Conservative Dentistry)	166	**171**
25.	Department of Oral Pathology	155	**160**
26.	Conservative & Operative Dentistry	143	**168**
27.	3rd Floor HOD Room (Department of Prosthodontics)	150	**165**
28.	Seminar Room	149	**160**
29.	Library	146	**158**
30.	UG Clinic (Prosthodontics)	120	**125**
31.	Casting Laboratory	152	**160**
32.	Post Graduate Clinic	128	**144**
33.	PG Lab	121	**129**
34.	Plaster Laboratory	161	**174**

35.	Mechanical Lab	170	180
36.	Ceramic Lab	164	174
37.	Implant Prosthodontics Clinic Facility Room	150	163

Santosh Hospital

S No	Location	Area	Lux	
			Min.	Max.
1	Ground Floor	Casualty	124	**142**
2		Triage	123	**138**
3		Reception	135	**147**
4		Waiting Lounge	139	**145**
5		X-ray room	121	**140**
6		CT scan	127	**138**
7		Ultrasound	124	**136**
8	1st Floor	General medicine OPD	139	**145**
9		General surgery OPD	142	**150**
10		Pediatric OPD	145	**154**
11		Gynecology OPD	142	**153**
12		Orthopedic OPD	148	**160**
13	2nd Floor	Dental OPD	147	**162**
14		ENT OPD	142	**168**
15		Pathology Lab	142	**152**
16		Microbiology Lab	137	**151**
17		Blood Bank	134	**159**
18		Ophthalmology OPD	139	**150**
19		Psychiatry OPD	140	**157**
20	5th Floor	General Ward	137	**154**
21		Gynecology OT	134	**157**
22		Labor Room	142	**167**
23	6th Floor	Private Ward	143	**168**

24	7th Floor	Accommodation	138	**150**
25	8th Floor	ICU	129	**151**
26		**Operation Theatre**	**130**	**155**

Medical College

SNo	Location	Area	Lux	
			Min.	Max.
1	Basement	Kitchen	128	**140**
2		Students Mess	130	**145**
3		Examination Hall	131	**147**
4	Ground Floor	Boys Common Room	138	**148**
5		Girls Common Room	135	**147**
6		Anatomy Museum	129	**138**
7		Histology lab	125	**140**
8		Anatomy Dissection hall-1	147	**164**
9		Anatomy Dissection hall-2	146	**167**
10		Tutor Room	137	**150**
11		Anatomy Assistant Professor Room	144	**158**
12		HOD Room Anatomy	146	**164**
13		Demonstration room	144	**163**
14		LT-1	153	**169**
15		LT-2	158	**172**
16		LT-3	152	**170**
17		Santosh Central Library	155	**174**
18		Research Lab	154	**171**
19		Departmental Library cum Journal Room	158	**178**
20		Biochemistry Lab	149	**173**

21	First Floor	Demonstration room	150	**180**
22		Professor and HOD Room (Biochemistry)	147	**164**
23		Department of Physiology	144	**165**
24		Department Library cum Seminar Room	146	**160**
25		Mammalian Lab	144	**158**
26		Hematology Lab	141	**152**
27		Demonstration room	149	**161**
28		Clinical Physiology	149	**174**
29	2nd Floor	Associate professor and HOD room (pathology)	142	**158**
30		Tutor room	145	**155**
31		Associate professor (3 room)	150	**171**
32		Clinical pathology lab	138	**147**
33		Research lab	135	**146**
34		Department library cum seminar room	158	**164**
35		Demonstration room (forensic medicine)	141	**149**
36		Museum (forensic medicine)	137	**144**
37	3rd Floor	Clinical pharmacology lab	144	**149**
38		Computer assisted lab	150	**154**
39		Non-teaching staff room	148	**160**
40		Research lab	142	**152**
41		Departmental library cum seminar room	148	**162**
42		Tutor room	151	**170**
43		Associate professor Room	143	**172**
44		HOD room	146	157

45		Tutor room (microbiology)	142	153
46		HOD room	142	159
47		Assistant professor room	143	157
48		Microbiology lab	137	145
49		Professor room	142	150
50		Empty room (3)	151	156
51		Demonstration room	153	160
52		Research lab	147	152
53		Museum	134	147
54		Library room	141	153
55		Seminar room	142	154
56		Staff room	147	158
57	4th Floor	Administrative offices	138	149
58		Account department	139	153
59		Central Research Facility	142	151
60		IQAC	136	147

11. DG Sets

SN	Description	Capacity	Location
1	DG N0 1	320	College
2	DG No 2	320	College
3	DG No 3	300	Hospital
4	DG No 4	300	Hospital
5	DG No 5	1000	Hospital

12. Air Conditioning

The building is having the Ceiling fans, AC, AHU and FCU for air circulation and Air coolers to get Comfort and also having window and split ACs for air conditioning

List of Fan:

SN.	Type	Location	Qty.
1	Ceiling Fan (60 W)	SANTOSH MEDICAL & DENTAL COLLEGE	**300**
2	Ceiling Fan (28 W)	HOSPITAL	**300**
Total			**600**

Ceiling fan replacement by energy-efficient ceiling fans		
Average power consumption of the ceiling fan at present	Watt	60
Average power consumption of energy-efficient star rated (BLDC) fans	Watt	28
Equivalent Power saving per fan	Watt	32
Numbers of fans to be replaced	Nos.	580
Working Hours Per annum	Hr.	6000
Overall electric Power Cost	Rs./KWH	9
Annual Energy Saving	KWH	115200
Monetary saving	Rs./Year	1036800
Investment	Rs.	1800000
Payback	Month	20.83

13. Area of Improvement

Energy Management has become crucial to the competitors of the facility. Rising fuel costs coupled with increased global competition is forcing industries/buildings and other facilities to slash energy costs. It was aimed at obtaining a detailed idea about the various end use energy consumption activities and identifying, enumerating and evaluating the possible energy savings opportunities. However, Energy conservation is a continuous process and there is always scope for further improvements. With this objective the

Energy Audit team with the active involvement of office we have identified the following Energy Conservation Opportunities (ECO's). Implementation of the ECO's can further help improve the energy consumption.

List of Energy saving / conservation recommendations

- PF improvement by installing APFC panel
- Replace the ceiling fan with BLDC fan
- It is recommended to install occupancy sensor in office cabins and toilets to save energy
- It is recommended to install the day light sensor on the outdoor lights for automation and control of the lights and this will also help us reduce the unwanted running hours of the lights.

14. Auditor Credentials

Certificate 32331810 / 4538792345

CQI / IRCA 30498

Gaurav Prakash

has been awarded a Certificate of Achievement for

ISO 50001:2018 - Lead Auditor Course

Energy Management System

by passing the written examination and continuous assessment

Held at
Delhi, India
Completed on
18 Sep 2020

This course meets the formal training requirements for individuals seeking certification under the IRCA Auditor Certification Scheme and for this purpose is valid for five years from the date of completion

CQI | IRCA CERTIFIED COURSE

Course Number 2000 - PT
254 Certificated by the International Register of Certificated Auditors (IRCA)

CQI | IRCA APPROVED TRAINING PARTNER

Heather Crick
UK Business Manager

Amanda Mangan
Global Training Manager

Issued by SGS United Kingdom Ltd. Registered in England No 1193985 Registered Office SGS United Kingdom Ltd. Rossmore Business Park
Ellesmere Port, Cheshire, CH65
3EN SGS United Kingdom Ltd. Certification and Business Enhancement SGS House, 217-221 London Road, Camberley, Surrey, GU15 3EY t +44(0) 1276 697 777 f +44(0) 1276 697 696

022464

The Institution of Engineers (India)

By virtue of Qualification, Professional training and Corporate Membership of this Institution

GAURAV PRAKASH

OF

ENVIRONMENTAL ENGINEERING DIVISION

is hereby authorised to use the style and title of

Chartered Engineer [India]

M-1718236

Dated 23-04-2021

Secretary and Director General