GREEN AUDIT REPORT
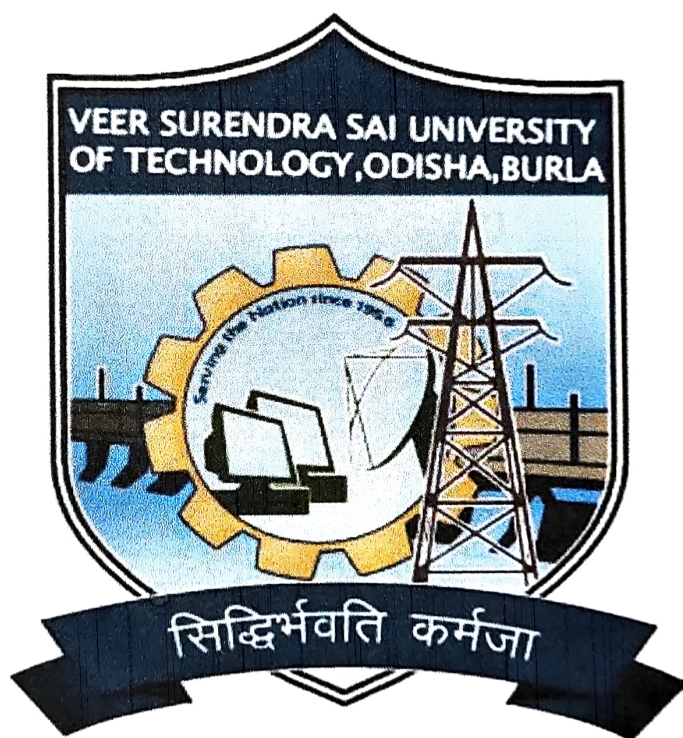
2020-2021

VEER SURENDRA SAI UNIVERSITY OF TECHNOLOGY

ODISHA, BURLA-768018

INDIA

Vice-Chancellor

Veer Surendra Sai University of Technology, Burla

Dist. Sambalpur – 768018, Odisha

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From the Desk of Chairperson, IQAC

Veer Surendra Sai University of Technology, Burla, Odisha has prepared the green auditing in 2020-2021 for a sustainable future of the campus. This audit process comprised initial interviews with management to clarify policies, activities, records and the co-operation of staff and students in the implementation of mitigation measures. This was followed by staff and student interviews, collection of data through questionnaire, review of records, observation of practices and observable outcomes. Besides, the approach ensured that the management and staff are active participants in the green auditing process at the University. The findings of this report shows that the University performs fairly well on sustainability issues and has implemented the previous audit recommendations. The University considers the environmental impacts of most of its actions and makes a concerted effort to act in an environmentally responsible manner. Even though the University does perform fairly well, the recommendations in this report highlight the different meance to be adopted by the University to improve its actions to be one exemplary sustainable university.

Summary

Rapid industrialization and urbanization have created severalenvironmental issues which may lead to the ecological crisis. Keeping this inmind it becomes essential to adopt sustainable methods in our day to dayactivities. VSSUT Burla believes in the same and is striving to address issues related to environmentalproblems.

The purpose of the green audit is to see that the practices followed inthe campus comply with the green policy adopted by the institution. Themethodology includes preparation and filling up the questionnaire, physicalinspection of the campus, observation and review of the documentation, dataanalysis, measurements and recommendations. It works on several facets likeWater conservation, Tree plantation, and Waste management, use ofAlternative energy source etc.The objective of the audit is to evaluate as to which degree the University comply with the same.

1. About the University

The Veer Surendra Sai University of Technology (VSSUT) Odisha was formed vide Orissa Act 9 of 2009 by converting University College of Engineering (UCE), Burla to a non-affiliating unitary university and came into force vide notification of the Industries Department, Government of Odisha in1stJuly 2009(Vide memo No.IV/TTI-33/2009-8553 and 8564 dtd.10th June 2009). The statutes of VSSUT, Burla 2010 has been approved by the Odisha Government vide Industry Department notification No.V-FE-II-01/2010/8697 dated 21stJune 2010. This state government university is also recognized by University Grants Commission (UGC), New Delhi vide UGC letter No. F.9-36/2009(CPP-I) dated5thJan 2010. The university is empowered to award degrees as specified by the UGC under section 22 of the UGC Act. The university has been declared eligible to receive central assistance under Section 12B of the UGC Act vide letter F.No.9-36/2009(CPP-I/PU) dated 8thNovember 2012.

1.1. Vision of the university

To emerge as an internationally acclaimed technical university to impart futuristic technical education and creation of vibrant research enterprise to create quality engineers and researchers, truly world-class leader and unleashes technological innovations to serve the global society and improve the quality of life.

1.2. Mission of the university

The Veer Surendra Sai University of Technology, Odisha, Burla strives to create values and ethics in its products by inculcating depth and intensity in its education standards and need-based research through

- Participative learning in a cross-cultural environment that promotes the learning beyond the classroom.

- Collaborative partnership with industries and academia within and outside the country in learning and research.

- Encouraging innovative research and consultancy through the active participation and involvement of all faculty members.

- Facilitating technology transfer, innovation and economic development to flow as natural results of research where ever appropriate.

- Expanding curricula to cater broader perspectives.

- Creation of service opportunities for upliftment of the society at large.

1.3. University Administration

Chancellor : His Excellency Prof. Ganeshi Lal, Governor of Odisha

Vice-Chancellor : Prof. Banshidhar Majhi

Registrar : Smt. UpamaKalo, OAS (SAG)

Comptroller of Finance : Sri. Tularam Kalet, OFS-1 (SB)

Director, IQAC : Prof. Debabrata Dhupal

PIC Civil Works : Prof. Ramakanta Panigrahi

Maintenance Engineer : Er. Pratap Kumar Pradhan

1.4. Members of the Board of Management

➢ Prof. Banshidhar Majhi, Vice-Chancellor, VSSUT, Burla (Ex-officio)

➢ Sri Hemant Sharama, IAS, principal Secretary, Skill Development & Technical Education Department, Government of Odisha, Bhubaneswar (Ex-officio)

➢ Director of Technical Education & Training, Odisha (Ex-officio)

➢ Additional Secretary to Government ES II, Finance Department, Government of Odisha. (Ex-officio)

➢ Hon'ble Vice-Chancellor, Biju Pattnaik University of Technology, Odisha, Rourkela

> ➢ Smt Upama Kalo, OAS (SAG), Registrara, VSSUT, Burla
> ➢ Dr Damodar Acharya, DN Oxy Park, Tower II, 16th Floor, Flat No 2173, Dumduma, Bhubaneswar 751019, AICTE Nominee
> ➢ Prof. P C Swain, Professor in Civil Engineering, VSSUT, Burla, VC Nominee
> ➢ Prof. Debadutta Mishra, Professor in Production Engineering VSSUT, Burla, VC Nominee
> ➢ Prof. Sidharth Panda, Professor in Electrical Engineering VSSUT, Burla, Academic Council Nominee
> ➢ Prof Sanjaya Kumar Patro, Professor in Civil Engineering, VSSUT, Burla, Academic Council Nominee
> ➢ Prof. Ratnam V. Raja Kumar, Director,m IIT Bhubaneswar,Chancellor's Nominee (Reputed Institute)
> ➢ Er Ashesh Padhy, VP and Head-Projects, JSW, Paradip Steel Project, Chancellor's Nominee (Alumni)
> ➢ Prof. Sukumar Mishra, Professor in Electrical Engineering, IIt Delhi, Chancellor's Nominee (Alumni)
> ➢ Shri Debesh Acharya, M.L.A., Bargarh

2. Overview of the University:

Veer Surendra Sai University of Technology (VSSUT),Burla was established in the year 1956as UCE, Burla - the first engineering college of the state. The university occupies over 502 acres of prime land in Burlaat the foothill of world famous Hirakud dam.It is located at Burla only 10 Km away from the city center of Sambalpur Municipality, and well connected to rest of India through national highway, railway and airway. The university is surrounded by other reputed educational institutes like Sambalpur University, VSS Medical college, IIM Sambalpur, GM University, Odisha State Open University. Apart from this, a large number ofpublicand private sector industries such as MCL, OHPC,HINDALCO, NALCO, NTPC, OPTCL, VedantaAluminium Ltd and Bhusan Steel Plant operate in its viscinity.

Over the years, the VSSUT, Burla hascarved a niche for itself among the best technical institutesin India, and asdream institute for many buddingengineers. The University offers B.Tech., M.Tech., M.Sc.,MCA and Doctoral research programmes. True to its reputation, the university has

produced over 25,000 graduate engineers, and 5000 post graduate enginners including doctorates. The university has a strong alumni base and most of them have occupied coveted positionsin many public offices in India, and educational, industrial and research organizations all over the world.

The university is fully residential with modern amenities and resources. It houses the administrative block cum academic building, auditorium, library, central internet facility, central computing facility, central workshop, e-learning center, innovation cum incubation center, gymkhana, eleven halls of residence for student accommodation, guesthouse and quarters to accommodate the faculty members, officers and staff of this university. Apartfrom this facilities like dispensary, bank, post office, park, playground, canteen, cafeteria, etc. are available for its residents. New state-of-art computer center, gymkhana, and swimming pool are under construction.

The university follow the philosophy of "learning in the lap of nature". In tune with the above philosophy, more than 60% of the campus is is kept green. The university has lush-green landscaped campus with varieties of flowering plants and perennial tree species. The Uniiversity emphasison Reduce, Reuse and Recycle of waste to reduce the environment footprint, and to preserve natural resource. The university encourage its students and staffs to adopt a sustainable framework to reduce thecarbon footprints.

2.1. Key infra structures:

Sl. No.	Description	Details	Area/Plinth Area
Land In Use			
1	University		36.5 Acres
2	Hall of Residences		28.0 Acres
3	Staff Quarters		69.1 Acres
4	Free Land		266.77Acres
5	Govt. Land Available for Extension		102.00 Acres
Construction details			
1	University Building	Main building of plinth area	1,22,715 sft

2		Workshop plinth area	27858 sft
3		Workshop office	3100 sft
4		High voltage Laboratory	1200 sft
5		Cycle shed	4600 sft
6		Garage	1660 sft
7		Guest House	3120 sft
8		Robotic Club	2700 sft
9		Auditorium	14850 sft
10		N.C.C. Building	6000 sft
11		Gymnasium	3300 sft
12		Athletic Building	1730 sft
13		Maintenance office	3200 sft
14		Dispensary	2560 sft
15		Computer Science & Engg. Building	19010 sft
16		Workshop Extension	2610 sft
17		Hydraulics Laboratory extension	1140 sft
18		Cycle sheds	2120 sft
19		Library Building	14050 sft
20		Administrative Building	8530 sft
21		Extension of Electrical & ELTCE Building	2880 sft
22		Community centre	2700 sft
23		Central Computer Centre	8181 sft
24		Innovation Centre	10420 sft
25		Swimming Pool	2010 sft
26		Gymnasium	16813 sft
27		E Learning Centre	10420 sft
		Total	**300083 sft.**

23	Halls of Residence	Atri Hall (Boys)	47260 sft
24		Kratu Hall (Boys)	47260 sft
25		Vasistha Hall (Boys)	47260 sft
26		Marichi Hall (Boys)	47260 sft
27		Pulastya Hall (Boys)	47260 sft.
28		Pulaha Hall (Boys)	363620 sft.
28		Agastya Hall (Boys)	93582 sft.
29		Angira Hall (Girls)	24160 sft.
30		Arundhati Hall (Girls)	58100 sft
31		Anuradha Hall (Girls)	35000 sft.
32		Visakha Hall (Girls)	35000 sft.
33		Rohini Hall (For Girls)	35000 sft.
		Total	**880762 sft**
Details of Staff Quarters			
33	A-1 Bungalow	1 No.	4725 sft
34	C	4 Nos.	12352 sft
35	D/TD	11 Nos.	15400 sft
36	E	18 Nos	20880 sft
37	F	100 Nos.	88000 sft
38	G	29 Nos.	13050 sft
39	RS	7 Nos.	3805 sft
40	4R	5 Nos.	9750 sft
41	F4R	4 Nos.	7320 sft
42	M4R	4 Nos.	7200 sft
43	5R	6 Nos.	11220 sft
44	3R	27 Nos.	29750 sft
45	F 3R	8 Nos.	8448 sft
46	Modified E	4 Nos.	3280 sft
47	E(New)	4 Nos.	2640 sft
48	B.F	2 Nos.	1720 sft

49	B.F	14 Nos.	10640 sft
50	G.E	10 Nos.	4000 sft
		Total	254180 sft

2.2. Selected Photographs:

Main entrance of Academic campus

Administrative block

Academic Block

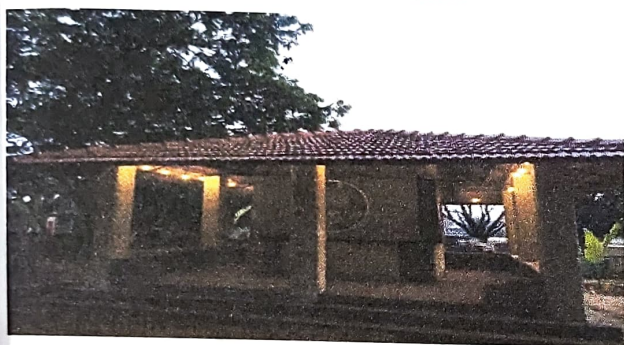Birds eye view of academic block

Library building

Biju Patnaik e-learning center

Entrance gate of a hostel

Central park at hostel

Low cost rammed earth building for coffee center

Landscaping near auditorium

3. Objectives of The Green Audit:

The green audit is carried out to promote the environment management and conservation in the university campus and around.Further, theaudit aims to identify, quantify, describe and prioritize framework ofenvironment sustainability in compliance with the applicable regulations,policies andstandards. The main objectives of carrying out Green Audit are:

- To introduce and make students aware of real concerns ofthe environment and its sustainability.
- To secure the environment and cut down the threats posed to humanhealth by analyzing the pattern and extent of resource use on thecampus.
- To establish a baseline data to assess future sustainability byavoiding the interruptions in environment that are more difficult tohandle and their corrections require high cost.
- To bring out a status report on environmental compliance.

3.1. Methodology

The audit was carried out by questionnaire, physical inspection, observation and review of documentation, interviewing key persons. The major topics focused in the audits report are the management of Water, Waste, and Greeneries in, and around the university campus.

4. Outcomes

4.1. Water audit

The water audit is an onsite survey and assessment to determine the current usage of water and future need, and to improve the efficiency in its use. The water auditincluded the water supply, consumption, and appliances and fixtures.

4.1.1. Observations

The University receives 2,35,000 L/day of water from Sambalpur Municipal Corporation through Public Health Department which is used for laboratories, lavatories, gardening anddrinking purpose. A well maintained treatment plant is availableat the source of water supply. Further, it is mention that for obtaining drinking water number of water purifition filters are positioned at different strategic locations of the university campus. During the survey, no loss of water is observed, neither by leakage nor bythe overflow of water from the overhead tanks. The data collected from all the departments are examined,and verified. On average, the total use of water in the university is 2,35,000 L/day, which include 1,10,000 L/day for domestic purposes, 50,000 L/day for gardening and 75,000 L/day for different laboratories. The water used for drinking purpose analyzed as per IS 10500:2012 - drinking water specification and observed to be potable.

The wastewater generated from the Laboratory is stored andtreated before disposal. Whereas domestic wastewater is treated in the septic tanksand soak pits.

4.1.2. Drinking water analysis report

A. *Organoleptic and Physical Parameters*

Sl.	Parameter	Result	Acceptable Limit as perIS10500:2012
1	Colour (Cobalt Scale) (part 4 of IS 3025)	2 Units	5 units
2	Odour (part5 of IS 3025)	agreeable	agreeable
3	pH Value (part 11 of IS 3025)	7.4	6.5-8.5
4	Turbidity	0.2 NTU	1NTU
5	Total Dissolved Solids(mg/l)	96 mg/l	500 mg/l
6	Calcium (as Ca) (mg/l)	5 mg/l	75 mg/l
7	Chloride (as Cl) (mg/l)	16.2 mg/l	250 mg/l
8	Fluoride (as F) (mg/l)	0.15 mg/l	1.0 mg/l
9	Iron (as Fe) (mg/l)	0.05 mg/l	0.3 mg/l
10	Magnesium (as Mg) (mg/l)	4mg/l	30 mg/l
11	Nitrate (as NO3) (mg/l)	0.2 mg/l	45 mg/l
12	Sulphate (as SO4) (mg/l)	4.5 mg/l	200 mg/l
13	Total Alkalinity	40 mg/l	200 mg/l
14	Total Hardness (as CaCO3) (mg/l of CaCo3)	27mg/l	200mg/l

B. *Bacteriological Analysis*

Sl.	Parameter	Result	Acceptable Limit as perIS10500: 2012
15	*E.coli*	nil	nil
16	Total Coliforms	nil	nil

4.1.3. Recommendations

- Dependency on municipal corporation shouldbe reduced.It can be achieved by minimizing the dependency for toilets and gardening.
- Dependancy on rainwater harvesting need to be increased.

- Drip/sprinkler irrigation system should be used in gardens for minimizing the water consumption.
- In campus small scale/medium scale/ large scale reuse and recycle of the water system is necessary

4.2. Waste generation and treatment

Solid waste generation and management is a burning issue. Unscientific handling of solid waste can create threats to everyone. Therefore, this audit is conducted to addresses waste production and disposal of different wastes like paper, food, plastic, biodegradable waste, glass, dust etc. and their recycling. Furthermore, solid waste often includes wasted material resources that could otherwise be channelled into better service through recycling, repair and reuse. The survey focused on volume, type and current practice of solid waste management.

4.2.1. Observations

The total solid waste collected in the campus is around 250kg/day. Wastegenerated from canteen and tree droppings is a major solid waste in thecampus. The waste is segregated at source by providing separatedustbins for the biodegradable and non-biodegradablewaste. The biodegradable wastes generated from mess kitchen, canteen and plant litters were collected and used for composting. The paper wastes especially the cardboards are generally sold to the recyclers. To reduce the paper consumption and paper waste generation the university follows double-sided printing on papers for official purposes. Segregationof chemical waste generated in laboratories is also in practice.

Single-side used papers are reused for writing and printing in alldepartments. Important and confidential reports/ papers are sent forrecycling to authorised recycler department after completion of their preservation period. Complying with government rules plastic has been banned. Metal waste and wooden waste are stored and given to authorized scrap agents for further processing. Glass bottles generated in laboratories are reused. The food waste from canteen and tree droppings is sent to vermicompost. All the laboratories are installed with fire extinguishers for an emergency.

4.3. E-waste Generation

E-waste can be described as consumer and business electronicequipment that is near or at the end of its useful life. Although, E-wastes makes up about 5%of all municipal solid waste worldwide but is much more hazardous than otherwaste because electronic components contain cadmium, lead, mercury andPoly-Chlorinated Biphenyls (PCBs) which are equivalently damaging for human health andenvironment.

4.3.1. Observations

E-waste generated in the campus is very negligible. The campus hasa total of 1028 computers and laptops, 95 printers, 18 Xerox machines,and 29scanners in working condition. The cartridges of printers are refilled and reused. The administration conducts awareness programmes regarding e-wastemanagement with the help of various departments. The e-waste anddefective item from the computer laboratory are stored properly. These electronic waste material such as computer, computer peripherals, printer, scanner etc.,where they can be reused/recycled safely, are handed over to needy organization/department. For the remaining wastes, theinstitution has decided to contact disposal facility and approved e-waste management for disposing of those wastes scientifically.

4.3.2. Recommendations

- As far as possible electronics instruments from reputed companies with a better life span should be purchased.
- E-waste generated at the University should be sent to recycle and reuse.

Solar cell in the University campus

4.4. Land Use and Green area

This includes the available area under construction and open space availablefor plantation to ensure that the buildings conform to green standards. Thishelps in ensuring that the Environmental Policy is enacted, enforced andreviewed using various environmental awareness programmes.

4.4.1. Chart showing Available area and area under construction.

Facility	Rooms	Carpet area Sqm.
Large ClassRooms	12	700
Small ClassRooms	69	5824
Laboratories for UG and PG Programs	49	9500
Computer Lab	3	360
Library	1	1265
Workshop	1	1675
Administrative Block	20	3,771
Seminar Hall	6	639

4.4.2. Campus & Built-up Area

- Location : Urban area
- Campus area : 166.48 Acres
- Built-up area in sq.mts : 1,39,964 Sqm.

4.4.3. University Master Plan

4.4.4. Greenery

The university attempts to maintain eco-friendly atmosphere on thecampus; the number and variety of plant species help to maintain an eco-friendlyambience. Further, to create eco-friendly awareness among thestudents, the university arranges special programmes through where the students get clear

idea and importance of trees in life. There are several perennial plantspecies in the campus. University has undertaken various activities like plantation and beautification of campus through various drives.

4.4.5. List of Plants

Sl.No.	Name of the Plant	Habit	Family
1	Terminalia chebula	Tree	Combretaceae
2	Terminalia belerica	Tree	Combretaceae
3	Madhuca longifolia	Tree	Sapotaceae
4	Acacia auriculiformis	Tree	Mimosaceae
5	Anthocephalus Cadamba	Tree	Rubiaceae
6	Alstonia scholaris	Tree	Apocynaceae
7	Hamelia Patens	Shrubs	Rubiaceae
8	Bougainvillea spectabilis	Climbers	Nyctaginaceae
9	Ocimum sanctum	Herb	Lamiaceae
10	Carica papaya	Herb	Caricaceae
11	Cymbopogon citratus	Herb	Poaceae
12	Azadirachta indica	tree	Meliaceae
13	Tectona grandis	tree	Lamiaceae
14	Mangifera indica	tree	Anacardiaceae
15	Ficus benghalensis	tree	Moraceae
16	Millettia pinnata	tree	Fabaceae
17	Syzygium cumini	tree	Myrtaceae
18	Aegle marmelos	tree	Rutaceae
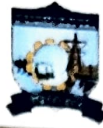
19	Caesalpinia pulcherrima	tree	Fabaceae
20	Peltophorum pterocarpum	tree	Fabaceae

4.4.6. Selected Photographs of plantation and beautification and cleaning drive

4.4.7. Recommendation

- The University has ample green area and has utilized the available spacegenerously in this regards. However, the university couldmakean understanding with localbodies to contribute to greening the spaces available with the local bodies.

4.5. Environmental Audit

This includes the assessment and monitoring of air quality, and noise levels in around the university.

4.5.1. Air Monitoring

Air quality in the academic institute is very important for the health of the students, faculty and staff of the institute. The air pollution sources in the university campus are wind, pollen grains, natural dust, vehicular emissions, and laboratory and AC fumes etc. All the pollutants were measured using standard air monitoring methods. The air pollutants monitored on regular basis are sulphur dioxide (SO_2), nitrogen oxide(NO_2), Suspended Particulate Matter (SPM), and Repairable Suspended Particulate Matter (RSPM) etc.Other relevant parameters such as temperature, humidity, pressure, and rainfall are also monitored.

Air qualitynear the main gate

A. *Meteorological Data / Environmental Conditions*

- Average wind velocity   : 0.98 km/h
- Prominent wind direction   : W-E
- Relative Humidity (Max./Min.) : 83/23 %

B. *Airquality Report*

Parameter	Result	NAAQS #2019
Sulphur Dioxide (SO2)	2.7 µg/nm^3	20 µg/m^3 24-hour mean
Nitrogen Dioxide (NO2)	1.8 µg/nm^3	40 µg/m^3 annual mean
Particulate Matter (size less than 10 µm) or PM10	5.0 µg/nm^3	20 µg/m^3 annual mean
Particulate Matter (size less than 2.5µm) or PM2.5	2.6 µg/nm^3	10 µg/m^3 annual mean
Ozone (O3)	Negligible	100 µg/m^3 8-hour mean
Lead	nil	0.50 µg/m^3 annual mean

| Carbon Monoxide (CO) | negligible | $2\ \mu g/m^3$ 8-hour mean |
| Ammonia (NH3) | negligible | $100\ \mu g/m^3$ annual mean |

4.6. Noise Environment

The noise level measurements were carried out using the Noise Level Meter. The noise level survey was carried out at seven locations, both circulation area as wellasthe study area. The university is 15 kms away from the District Headquarters and 2 kms away from the National Highway and train line. The noise levels monitored in the university campus aswell as inside the classroom and found the noise level within the permissible limit.

Sl. No.	Location	Minimum Reading In dB	Maximum Reading In dB	Limits
1	Near Main Gate	26	42	75
2	Near back Gate	18	38	75
3	Inside Class room	32	46	75
4	Outside Class room	27	40	75
5	Inside Library	20	25	75
6	Inside Chemistry lab	22	27	75
7	Inside Computer Centre	20	25	75

4.6.1. Recommendation

- Stand of tall trees should be planted along the front boundary wall toreduce noise and air pollution from the roadside.
- Use proper acoustic in rooms installed with heavy machines. Improvedamping for machine vibration and sound.
- A continuous air monitoring system should be procured for measurement of air pollution.

5. Conclusions

There is significant environmental awareness amongst the faculty, staff, students and initiatives taken by them are substantial. The installation of solar panels, paperless work system, composting, besides
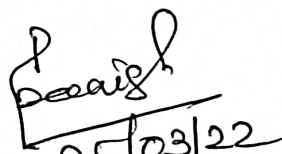
environmental awareness course initiated by the administration shows how the campus is going to be a Green Campus. Few recommendations are added to curb the menace of waste management using eco-friendly and scientific techniques.

As part of the green audit of the campus, the auditing carried out for monitoring of water, waste, e-waste, greenery, ventilation, illumination, airquality, noise level inside and around the campus has been carried out. It was observed that Illumination and ventilation are adequate considering natural light and air velocity present.Noise level in the campus is well within the limit.The green audit report is one of the useful means of demonstrating an organisation's commitment to openness and transparency. To promote continuous improvement, it is recommended to conduct the next green auditing during the year 2021-22.

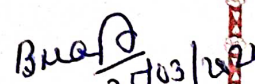Er P K Pradhan
Maintenance Engineer

Prof. P K Kar
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