



MEENAKSHI SUNDARARAJAN ENGINEERING COLLEGE

363, Arcot Road, Kodambakkam, Chennai – 24
Approved by AICTE & Affiliated to Anna University
email Id: principal@msec.edu.in
Website : www.msec.edu.in

Criterion VII – Institutional Values and Best Practices

7.1 Institutional Values and Social Responsibilities

**7.1.6 Quality audits on environment and energy are
regularly undertaken by the institution**

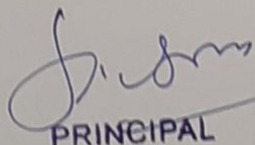
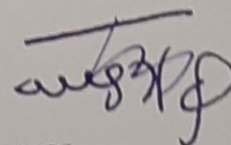
GREEN, ENVIRONMENT & ENERGY AUDIT REPORTS

IGNITE ENGINEERING

Green Audit Surveillance Assessment Report

MEENAKSHI SUNDARARAJAN ENGINEERING COLLEGE
363,ARCOT ROAD KODAMBAKKAM CHENNAI-24

Audit Date : 07.04.2021
Audit Location : COLLEGE PREMISES
Auditor : Er.P.Vivek
Audit Standards : ISO 14001:2015 Standards

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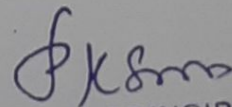
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Disclaimer

The Auditing is based on a sampling process of the available information and consequently there is an element of uncertainty which may be reflected in the Audit findings. Those relying or acting upon the Audit results and conclusions to be aware of this uncertainty. The Audit recommendations are subject to an independent review, prior to decision.



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Definitions

Non-conformity

Non-fulfilment of a requirement.

Major non-conformity

Non-conformity that affects the capability of the management system to achieve the intended results.

Non-conformities could be classified as major in the following circumstances:

- If there is a significant doubt that effective process control is in place, or that products or services will meet specified requirements;
- A number of minor non-conformities associated with the same requirement or issue could demonstrate a systemic failure and thus constitute a major nonconformity.

Minor non-conformity

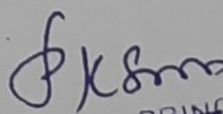
Non-conformity that does not affect the capability of the management system to achieve the intended results.

Opportunity for improvement

It is a statement of fact made by an assessor during an assessment, and substantiated by objective evidence, referring to a weakness or potential deficiency in a management system which if not improved may lead to nonconformity in the future. We may provide generic information about industrial best practices but no specific solution shall be provided as a part of an opportunity for improvement.

Observation

It is ONLY applicable for those schemes which prohibit the certification body to issue an opportunity for improvement. It is a statement of fact made by the assessor referring to a weakness or potential deficiency in a management system which, if not improved, may lead to a non-conformity in the future.


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Audit Findings

Section A:

1.	Non-Conformities – None
2.	Observation: 1.E waste vendor letter is not evident

Section B

1.	Good practices
2.	(i) Created awareness among the students & Staff regarding reduction carbon foot printing

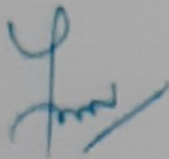
3.Opportunities for Improvement:

1. we recommended to Establish Biogas Plant & Sewage Treatment Plant.

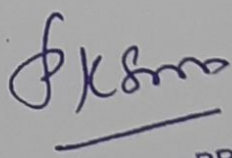
4. Recommendations

✓ System is being maintained effectively. Recommending the continued validity of the certificate.	
Remarks	

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ER.P.VIVEK M.E
LEED GREEN ASSOCIATE
CHARTERED ENGINEER

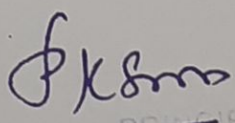

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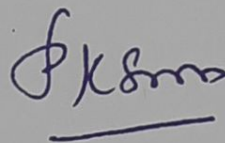
Audit Date : 06.04.2020
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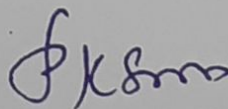
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Audit Findings

Section A:

1.	Non-Conformities – None
2.	Observation: 1.Rain water Harvesting pits are not maintained properly and Proper Markings are not done

Section B

1.	Good practices
2.	(i)Vermicomposting and Plantation of Organic vegetables inside the college is Good Practices

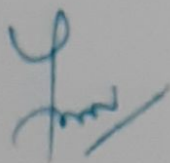
3.Opportunities for Improvement:

1. Green area Management to be done in Effective Manner and we recommended to Establish Herbal Garden & Biogas Plant

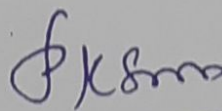
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4 March 2019- 5 March 2019

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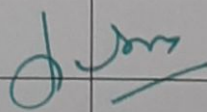
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Executive Summary

The rapid urbanization and economic development at local, regional and global level has led to several environmental and ecological crises. On this background it becomes essential to adopt the system of the Green Campus for the institute which will pave way for sustainable development.

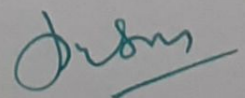
Meenakshi Sundararajan engineering College believes that there is a need to address these fundamental environmental problems and reverse the trends. The purpose of the audit was to ensure that the practices followed in the campus are in accordance with the Green Policy adopted by the institution.

It works on the several facets of 'Green Campus' including Water Conservation, Tree Plantation, Waste Management, Paperless Work, and Alternative Energy. With this in mind, the specific objectives of the audit was to evaluate the adequacy of the management control framework of environment sustainability as well as the degree to which the Departments are in compliance with the applicable regulations, policies and standards. The criteria, methods and recommendations used in the audit were based on the identified risks.

Introduction

Green audit was initiated with the beginning of 1970s with the motive of inspecting the work conducted within the organizations whose exercises can cause risk to the health of inhabitants and the environment. It is known as the systematic identification, quantification, recording, reporting and analysis of components of environmental diversity.

It is the duty of organizations to carry out the Green Audits of their ongoing processes for various reasons such as; to make sure whether they are performing in accordance with relevant rules and regulations, to improve the procedures and ability of materials, to analyze the potential duties and to determine a way which can lower the cost and add to the revenue.



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The intention of organizing Green Audit is to upgrade the environment condition in and around the institutes, colleges, companies and other organizations. It is carried out with the aid of performing tasks like waste management, energy saving and others to turn into a better environmental friendly institute.

About the College

MSEC is an self financing engineering college affiliated to Anna University and approved by AICTE & Four UG Courses are Accredited by NBA. It has been recognized as a premier institution of higher learning for job-oriented courses.

The campus is spread over an area of more than 8 acres of land and the Green campus situated in the Main of city The college offers 6 Under Graduate Courses and 1 Post Graduate courses and There are more than 1400 students and 110 teaching faculty in the college which is promising to grow rapidly.

The College offers job-oriented courses, extra-curricular activities and technically advanced facilities accessible to the faculty, the students and the supporting staff. Here, each individual is encouraged to step beyond the confines of academic and administrative disciplines to explore and intervene in the larger interests of the community that thrives on participation and the desire to venture into newer vistas.



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Objectives of the Study

The main objective of the green audit is to promote the Environment Management and Conservation in the College Campus. The purpose of the audit is to identify, quantify, describe and prioritize framework of Environment Sustainability in compliance with the applicable regulations, policies and standards.

The main objectives of carrying out Green Audit are:

- To introduce and aware students to real concerns of environment and its Sustainability.
- To secure the environment and cut down the threats posed to human health by analyzing the pattern and extent of resource use of the campus.
- To establish a baseline data to assess future sustainability by avoiding the
- Interruptions in environment that are more difficult to handle and their corrections requiring high cost.
- To bring out a status report on environmental compliance.

Benefits of green audit

- Green auditing should become a valuable tool in the management and monitoring of environmental and sustainable development programs of the college.
- Impart environmental education through systematic environmental Management approach and Improving environmental standards
- To create a green campus.
- To enable waste management through reduction of waste generation, solid-waste and water recycling.

Methodology

In order to perform green audit, the methodology included different tools such as preparation of questionnaire, physical inspection of the campus, observation and review of the documentation, interviewing key persons and data analysis, measurements and recommendations. The study covered the following areas to summarize the present status of environment management in the campus:

- Water management
- Energy Conservation
- Waste management
- E-waste management
- Green area management
- Environment Monitoring

Observations and Recommendations

Water Use

The study observed that the main source of water for the institute is received from Five bore wells. Water is used for drinking purpose, toilets and gardening. The waste water from the RO water purifier is used for gardening purpose. During the survey, no loss of water is observed, neither by any leakages, or by over flow of water from overhead tanks. The data collected from all the departments is examined and verified. On an average the total use of water in the college is 30,000 L/day, which include 20,000 L/day for domestic, 5,000 L/day for gardening purposes and 5,000 L/day for drinking purpose.



Fig. : Bore wells

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Fig. : RO Based Drinking Water Unit Installed in the campus

Water Management

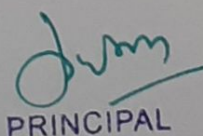
SL.NO	PARAMETERS	Response
1	Source of water	Bore Well
2	No of Wells	5
3	No of motors used	5
4	Horse power – Motor	1 Hp-1 1.5HP-2 2Hp-1
5	Depth of well –Total	350 ft- 1 180 ft- 4
6	Water level	15ft
7	Number of water tanks	8
8	Capacity of tank	10000 L - 1 3000 L- 2 50000 L-2
9	Quantity of water pumped every day	30000 L
10	Any water wastage/why?	NO

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11	Water usage for gardening	500 l/day
12	Waste water sources	Lab, Canteen
13	Use of waste water	Nil
14	Fate of waste water from labs	After neutralization waste water is kept in a large covered pit
15	Whether waste water from labs mixed with ground water	No
16	Any treatment for lab water	"Micro scale analysis "is implemented for chemistry students
17	Whether any green chemistry method practiced in labs	yes
18	No of water coolers	-
19	Rain water harvest available?	yes
20	No of units and amount of water harvested	10 units
21	Any leaky taps	Nil
22	Amount of water lost per day	Nil
23	Any water management plan used ?	Water management audit conducted
24	Any water saving techniques followed ?	Nil
25	Are there any signs reminding peoples to turn off the water?	Yes



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Rain water harvesting units are also functional for recharging ground water level. There are soaking pits available widespread all over the campus.



Fig. : Rain water Harvesting Pits

Recommendations

- There is a need for monitoring and controlling overflow and periodically supervision drills should be arranged.
- Minimize wastage of water and use of electricity during the reverse osmosis process and ensure that the equipment used are regularly serviced and in good condition.
- The cleaning products used by staff should have a minimal detrimental impact on the environment. They should be biodegradable and non-toxic.
- Ensure that all cleaning products used by college staff have a minimal detrimental impact on the environment, i.e. they are biodegradable and non-toxic, even where this exceeds the Control of Substances Hazardous to Health (COSHH) regulations.

- Gardens should be watered by using drip/sprinkler irrigation system to minimize water use.

Energy Management

This indicator addresses energy consumption, energy sources, energy monitoring, lighting, appliance, natural gas and vehicles. Energy use is clearly an important aspect of campus sustainability and thus requires no explanation for its inclusion in the assessment. The study carried out also analyzed the use of alternate energy resources that are eco-friendly.

Observations

The source of energy for all the buildings within the campus is through electricity only. The institution consumes about **483.424kW/day**. However, about 30 % of the daily electricity requirement is supplied from **solar energy**.

The entire campus including common facility centers are equipped with LED lamps and LED tube lights, except at few locations. Besides this, photovoltaic cells are also installed in the campus as an alternate renewable source of energy & capacity of Solar Plant is 5kw Computers are set to automatic power saving mode when not in use. Solar water heaters are installed in hostel buildings and staff quarters as to promote renewable energy. Also, campus administration runs switch-off drill on regular basis. Equipment like Computers is used in power saving mode.

Meenakshi Sundararajan Engineering College(MSEC) had installed an off grid 15 kW Photovoltaic system in encouraging this grand initiative led by MNRE. The Cross Functional Research Team (CFRT) of Meenakshi Sundararajan Engineering College(MSEC) had proposed a Load Management Scheme for this 3 x 5 kW Photovoltaic system. The main objective of designing this Load Management system is to 'track' the generation and optimize Generation with respect to Load.

Installed power plant details:

The PolyCrystalline PV constituted 5 kW of the installed capacity and feed energy to the loads connected in the class rooms located in the third floor of the Civil Engineering Block. As part of the initial step towards the project, the open loop

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Load Management Scheme has been commissioned and working satisfactorily for the 5 kW Poly-Crystalline PV system. The College Management has released a sum of Rs. 25,000 /- as initial installment to the CrossFunctional Research Team in developing the Open Loop System.

Table 1: Distribution of the connected Load.

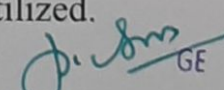
Table 1: Distribution of the connected Load.					
Site	Wing	Room	Fluorescent Lights (40 W)	Fan (60 W)	Connected Load
Civil Block 3rd Floor	West	1st Class Room	22	6	1240 W
		2nd Class Room	22	6	1240 W
		3rd Class Room	22	6	1240 W
	East	1st Class Room	22	6	1240 W
		2nd Class Room	22	6	1240 W
		3rd Class Room	22	6	1240 W
		Total Connected Load			

Installed capacity: The Installed capacity is 4800 W. This installed capacity of 4800 W can feed a load of 3960 W (82.5 % of installed capacity) after accounting for various losses. The losses come in the form of temperature variation, wiring mismatch, dust and efficiency of sub-systems which make up the system. As seen there is a deficit of nearly 53 % of connected load.

$$\begin{aligned}\text{Deficit} &= 3960 / 7440 \\ &= 53\%\end{aligned}$$

which implies a deficit of 53 %

In order to overcome the above deficit the existing phase groups is utilized.


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Electricity Board Supply mains:

The deficit of 3480 W (7440 – 3960) is planned to be fed by Electricity Board supply mains. One of the two phases in each class room will be constantly fed from Electricity Board Mains.

In each class room, a total of 580 W ($3480 / 6 = 580$ W) will be supplied directly from the Electricity Board Supply mains continuously. By feeding one phase group with Electricity Board Supply mains, the deficit in the generation and the uninterrupted supply of electrical energy is satisfied.

PV system Load: The remaining loads are fed by PV system.

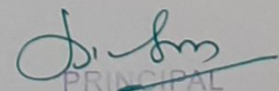
Remaining Connected Loads = Total connected load – Essential loads

$$= 6200 \text{ W} - 6 * (580 \text{ W})$$

$$= 3960 \text{ W}$$



Fig. : Solar Power Plant Installed in the campus


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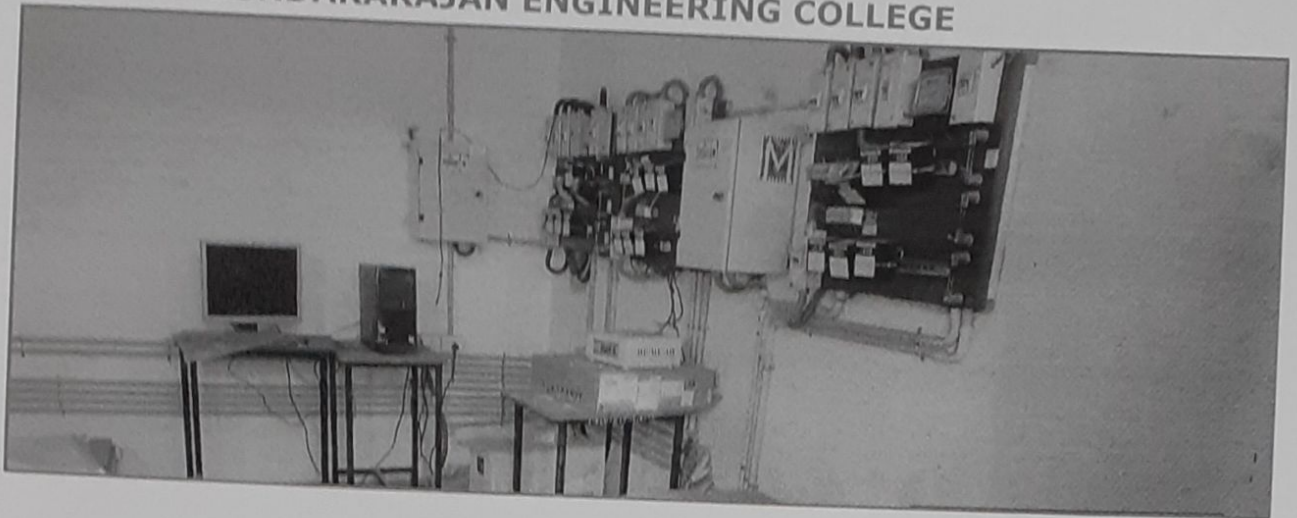


Fig. : Photovoltaic cell Control Unit

Recommendations

- The management should support more of renewable and carbon-neutral electricity options on any energy- purchasing consortium, with the aim of supplying all college properties with electricity that can be attributed to renewable and carbon-neutral sources.
- More LED lights should be installed to reduce power consumed for lighting.
- The campus administration should run switch-off drill on regular basis.
- In campus premises electricity should be shut down from main building supply after occupancy time, to prevent power loss due to eddy current.
- 5-star rated Air Conditioners, Fans and CFLs should be used.
- Cleaning of tube-lights/bulbs to be done periodically, to remove dust over it

Waste Management

This indicator addresses waste production and disposal of different wastes like paper, food, plastic, biodegradable, construction, glass, dust etc. Furthermore, solid waste often includes wasted material resources that could otherwise be channeled into better service through recycling, repair, and reuse. Solid waste generation and management is a burning issue. Unscientific handling of solid waste can create

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threats to everyone. The survey focused on volume, type and current management practice of solid waste generated in the campus.

Observations

Liquid waste management

A mini **water treatment plant** is available within the campus. The waste water from domestic usage (grey water) is recycled and used for gardening. This is one of the greening initiatives taken by the management.

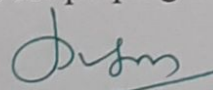
They have a **central RO plant** with a capacity of 1000Ltrs/hr to provide water for drinking and cooking.



Fig. : Reverse Osmosis Water Unit

Solid waste management

Waste generated from tree droppings and lawn management is major solid waste generated in the campus. Separate dustbins are provided for Bio-degradable and Plastic waste in order to segregate them at the source itself. Single sided used papers are reused for writing and printing in all the departments to minimize the usage of papers. Important and confidential reports/ papers are sent for pulping and recycling after completion of their preservation period.


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Chemical waste generated in laboratories that are potentially hazardous are segregated. Very less plastic waste (0.1Kg/day) is generated by some departments, office, garden etc Metal waste and wooden waste is stored and sent to authorized scrap agents for further processing. Glass bottles are reused in the laboratories.

Vermicomposting

There is a separate in-house vermi-compost production run by Management. In this unit vermi-compost farming is done utilizing the food waste generated from college mess and biomass waste like weeds and plant debris collected on college campus.



Vermicomposting unit installed in the campus

Organic manure generated here is utilized in the college agricultural lands facilitating cultivation of organic vegetables, fruits, flowers and trees within the campus. Later they are being sold to the Institute faculty.

The college has separate bins to collect biodegradable and non-biodegradable waste generated in the campus.



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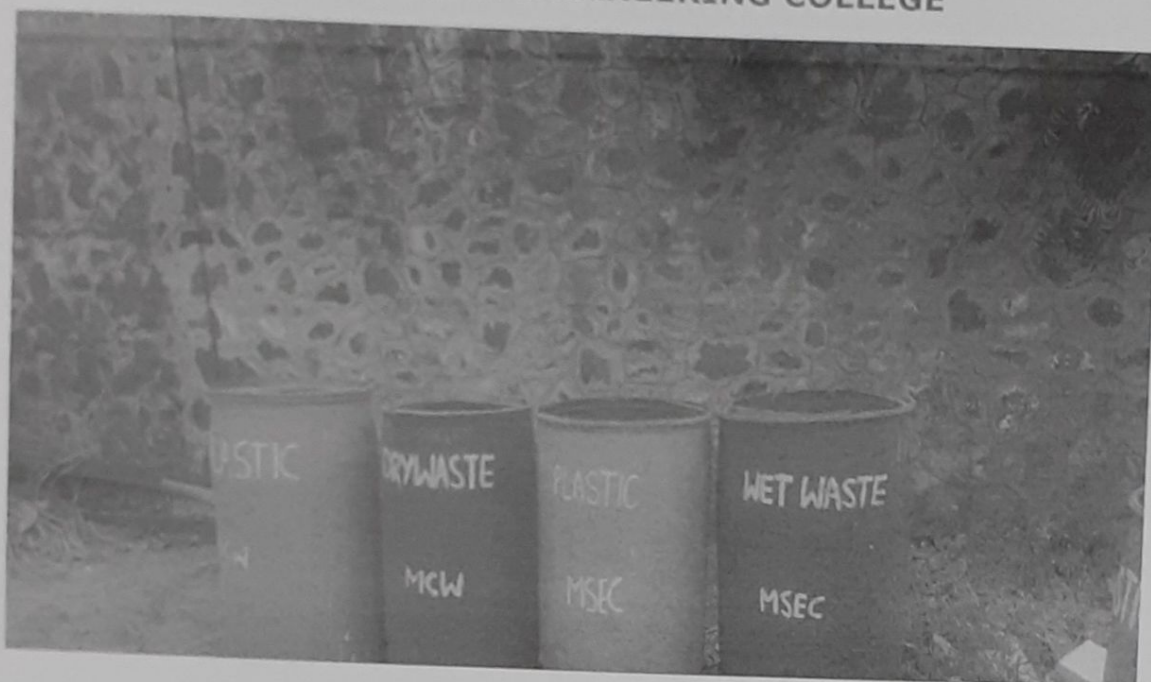


Fig. : Separate Bins for Waste Segregation

Recommendations

- The amount of waste generated from classrooms and staff rooms can be minimized.
- Full use of all recycling facilities provided by City Municipality and private suppliers can be utilized for waste disposal.
- Sufficient, accessible and well-publicized collection points can be made available for recyclable waste, with responsibility for recycling clearly allocated.

E-waste Management

E-waste is a consumer and business electronic equipment that is near or at the end of its useful life. This waste makes up about 5% of all municipal solid waste worldwide. It is hazardous than other waste because electronic components contain cadmium, lead, mercury, and Polychlorinated biphenyls (PCBs) that can damage human health and the environment.

Observations

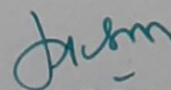
E-waste generated in the campus is of minimal quantity. It is being effectively managed, keeping in mind the environmental hazards that may arise if not disposed properly.

The cartridges of laser printers are refilled outside the college campus. Administration Awareness programmes are being conducted regarding E-waste Management in various departments. The E- wastes and defective items from computer laboratories are being stored properly.

The dismantled hardware of personal computers are used in PC trouble shooting lab. This is put to use to conduct practical courses for B.E (Computer science & Communications) The dismantled electronic spare parts are immediately sold for reuse. The minimal amount of e-waste that is generated after reusing is sent to recycler at specific intervals.

Recommendations

- Use reusable resources and containers and avoid unnecessary packaging wherever possible.
- The management should take an initiative to purchase recycled resources when they are available.
- Recycle or safely dispose of white goods, computers and electrical appliances.



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Green Area Management

This includes the plants, greenery and sustainability of the campus to ensure that the buildings conform to green standards. This also helps in ensuring that the Environmental Policy enacted, enforced and reviewed using various environmental awareness programmes.

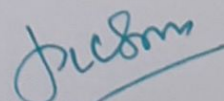
Observations

Campus is located in the vicinity of many trees (species) to maintain the biodiversity. Various tree plantation programs are being organized at college campus and surrounding villages through NSS (National Service Scheme) unit. This program helps in encouraging eco-friendly environment which provides pure oxygen within the institute and awareness among villagers. The plantation program includes various type of indigenous species of ornamental and medicinal wild plant species.

The college cultivates vegetables for its own use through organic farming initiatives.



Fig. : Organic Fruit Cultivation around the campus



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Fig. : Green Area Management around the Campus

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A handwritten signature in blue ink, appearing to read 'J. S. S.', with a long horizontal line extending to the right.

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World Environment Day Celebration



Tree Plantation Inside the campus

A handwritten signature in blue ink, likely belonging to the Principal.

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Recommendations

- Review periodically the list of trees planted in the garden, allot numbers to the trees and keep records. Assign scientific names to the trees.
- Promote environmental awareness as a part of course work in various curricular areas, independent research projects, and community service.
- Create awareness of environmental sustainability and take actions to ensure environmental sustainability.
- Establish a College Environmental Committee that will hold responsibility for the enactment, enforcement and review of the Environmental Policy. The
- Environmental Committee shall be the source of advice and guidance to staff and students on how to implement this Policy.
- Ensure that an audit is conducted annually and action is taken on the basis of audit report, recommendation and findings.
- Indoor plantation to inculcate interest in students, Bonsai can be planted in corridor to bond a relation with nature.
- Green library should be established.
- Establish Herbal Garden inside the college campus.



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Environmental Monitoring

As part of green audit of campus, the Green Audit Assessment Team has carried out the environmental monitoring of campus. This includes Illumination, Noise level, ventilation and indoor Air quality of the class rooms. It was observed that Illumination and Ventilation is adequate considering natural light and air velocity present. Noise level in the campus is well below the limit.

The following surveys were conducted:

1. Ambient air quality Monitoring– Annexure 1
2. Lux monitoring – Annexure 2
3. Noise monitoring – Annexure 3

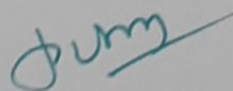
Ambient Air Quality Monitoring

Ambient air quality monitoring can help in providing a strategic solution towards air purification and help lead a safer life. Also, air quality monitoring in the college campus not only develops trust among the parents but ensures that the administration cares about their Students and Staff.

Lux & Noise Monitoring

Illumination is one of the most important environmental factors in the classroom. Many Doctors have discovered that lighting settings have significant impact on students' performance. So Lux monitoring can help in providing a Comfort Vision Environment to Students.

When assessing noise exposure in campus environments, it can be difficult to determine whether the level of sound has reached a point where it interferes with student learning and staff productivity, or worse, becomes a threat to their health and well-being.



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Conclusion

Though the institution is predominantly an Engineering college, there is significant environmental research both by faculty and students. The environmental awareness initiatives taken by the management are substantial. The installation of Solar system paperless work system and vermincomposting practices are remarkable. Besides, environmental awareness programmes initiated by the administration prove the campus is going green. Few recommendations are added for waste management and waste reduction using alternate eco-friendly and scientific techniques. This may lead to the prosperous future in context of Green Campus and thus aid in a sustainable environment and community development.

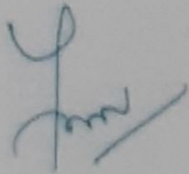


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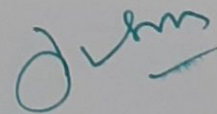
Acknowledgement

We are grateful to the management and committee members of MSEC Management to award this prestigious project on green auditing. Further we sincerely thank the college staff for providing us the necessary facilities and co-operation during the audit. This ample co-operation helped us a lot in making this audit possible and successful.

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ER.P.VIVEK M.E
LEED GREEN ASSOCIATE
CHARTERED ENGINEER



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