1. The e-copies of all the three audit reports- environmental, green and energy made by a certified agency

ENVIRONMENT AUDIT REPORT FOR SAMMILANI MAHAVIDYALAYA

Elion Technologies & Consulting Private Limited

307, 3rd Floor, DDA Lal Market, H-Block
Vikas Puri, New Delhi-110018

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Principal
Sammilani Mahavidyalaya
E.M. Bypass, Baghajatin
Kolkata-700 094

Acknowledgement

Elion Technologies and Consulting Pvt Ltd thanks the management of Sammilani Mahavidyalaya for assigning this important work of Environmental Audit. We appreciate the co-operation to our team for completion of study.

For giving us necessary inputs to carry out this very vital exercise of Environment Audit. We are also thankful to other staff members who were actively involved while collecting the data and conducting field measurements.

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Sammilani Mahavidyalaya
E.M. Bypass, Baghajatin
Kolkata-700 094

Site Information

Name of College	Sammilani Mahavidyalaya
College Address	Eastern Metropolitan Bypass, Baghajatin, Kolkata, West Bengal, 700094
Execution Partner	ELION Technologies & Consulting Pvt Ltd
Communication Address	307, 3rd Floor DDA Lal Market H-Block Vikas Puri, New Delhi-110018
Date of Audit	17th March 2022
Year of Audit	2021 - 2022
Audit Participants	Dr. Sharmila Chakraborty – Teacher In Charge Prof. Debashish Roy – Coordinator of Quality Audits Dr. Srikanta Malakar – IQAC Coordinator Dr. Ananda Mukherjee – Associate Professor, Commerce Prof. Uttam Kumar Ghosh – Associate Professor, Commerce Prof. Lupsy Mohanty Roy – Assistant Professor, Pol. Sc. Prof. Brototi Mondal – Assistant Professor, Computer Sc. Shri Rajesh Das (Electrician) Premanshu Purkait and Tarapada Das – Cleaning Agency appointed personnel
Total College Area	8093 sq. mt.
Total Green Area	5417.25 sq. mt.

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Concept

The term 'Environmental audit' means differently to different people. Terms like 'assessment', 'survey' and 'review' are also used to describe similar activities. Furthermore, some organizations believe that an 'environmental audit' addresses only environmental matters, whereas others use the term to mean an audit of health, safety and environment-related matters. Although there is no universal definition of Environmental Audit, many leading companies/ institutions follow the basic philosophy and approach summarized by the broad definition adopted by the International Chambers of Commerce (ICC) in its publication of Environmental Auditing (1989).

The ICC defines Environmental Auditing as:
"A management tool comprising a systematic, documented, periodic and objective evaluation of how well environmental organization, management and equipment are performing with the aim of safeguarding the environment and natural resources in its operations/projects."

The European Commission, in its proposed regulation on environmental auditing, has also adopted the ICC definition of Environmental Audit.

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Introduction

A clean and healthy environment aids effective learning and provides a conducive learning environment. There are various efforts around the world to address environmental education issues.

Environmental Management Systems (EMS) is very popular in the industrial sector, but the general belief is that EMS is something pertaining to industries only. Other parts of the world have started adopting compatible environmental management systems either voluntarily or for promoting standards by external certification. International environmental standards do not suit the existing Indian educational system.

A very simple indigenized system has been devised to monitor the environmental performance of educational institutions. It comes with a series of questions to be answered on a regular basis. Environmental conditions may be monitored from angles that are relevant to Indian requirements, without stress on legal issues or compliance. This innovative scheme is user- friendly and totally voluntary. The environmental monitoring system helps the institution to set environmental examples for the community and to educate young learners. It can be adapted to urban and / or rural situations.

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Overview of Campus

Sammilani Mahavidyalaya was established on 12th of December, 1996 by the initiative of some academic entrepreneurs, with a definite objective to impart knowledge and skill to the young generation of the locality. Along with those academicians, enthusiasts from all sections of the society also rendered their active co-operation in this selfless venture. Initially the college started functioning from a local secondary school, Santoshpur Vidyamandir (Boys) and the classes were held in the evening. Within a record period of only seven months, the new building was constructed and the college shifted to its present address. On 5th June 2003, UGC granted the college the status to receive financial assistance under the rule U/S 12(B) of the UGC Act. 1965. The college has been accredited by the National Assessment and Accreditation Council in 2005 and awarded Grade 'B' and Grade 'B++' in the year 2016. It has also been assessed by the Department of Higher Education, Govt. of West Bengal in January, 2010 under the State Level Assessment Programme (SLAP). The college, which started with only three students, is now bustling with more than 2000 students in the different departments of Arts, Science and Commerce faculties. The active and moral support of Sri. Buddhadeb Bhattacharjee, former Chief Minister of West Bengal, the unyielding devotion of Sri Kanti Bhushan Ganguly, former Minister of Sunderban Affairs, Govt. of West Bengal (and also the erstwhile Secretary of the Preparatory Committee of the college), the sincere dedication and guidance of Late Prof. Ramaranjan Mukhopadhyay and Prof. K.P. Majumder and the efforts and services rendered by all those persons who are associated with the college in one way or the other have helped the college to attain present position as one of the leading academic institutions in the locality. Today the college is on the fast track of progress and success. Yet, there are many miles to tread before our dream becomes true, before our vision materialises into reality.

List of programs offered by the institute:

Following are the list of undergraduate courses offered by the institute-

Three year degree programmes in:

A. Arts

History, Geography, Political Sciences, Sanskrit, Education, English, Bengali, Philosophy, Economics.

B. Science

Computer Science, Microbiology, Physics, Chemistry, Zoology, Botany, Mathematics.

C. Commerce

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List of the Facility Building:

Total Area: 8093 sq.mt (2 Acre)
Green Area: 5417.25 sq.mt

Building Name	Areas	Number of Floors
Main Block including West Block	1103 sq. mt.	4
West Block	484.4 sq. mt.	3
New Block	559 sq. mt.	2
Annex building	197 sq. mt.	2
Space among the blocks	332.35 sq. mt.	

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Audit Objectives

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

- Environmental education through systematic environmental management approach
- Improving environmental standards
- Benchmarking for environmental protection initiatives
- Reduction in resource use
- Financial savings through a reduction in resource use
- Curriculum enrichment through practical experience
- Development of ownership, personal and social responsibility for the college campus and its environment
- Enhancement of university profile
- Developing an environmental ethics and value systems in young people

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Executive Summary

An environmental audit is a snapshot in time, in which one assesses campus performance in complying with applicable environmental laws and regulations. Though a helpful benchmark, the audit almost immediately becomes outdated unless there is some mechanism in place to continue the effort of monitoring environmental compliance.

This is second environmental audit of campus for NACC affiliation; QS Program and doing their bid towards environmental protection and environmental awareness at local and global front. Audit criterion is environmental cognizance, waste minimization and management, biodiversity conservation, water conservation, energy conservation and environmental legislative compliance by the campus. A questionnaire is used during audit. This audit report contains observations and recommendations for improvement of environmental consciousness.

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Environmental Audit - Questionnaire

The areas of eco/environmental/green auditing to be followed/practised by participating institutions:

I. Waste Minimization and Recycling
II. Greening
III. Energy Conservation
IV. Water Conservation
V. Clean Air
VI. Animal Welfare
VII. Environmental Legislative
VIII. General Practices

Is any Environmental Audit conducted earlier?
No, this is the first time.

What is the total permanent population of the Campus?

	Male	Female	Total
Students	1192	848	2040
Teachers	43	41	84
Non-Teaching Staff	25	1	39
Sub Total	1260	890	2150
Approximate Number of Visitors (Per day)			150
What is the total number of working days of your campus in a year?			230

Where is the campus located?
The campus is located in southern part of Kolkata.

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Which of the following are available in your campus?

1	Garden area	Yes
2	Playground	Yes
3	Kitchen	Yes
4	Toilets	Yes
5	Garbage Or Waste Store Yard	No
6	Laboratory	Yes
7	Canteen	Yes
8	Hostel Facility (Numbers)	No
9	Guest House	No

Which of the following are found near your campus?

1	Municipal dump yard	Yes
2	Garbage heap	No
3	Public convenience	Yes
4	Sewer line	Yes
5	Stagnant water	No
6	Open drainage	No
7	Industry – (Mention the type)	No
8	Bus / Railway station	Yes
9	Market / Shopping complex / Public halls	Yes

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I - WASTE MINIMIZATION AND RECYCLING

1.	Does your campus generate any waste? If so, what are they?	YES. Papers, flat boards, plastic bottles, metals(aluminum, copper), E-waste, hazardous waste (chemicals and laboratory end products), organic and bio-degradable (plant origin)
2.	What is the approximate amount of waste generated per day? (in Kilograms/month) (approx.)	• Paper Waste – 20KG/Month • Plastic Waste – 5KG/Month • Biodegradable Waste – 5KG/Month • Hazardous Waste – 6KG/Month • E-waste & Metals – 20KG/Month
3.	How is the waste generated in the campus managed? By 1 Composting 2 Recycling 3 Reusing 4 Others(specify)	• Composting is done for organic and biodegradable products. • Recycling is done for paper and plastic waste. • Some non-degradable and degradable wastes are being off- loaded separately to KMC (Kolkata Municipality Corporation) approved dump yard ; from where Kolkata Municipality Corporation collect these wastes, for further processing and recycling according to the merit of the waste materials. Note : College has signed a MOU with M/S Redivivus Recyclers private LTD (Vital waste) of Kolkata 700020 for recycling of dry waste* materials on 23rd May 25, 2022.
4.	Do you use recycled paper in campus?	Yes
5.	Do you use reused paper in campus?	Yes

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6.	How would you spread the message of recycling to others in the community? Have you taken any initiatives? If yes, please specify.	• Through organizing seminars and awareness camping programs organized by college. • By encouraging students to participate in such programs organized elsewhere. • Involving students in cleaning programs in college premises and thereby giving them practical knowledge on different types of waste (bio degradable and non- bio degradable) and the importance of recycling and consequence of pollution. YES. Conducting Awareness programs by the NSS in the local slum areas. Involving students in such programs and they also convey the message to peoples at their distant rural and urban residential places.
7.	Can you achieve zero garbage in your campus? If yes, how?	Yes Through waste management systems by appointing authorized company (Vital wastes) who collect hazardous wastes, e wastes, papers, flat boards, metals, chemicals at scheduled regular interval for further processing. Through appointing cleaning agency who conduct day to day collection of bio degradable and no- degradable wastes from college premises accumulated in green and blue bins and dispose them in nearest KMC (Kolkata Municipality Corporation) dump-yard for further processing by the municipality. Plant products (leaf, shoots, dry

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		grasses, etc) of gardens and greeneries are collected and stored in specific place for decomposing and manure formation.

II – GREENING THE CAMPUS

1.	Is there a garden in your campus?	Yes
2.	Do students spend time in the garden?	Not Allowed
3.	Total number of Plants in Campus	Large Trees – 250 Shrubs – 750 Herbs - 20
4.	Provide some names of trees and plants in the campus.	• Mahogany, Sal, deodar are among trees. • Among vegetables green chili, tomato etc and among fruits guava, banana, coconut are suitable for the college campus. • Seasonal flowering plants like dahlia, marigold, sunflowers, daisy, pansy etc. • Some medicinal plants like boira, haritoki, amloki, tulsi etc. • Other plants like rose, champa (plumeria), togar (Jasmine), and different decorative plants can also be planted.
5.	Does the college campus have any Horticulture Department?	No
	If yes, number of Staff working in Horticulture Department?	NA

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6.	Number of Tree Plantation Drives organized by institute per annum.(If Any)	One
7.	Number of Trees Planted in Last year.	200
	Survival Rate	90%
8.	Plant Distribution Program for Students and Community	Yes
9.	Plant Ownership Program	Yes

III – ENERGY

1.	List down ways that you use energy in your campus. (Electricity, LPG, firewood, others). Using this list, try to think of ways that you could use less energy every day.	1. Lighting of rooms. 2. Cooling of rooms by fans. 3. Cooling of rooms (laboratories, offices, smart classrooms) by air conditioners. 4. Using LPG in canteen and kitchen. 5. Running DG sets by Diesel. 6. Lighting up hoardings and glow sign boards. 7. Running of pumps to supply water in laboratories and toilets. 8. Running of RO machines for water purification and for generation of drinking water.

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		9. Watering gardens. 10. Running of various electronic devices like computer, printers, photo copy machines and laboratory equipment .
2.	Are there any energy saving methods, equipments, techniques employed in your campus? If yes, please specify. If no, suggest some	YES. • Installation of roof top solar plants. Generated power is transferred to the grid of CESC. (CALCUTTA ELECTRIC SUPPLY CORPORATION) • Using of LED in all class rooms and laboratories. Approx. Just above 70% of all the lights are energy saving LED. Rest of the conventional lights shall be replaced in near future. • College class rooms and laboratories, stairs, corridors are well lit up with natural light through large windows. • Using of AC drain water in nearest garden. Suggested: • Using of RO drainage water for suitable purposes. (Garden/ washing etc) • Installation of smart tap and dual flush system. • Regular maintenance of air-conditioner . • Organizing awareness

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		programs on judicial use of energy and on our social responsibilities. • Installation of sensor-based lights is under consideration. One light has already been installed on experimental basis.
3.	Give an estimate of number of lights installed in your campus along with numbers?	300 LED and Tubelights
4.	Are any alternative energy sources employed/ installed in your campus? (photovoltaic cells for solar energy, windmill, energy efficient stoves, etc.,) Specify.	Yes, Photovoltaic cells for solar energy.
5.	Do you run "switch off" drills at campus?	No
6.	Are your computers and other equipment's put-on power-saving mode?	Yes
7.	Does your machinery (TV, AC, Computer, weighing balance, printers, etc.) run on standby modes most of the time? If yes, how many hours?	No However they run on stand- by mode in interval of consecutive use. 5-10 min.

IV - WATER CONSERVATION

1.	List all the uses of water in your campus?	• Toilets. • Laboratories. • RO/ drinking • Gardening • Cleaning and washing.

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2.	How does your campus store water? (mention tanks with capacity) Are there any water saving techniques followed in your campus?	Institute has overhead tanks for water storage. It also has a tank at the ground level for rain -water harvesting. Signage in front of taps, using of Ac drainages to gardens, rain water harvesting.
3.	If there is water wastage, specify why and how can the wastage be prevented/ stopped?	RO drainage waters are so far not used. The decision is pending. If that water fits suitable for plant then it could be used in garden. Otherwise it can be used for washing and cleaning.
4.	Locate the point of entry of water and point of exit of waste water in your campus. Entry- Exit-	Pipe line connected with the overhead tank supply the water to the toilets and basins. Underground pipes and drains that carry the waste water opens in the underground sewerage line of KMC.
5.	Write down few ways that could reduce the amount of water used in your campus?	• Using of signage at every point of water use. • Use of A/C drainages in the garden. • Use of RO drainage water for cleaning • By storing water through rain water harvesting and thereby using it for suitable purpose can reduce the water used.
6.	Record water use from the campus water meter for six months (record at the same time of each day). At the end of the period, compile a table to show how many litres of water have been used.	The water is not coming through water supply line. The institute has own bore well from which the water is pumped to the overhead tanks. The institute does not has any water meter installed either to record the regular

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		usages of water quantity. However from the regular running hours and water tank capacities we can calculate the daily water use.
7.	Does your campus harvest rain water? (Please explain the method and uses)	Yes
8.	Is there any water recycling System.	No water recycling system.

V - CLEAN AIR

1.	Are the Rooms in Campus are Well Ventilated?	Yes				
2.	Number of windows per room (aggregate value to be provided)	0.096(W/F in Sq.ft)				
3.	What is the ownership of the vehicles used by your institute? (Please Tick ✓ only one)	✓	No			
			Operator-owned vehicles			
			Institute-owned vehicles			
			A combination of campus-owned and operator-owned vehicles			
4.	Provide details of institute-owned motorized vehicles?	Buses	Cars	Vans	Other	Total
	No. of vehicles	-	-	-	-	-
	No. of vehicles more than five years old	-	-	-	-	-
	No. of Air conditioned vehicles	-	-	-	-	-
	PUC done	-	-	-	-	-
5.	Specify the type of fuel used by your institute's vehicles:	Buses	Cars	Vans	Other	
	Diesel	-	-	-	-	

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	Petrol	-	-	-	-
	CNG	-	-	-	-
	LPG	-	-	-	-
	Electric	-	-	-	-
6.	Air Quality Monitoring Program (If Any)	Conducted by department of Geography in recent past.			
7.	Students suffer from respiratory ailments? (If Any)	No			
8.	Details of Diesel/Gas Generator. (Rating & Make)	34KVA Kirloskar make DG set is available.			

VI – ANIMAL WELFARE

1.	List the animals (wild and domestic) found on the campus (dogs, cats, squirrels, birds, insects, etc.) (if any)	No domestic animals present in the college campus. However, the wildlife in college premises is diversified. Various birds (myna, wagtail, sunbird, red vented bulbul etc), Mammals (rodents, mongoose, squirrel etc) Reptiles (different snakes, garden lizards, skink etc) amphibians (frog and toads) are common. Among insect's different species of butterfly, dragon fly, beetles are predominant.
2.	How many dogs in your area have undergone Animal Birth Control - Anti Rabies (ABC - AR)?	NA
3.	Does your campus have a Biodiversity Programme or a KARUNA CLUB?	The institute has its own form of biodiversity programs but there is no karuna club.

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VII - ENVIRONMENTAL LEGISLATIVE COMPLIANCE

1.	Are you aware of any environmental Laws pertaining to different aspects of environmental management?	Yes
2.	Does your campus have any rules to protect the environment? List possible rules you could include.	The rules are: 1. Students must not pluck flowers and to damage any part of the plants in the college premises. 2. Every student shall take responsibilities so that college premises must be clean. 3. There are green and blue bins where the wastes are suggested to be disposed by the students. 4. Students must use water and electricity judicially.
3.	Dose Environmental Ambient Air Quality Monitoring conducted by the Campus?	Yes, in recent past prior to COVID.
4.	Dose Environmental Water and Wastewater Quality monitoring conducted by the Campus?	No
5.	Dose stack monitoring of DG sets conducted by the Campus?	Yes
6.	Is any warning notice, letter issued by state government bodies?	No
7.	Dose any Hazardous waste generated by the Campus? If yes explain its category and disposal method.	Yes. Laboratories of different disciplines mainly from chemistry the hazardous waste are generated. Disposal is done by college appointed registered waste management agency. (Vital Waste)

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8.	Dose any Bio medical waste generated by the Campus? If yes explain its category and disposal method.	No

VIII - GENERAL

1.	Are you aware of any environmental Laws pertaining to different aspects of environmental management?	Yes
2.	Does your campus have any rules to protect the environment? List possible rules you could include.	Yes
3.	What is the housekeeping schedule of garden and common areas in your campus?	Daily cleaning.
4.	Are students and faculties aware of environmental cleanliness ways? If Yes Explain	Yes. Apart from regular cleaning programme, the institute conducts cleaning programmes through NSS unit which involve teachers and students of various disciplines in cooperation of cleaning personnel and sweepers.
5.	Does Important Days Like World Environment Day, Earth Day, and Ozone Day etc. celebrated in your Campus?	Yes.
6.	Does Campus participated in National and Local Environmental Protection Movement?	Yes
7.	Does Campus has any Recognition/certification for environment friendliness?	No
8.	Does Campus using renewable energy?	Yes, Solar Energy.
9.	Does Institution conducts a green/environmental audit of its campus?	No

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10.	Has the institution been audited/ accredited by any other agency such as NABL, NABET, TQPM, NAAC etc.?	NAAC

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Recommendations

- Environment Policy to be adopted by the college.
- Water Meter should be installed at the bore well and daily consumption of water shall be recorded to keep a check on water usage.
- Equipments when not in use shall be switched off and should not run in standby modes or ideal.

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Photographic Evidences

Solar Power Plant

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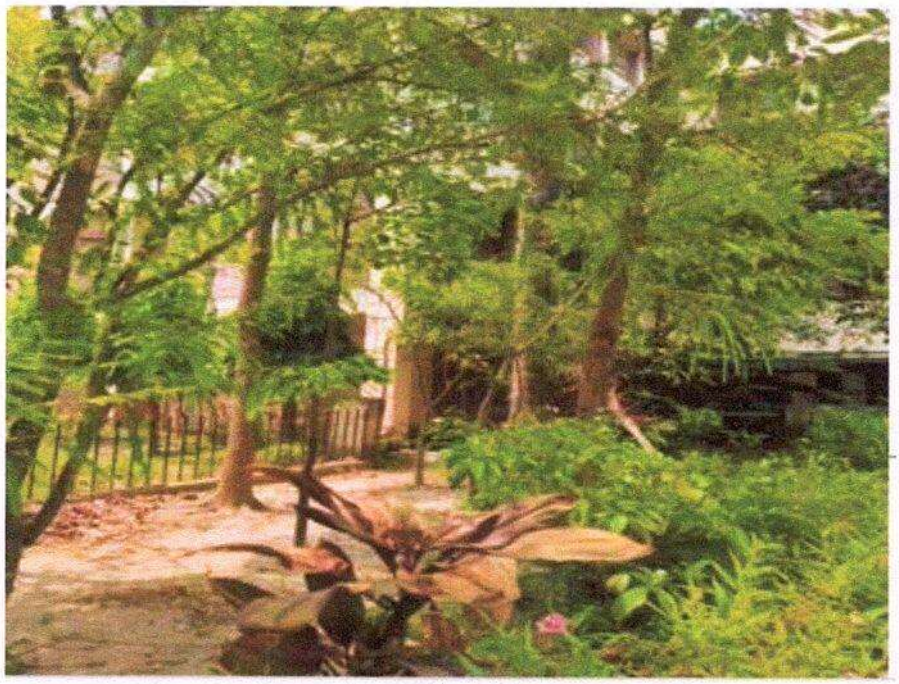

Tree Plantation

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Green Campus

Conclusion

This audit involved extensive consultation with all the campus team, interactions with key personnel on wide range of issues related to Environmental aspects. Overall, 60% of university campus is for landscaping. The audit has identified several observations for making the campus premise more environmentally friendly. The recommendations are also mentioned with observations for university campus team to initiate actions.

The audit team opines that the overall site is maintained well from environmental perspective. There are no major observations but recommendation is made in this report which would further strengthen the goal to achieve 100% environment friendly campus.

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References

- The Environment [Protection] Act – 1986 (Amended 1991) & Rules-1986 (Amended 2010)
- The Petroleum Act: 1934 – The Petroleum Rules: 2002
- The Central Motor Vehicle Act: 1988 (Amended 2011) and The Central Motor Vehicle
- Rules:1989 (Amended in 2005)
- Energy Conservation Act 2010.
- The Water [Prevention & Control of Pollution] Act – 1974 (Amended 1988) & the Water (Prevention & Control of Pollution) Rules – 1975
- The Water [Prevention & Control of Pollution] Cess Act-1977 (Amended 2003) and Rules- 1978
- The Air [Prevention & Control of Pollution] Act – 1981 (Amended 1987) The Air (Prevention & Control of Pollution) Rules – 1982
- The Gas Cylinders Rules – 2016 (Replaces the Gas Cylinder Rules – 1981
- E-waste management rules 2016
- Electrical Act 2003 (Amended 2001) / Rules 1956 (Amended 2006)
- The Hazardous Waste (Management and Handling and Trans-boundary Movement) Rules, 2008 (Amended 2016)
- The Noise Pollution Regulation & Control rules, 2000 (Amended 2010)
- The Batteries (Management and Handling) rules, 2001 (Amended 2010)
- Relevant Indian Standard Code practices

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End of Report

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DISCLAIMER

All information contained in this report is based on the data available and observations made during the audit. All recommendations made in this audit report should be duly evaluated by the management before implementation.

No warranty, guarantee, or representation, either expressed or implied, is made as to the correctness or sufficiency of any representation contained herein. This report may not address every possible loss potential, violation of any laws, rules or regulations, or exception to good practices and procedures. The absence of comment, suggestion, or recommendation does not mean the property or operation(s) is in compliance with all applicable laws, rules, or regulations, is engaging in good practices and procedures, or is without loss potential. No responsibility is assumed for the discovery and/or elimination of hazards that could cause accidents or damage at any facility that is subject to this report.

GREEN AUDIT REPORT
FOR
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We acknowledge with gratitude the whole hearted support and cooperation extended by all team members while carrying out the study.

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Overview of Institute

Sammilani Mahavidyalaya was established on 12th of December, 1996 by the initiative of some academic entrepreneurs, with a definite objective to impart knowledge and skill to the young generation of the locality. Along with those academicians, enthusiasts from all sections of the society also rendered their active co-operation in this selfless venture. Initially the college started functioning from a local secondary school, Santoshpur Vidyamandir (Boys) and the classes were held in the evening. Within a record period of only seven months, the new building was constructed and the college shifted to its present address. On 5th June 2003, UGC granted the college the status to receive financial assistance under the rule U/S 12(B) of the UGC Act. 1965. The college has been accredited by the National Assessment and Accreditation Council in 2005 and awarded Grade 'B' and Grade 'B++' in the year 2016. It has also been assessed by the Department of Higher Education, Govt. of West Bengal in January, 2010 under the State Level Assessment Programme (SLAP). The college, which started with only three students, is now bustling with more than 2000 students in the different departments of Arts, Science and Commerce faculties. The active and moral support of Sri. Buddhadeb Bhattacharjee, former Chief Minister of West Bengal, the unyielding devotion of Sri Kanti Bhushan Ganguly, former Minister of Sunderban Affairs, Govt. of West Bengal (and also the erstwhile Secretary of the Preparatory Committee of the college), the sincere dedication and guidance of Late Prof. Ramaranjan Mukhopadhyay and Prof. K.P. Majumder and the efforts and services rendered by all those persons who are associated with the college in one way or the other have helped the college to attain present position as one of the leading academic institutions in the locality. Today the college is on the fast track of progress and success. Yet, there are many miles to tread before our dream becomes true, before our vision materialises into reality.

List of programs offered by the institute:

Following are the list of undergraduate courses offered by the institute-

Three year degree programmes in:

A. Arts

History, Geography, Political Sciences, Sanskrit, Education, English, Bengali, Philosophy, Economics.

B. Science

Computer Science, Microbiology, Physics, Chemistry, Zoology, Botany, Mathematics.

C. Commerce

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List of the Facility Building:

Total Area: 8093 sq.mt (2 Acre)
Green Area: 5417.25 sq.mt

Building Name	Areas	Number of Floors
Main Block including West Block	1103 sq. mt.	4
West Block	484.4 sq. mt.	3
New Block	559 sq. mt.	2
Annex building	197 sq. mt.	2
Space among the blocks	332.35 sq. mt.	

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Introduction

Green Audit is a process of systematic identification, quantification, recording, reporting and analysis of components of environmental diversity of institute. It aims to analyse environmental practices within and outside of the concerned place, which will have an impact on the eco-friendly atmosphere. Green audit is a valuable means for a college to determine how and where they are using the most energy or water or other resources; the college can then consider how to implement changes and make savings. It can create health consciousness and promote environmental awareness, values and ethics. It provides staff and students' better understanding of Green impact on campus. If self-enquiry is a natural and necessary outgrowth of a quality education, it could also be stated that institutional self-enquiry is a natural and necessary outgrowth of a quality educational institution. Thus it is imperative that the college evaluate its own contributions toward a sustainable future. As environmental sustainability is becoming an increasingly important issue for the nation, the role of higher educational institutions in relation to environmental sustainability is more prevalent.

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 institutes which will lead for sustainable development and at the same time reduce a sizable amount of atmospheric CO2 from the environment. The National Assessment and Accreditation Council, New Delhi (NAAC) has made it mandatory that all Higher Educational Institutions should submit an annual Green 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.

Advantages of Green Audit:

Green Audit is assigned to the Criteria 7 of NAAC, National Assessment and Accreditation Council which is a self-governing organization of India that declares the institutions as Grade A, Grade B or Grade C according to the scores assigned at the time of accreditation. Some main advantages of green Audit are:

- It helps to shield the environment.
- Minimizing the waste and managing the cost.
- Authenticate conformity with the implemented laws.
- Minimizing the energy consumptions and focus on green and clean energy.
- Ambient Environmental Condition.
- Awareness and Training on Sustainability for Students.
- Awareness about environmental guidelines and duties.

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Environment Setting

The land use around the campus is mix of residential and institutional area. Schools, Restaurants, Housing Complexes and other institutes are present around the campus.

Sammilani Mahavidyalaya Campus

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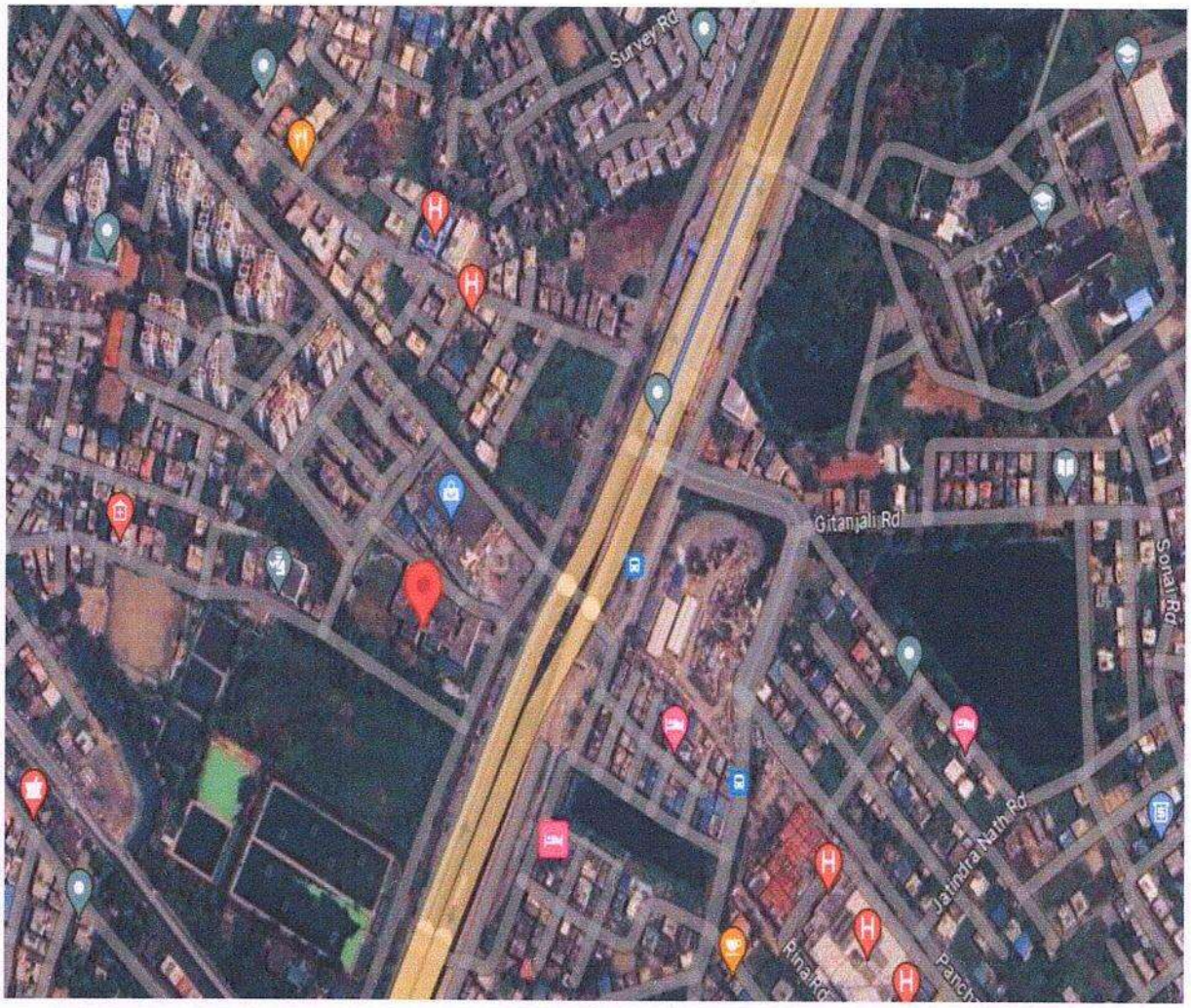

Location of Sammilani Mahavidyalaya Campus

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Green Audit

For Green Audit following 13 major areas (including their subsections) were covered and compliance/ initiatives under these areas were verified/ validated.

a) Good Daylight Design and Ventilation
b) Water Efficiency
c) Wastewater Management
d) Indoor Air Quality
e) Energy Efficiency
f) On-site Energy Generation
g) Temperature and Acoustic Control
h) Paper Waste Management
i) E-Waste Management
j) Canteen and Solid Waste Management
k) Universal Access and Efficient Operation and Maintenance of Building
l) Green Belt
m) Green Programs (Green initiatives)

3.1 Good Daylight Design and Ventilation

a) Corridors are wide with good ceiling height. All the corridors receive good daylight.
b) Classrooms, Labs and Library have large windows. Adequate daylight is received through the windows during daytime.
c) Classroom walls, corridors and labs are white-washed, this enhances the daylight received.
d) Curtains are provided on some of the windows to avoid glare.
e) Laboratories and washrooms are provided with exhaust fans to disperse heat, fumes and odors.
f) Stair cases receive daylight through windows provided at various levels.

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Good Daylight in Classrooms and Labs

Daylight in Staircases

3.2 Water Efficiency:

a) Borewell is used for water supply in the campus.
b) Water from borewell is stored in 8 overhead tanks of capacity 4KL and 2KL each.
c) Normally mops are used for floor cleaning and hose is used for cleaning once a week
d) Dual flushing system is not provided in the washrooms.
e) Signages are provided in washrooms emphasizing water conservation.
f) Water from air conditioning unit is used in gardening.
g) Rain water harvesting system is available in the campus.
h) Water conservation taps were not installed in the washrooms.

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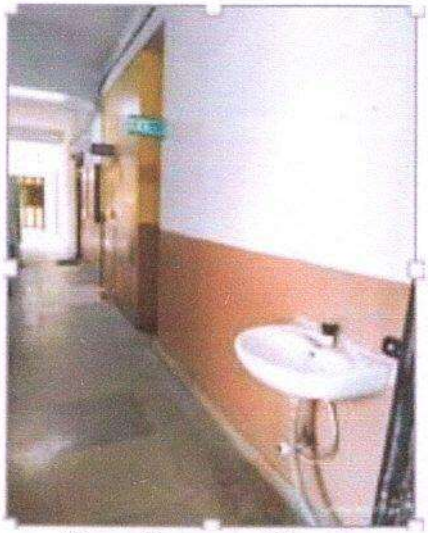
Water conservation signage present



Normal taps and faucets

3.3 Wastewater Management:

i) Waste water or sewage treatment plant is not available in the campus.

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3.4 Indoor Air Quality;

Indoor Air Quality (IAQ) refers to the air quality within and around buildings and structures, as it relates to the health and comfort of building occupants. Some common indoor pollutant are listed as below:

- Molds and other allergens – This may arise from water seeping into the building envelope or skin, plumbing leaks, condensation due to improper ventilation, or from ground moisture penetrating a building part.
- Carbon monoxide – Sources of carbon monoxide are incomplete combustion of fossil fuels.
- Volatile organic compounds (VOCs) – VOCs are emitted by paints and lacquers, paint strippers, pesticides, office equipment such as copiers and printers, correction fluids and carbonless copy paper, graphics and craft materials including glues and adhesives, permanent markers, and photographic solutions etc.
- Carbon dioxide – Due to human respiration
- Particulate matter – Due to construction and maintenance activities

Major observations under indoor air quality are as below:

a) In classrooms the mode of ventilation is natural (through windows) and is enhanced by fans. Air conditioners are used in some of rooms such as offices, labs, computer labs, computer server room etc.
b) Heating Ventilation and Air Conditioning (HVAC) system does not exist. Split and Windows Air conditioners are used.
c) Indoor plants are seen in the College. Indoor plants can be plotted not only for the aesthetic appearance but also for health benefits. Refer Annexure 1 for details.
d) Indoor air quality signages were not present in the campus.
e) Green belts have been set up in campus area.

3.5 Energy Efficiency:

Electricity:

Power is supplied by CESC Limited. The major electricity consuming equipment installed in the campus are Windows and Split AC, Submersible Motor, Motors, RO Plant, Desktop, Printer, Fan, Tube light, LED Bulb etc.

Following is details of energy consumption:

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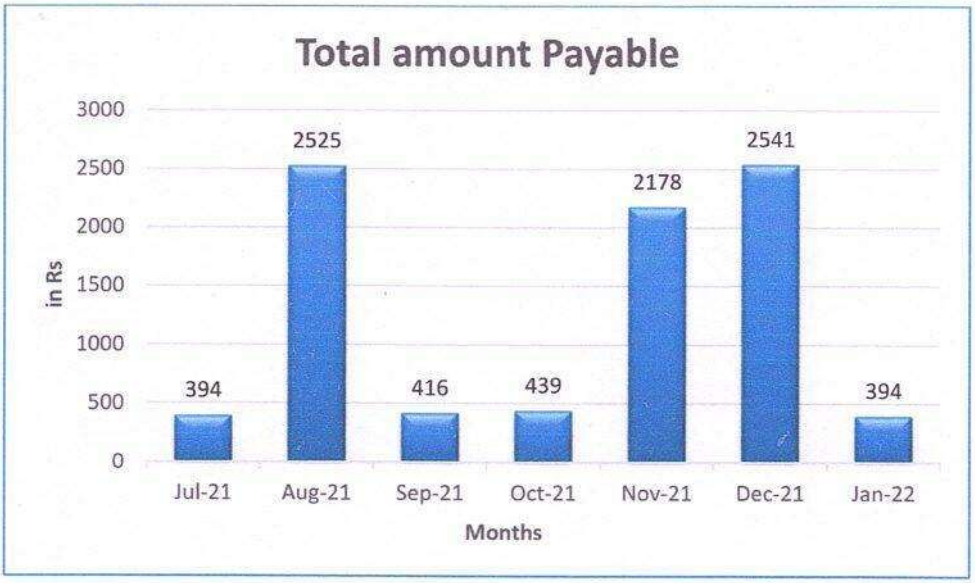
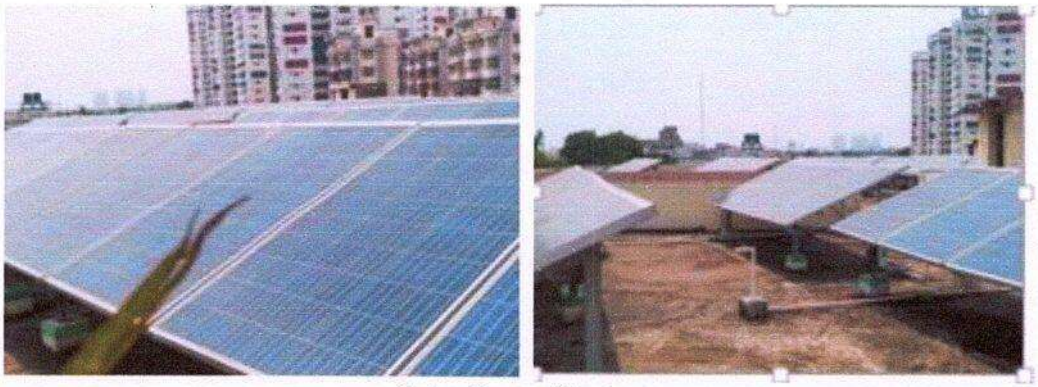


It was observed that:

a) LED lights are used at majority of the places.
b) Campus has air conditioners which are in good working condition.
c) Solar power plant is also installed in the campus.



Solar Power Plant

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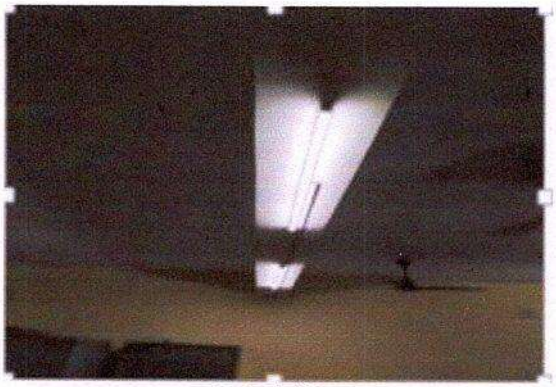

LED lights

3.6 On Site Energy Generation (usage of LPG/ Natural Gas):

a) LPG is provided in the canteen for cooking.
b) Back Up diesel generator of rating 34KVA is present although the running hours of generator is pretty low..

3.7 Temperature and Acoustic Control

a) White washed rooms & corridors and white/ off-white flooring improve the lighting conditions.
b) The entire campus has green area.
c) Two flower gardens and one medicinal plants garden are present in the college premises. Apart from these, plants of various types are planted in different locations in the college campus.

3.8 Paper Waste Management:

Being academic institution, waste paper is the main solid waste generated in the premises. The College has taken steps to minimize and avoid paper usage.
It was observed that:

a) Prints and photocopies are taken on both sides of the pages to avoid excess paper usage. Rather than photocopy, digitalization (scanning) is practiced.
b) Internal notices and communications are through E-mail/Whatsapp.
c) Faculty and administration staff uses old papers and envelopes for internal usages as rough work, file markers, page separators etc.
d) Paper notices are displayed on the notice boards.

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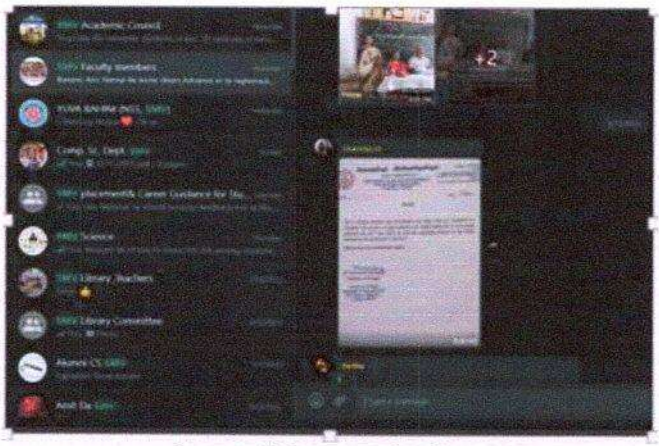
Paper Notices



Internal Communication

3.9 E-Waste Management:

a) M/s. Redivivus Recyclers Private Limited, is engaged in managing the e waste and some other waste materials like papers, flat boards, plastic bottles, metals (aluminium, copper etc), chemical/ hazardous waste, electronic waste etc.

3.10 Solid Waste Management:

It was observed that:

a) Wet waste and dry waste segregation is practised in the premises. Separate bins are provided for wet biodegradable and dry recyclable waste.
b) Non E- waste, used papers, flat boards, plastic bottles, metals (aluminum, copper etc.), chemical/hazardous waste, electronic waste are disposed by authorised

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management companies appointed by the Institution. Biodegradable waste is mainly generated in canteen.

c) Composting Regular house hold waste materials like small packets, plastic, scrap foods and collected in blue and green bins. Wastes from regular anthropogenic activities are collected by the institution appointed cleaning agency personnel through green and blue bins placed in different points within college premises. The wastes therefore placed in Kolkata Municipality Corporation scheduled dumping - yard, from where KMC collect waste for processing and recycling, as applicable.

3.11 Universal Access and Efficient Operation and Maintenance of Building:

It was observed that:

a) College is easily accessible. Staircase and ramps are provided for staff and students.
b) Since the access and staircases are wide and uncluttered, it is possible to have a safe evacuation during emergency.
c) Fire extinguishers are provided for emergency. They are inspected and serviced by fire protection Service Company annually.
d) Directional exit signages and floor markings are present on every floor of the campus.
e) Regular Fire Safety Trainings shall be given to staff and students on annual basis.

Ramps present in campus

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Fire extinguishers and directional exit signages

3.12 Green belt/ Landscaping:

a) Large trees and plants are planted in the premises. Plantation also helps maintaining lower temperatures of the area.

3.13 Green Initiatives:

Yes, various types of Cultural programmes are conducted on regular intervals.

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Recommendations/Suggestions

For Improving Energy Consumption:

a) Every classroom and lab with central switch board can have a diagram linking location of a tube light, fan etc. with corresponding switch. This will ensure that correct fitting is switched on/ off and can save time & unnecessary operation.
b) Installation of automatic lights with sensors can be considered.
c) Standard Operation Procedures (SOPs) should be prepared and followed for green purchasing. Equipment with star rating, using eco-friendly materials; with safe disposal policy to be preferred. Policy of returning equipment at the end of life span to the supplier to be preferred.
d) For purchasing new electronic appliances, star rating provided by Bureau of Energy Efficiency (BEE) should be considered. The equipment which has maximum star ratings could be purchased, which will consume less energy, ensure environmental sustainability and also operate at low cost.
e) Usage of light reflectors is recommended as the reflectors can spread light to relatively large areas.
f) If possible, computers should be switched off from main power connections.
g) Notices/signages can be put up/displayed near switches and on notice boards, informing students and staff to switch off all electricals when not in use.
h) Control sensors can help to reduce consumption by automatically dimming lights when people are not around, and keeping blinds open to use natural light & reduce energy consumption.
i) Raise awareness:
    - Encourage students to help in monitoring energy consumption & implement corrective actions
    - Integrate energy education into classroom learning.

Water Conservation:

a) Provide information on water usage and savings to students/ staff through notices, screen savers in computer labs.
b) Dry sweep or use a sponge broom when possible, instead of using a hose to clean floors, sidewalks, or other hard surfaces.
c) Minimize/ reduce water usage by installing water saving faucets such as pressmatic taps, tap aerators, jet sprays etc.
d) Installation of waterless urinals can be considered to reduce water consumption.

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e) Water balance diagram can be prepared to quantify the water consumption by installing water meters at key points. Based on data gathered, appropriate measures can be taken to reduce the water consumption.

Paper and other Solid Waste Reduction:

a) Inventories of all solid waste generated in the premises must be maintained.
b) Enhance recycling. This can be done by creating a group where students can recycle books, personal clothes and other material to needy students. This can be an initiative under green program.
c) Standard Operating Procedures (SOP) for Solid and E-waste management and for recycling of waste should be prepared & practiced. The SOP's may include collection, segregation and reuse of different types of wastes, if any (e.g. biodegradable waste for composting). This will help in safe disposal of waste to recycle agencies.
d) Training as well as awareness programs should be organized on segregation of biodegradable waste and recycling of waste. Efforts should be taken to inform students about recycling options and signs should be posted on appropriate bins indicating what could be dumped in each bin.
e) The college can introduce online app, which can be useful for conducting internal exams, assignment/ reports submission. This system can also be used for displaying important notices, timetables.
f) Paper usage shall be monitored to understand the impact of digitization in the facility.

Others:

a) Environmental advisory committee could be formed. The discussions/ information sharing among different departments can generate lot of ideas and awareness on green issues.
b) Maintain minutes of meetings of environmental committees; evaluate the effectiveness of various environmental programs conducted by the institutes. Set annual targets for Green Initiatives & monitor them closely. Create 'Green Champions'.
c) Since each student uses computer lab, the screen savers can be set up for creating environmental awareness. (Ergonomics, water conservation etc.). Short 30 second pop up can be displayed on computer screens when they are on standby mode. Or wallpapers informing students about environment conservation can be created.

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d) Consider detailed energy audit (energy consumption, thermal emission, visual comfort) and water audit.
e) Adopt environmentally responsible purchasing policy, and work towards creating and implementing a strategy to reduce environmental impact of its purchasing decision.

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Annexure 1 – Indoor Gardening Details

Indoor plants are commonly used for their aesthetics benefits but they also have vital role reducing airborne pollution. The right choice of plants can be an excellent way of improving indoor air quality and general health. Local landscape contractor can be contacted for supply and rotation of these plants.

Plants	VOC it removes	Indoor source of VOC's	Plant care
 Aloe Vera	Formaldehyde, Trichloroethylene and Benzene	Chemical based cleaners and paints	Easy to grow with enough sunlight
 Bamboo Plant	Formaldehyde, Trichloroethylene and Benzene	Paints, Plastics, Wood products etc.	Thrives under low light conditions as well as easy to maintain
 Chinese Evergreen	Benzene	Paints	Low maintenance plant that prefers low light conditions.

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 **English Ivy**	Formaldehyde, Benzene, Air borne fecal matter particles	Wood, Paper products, Air borne fecal – matter particles from pests	Easy to maintain
 Janet Craig	Formaldehyde, Benzene and Trichloroethylene	Paints, Plastics, Wood products etc.	Medium to low light tolerant plant. Requires little water for growth.
 Golden Pothos or Devils Ivy	Formaldehyde, Cleanses air	Exhaust fumes, carpeting materials, panelling and furniture products made with particle board	Extremely easy to maintain under low to bright light conditions. Fast growing and grows well under Fluorescent light.
 Mass Cane	Formaldehyde, benzene and trichloroethylene	Paints, Plastics, Wood products etc.	Medium to low light tolerant plant. Requires little water for growth.

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 Snake plant	Formaldehyde and trichloroethylene	cooking fuels, wood products, facial tissues, personal care products and waxed papers	Drought resistant and Tolerates a variety Of light conditions. Hard to damage or kill.
 Peace Lily	Formaldehyde, benzene and trichloroethylene	Paints, Plastics, Wood products etc.	Relatively easy to maintain. Survives in low light conditions.
 Red-edged Dracaena	Formaldehyde and trichloroethylene	cooking fuels, wood products, facial tissues, personal care products and waxed papers	Drought resistant and Tolerates a variety of light conditions. Hard to damage or kill.
 Spider Plant	Formaldehyde, benzene, carbon monoxide and xylene	cooking fuels, wood products, Printing	Easy to maintain under medium to bright light condition.

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 Parlor Palm	Purifies indoor air	-	Easy to maintain

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Elion Technologies & Consulting Private Limited

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Website: www.elion.co.in

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ENERGY AUDIT REPORT
FOR
SAMILLANI MAHAVIDYALAYA

Elion Technologies & Consulting Private Limited

307, 3rd Floor, DDA Lal Market, H-Block
Vikas Puri, New Delhi-110018

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Acknowledgement

Elion Technologies and Consulting Pvt Ltd places on record it's thanks to Sammilani Mahavidyalaya for entrusting the task of conducting energy audit study.

We acknowledge with gratitude the whole hearted support and cooperation extended by all team members while carrying out the study.

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Site Information

Name of College	Sammilani Mahavidyalaya
College Address	Eastern Metropolitan Bypass, Baghajatin, Kolkata, West Bengal, 700094
Execution Partner	ELION Technologies & Consulting Pvt Ltd
Communication Address	307, 3rd Floor DDA Lal Market H-Block Vikas Puri, New Delhi-110018
Date of Audit	17th March 2022
Year of Audit	2021 - 2022
Audit Participants	Dr. Sharmila Chakraborty – Teacher In Charge Prof. Debashish Roy – Coordinator of Quality Audits Dr. Srikanta Malakar – IQAC Coordinator Dr. Ananda Mukherjee – Associate Professor, Commerce Prof. Uttam Kumar Ghosh – Associate Professor, Commerce Prof. Lupsy Mohanty Roy – Assistant Professor, Pol. Sc. Prof. Brototi Mondal – Assistant Professor, Computer Sc. Shri Rajesh Das (Electrician) Premanshu Purkait and Tarapada Das – Cleaning Agency appointed personnel
Major Electrical Equipments	- Air Conditioners - Lighting - Fans - Motors and Pumps

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Executive Summary

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Annex building	197 sq. mt.	2
Space among the blocks	332.35 sq. mt.	

Electricity is supplied by CESC Limited and for backup power supply DG Set is available of 34KVA.

The energy audit included detailed data collection, analysis of data and identification of specific energy saving proposals.

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Chapter 01: Introduction

Sammilani Mahavidyalaya evinced interest in availing the services of Elion Technologies and Consulting Pvt Ltd for conducting energy audit of their premises.

Elion Technologies and Consulting Pvt Ltd team conducted the detailed Energy audit on 17th March 2022.

This report is on the energy audit carried out Sammilani Mahavidyalaya. The detailed energy audit comprised the following activities:

- Data collection of power consuming equipments.
- A brief session on energy management was conducted to seek more inputs from the personnel engaged in operation and maintenance of electro mechanical services.
- Analysis of collected data.
- Discussion with the officials on the identified proposals.
- Discussion and reporting of the findings of energy audit with the team members and the management staff.

All the identified energy savings proposals have been discussed with the executives concerned before finalizing the projects.

The contents of the report are based solely on the data provided by Sammilani Mahavidyalaya officials during the energy audit.

The management should implement the suggestions made in the report after verifying requisite safety aspects.

Methodology for Energy Audit:

The following is a list of general procedure and information undertaken during the energy audit:

- General information of the site.
- Baseline energy description.
- Past energy consumption bills which includes electricity bills.

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- On site data collection
- Energy analysis of different sectors.
- Recommendation of energy conservation measures.

The primary goal of the energy audit was to identify sources and areas of potential energy savings and cost saving throughout the college premises by measures of optimization, replacement, retrofitting, and on the other hand, to also provide recommendations on operational and maintenance practices improvements.

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Chapter 02: Energy Consumption Details

The main areas of energy consumption as observed during the audit are as follows:

- Air Conditioners
- Lighting & Fans
- Motors & Pumps
- Desktops & Printers

The main sources of energy to meet the required consumptions are as follows:

- Electricity supply from Power Distribution Company.
- DG set.
- Solar Power Plant of capacity 20KW.

Consumption pattern for energy is given below:

Months	Billed Units (KWH)	Total amount Payable
Jul-21	675	394
Aug-21	284	2525
Sep-21	740	416
Oct-21	790	439
Nov-21	238	2178
Dec-21	286	2541
Jan-22	693	394

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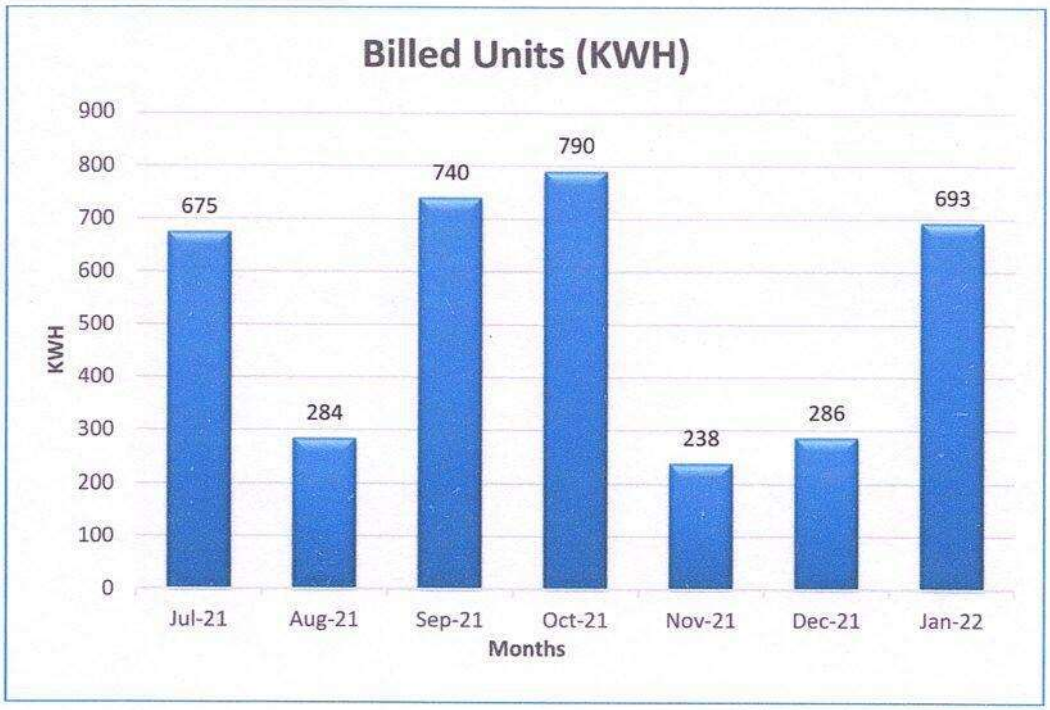

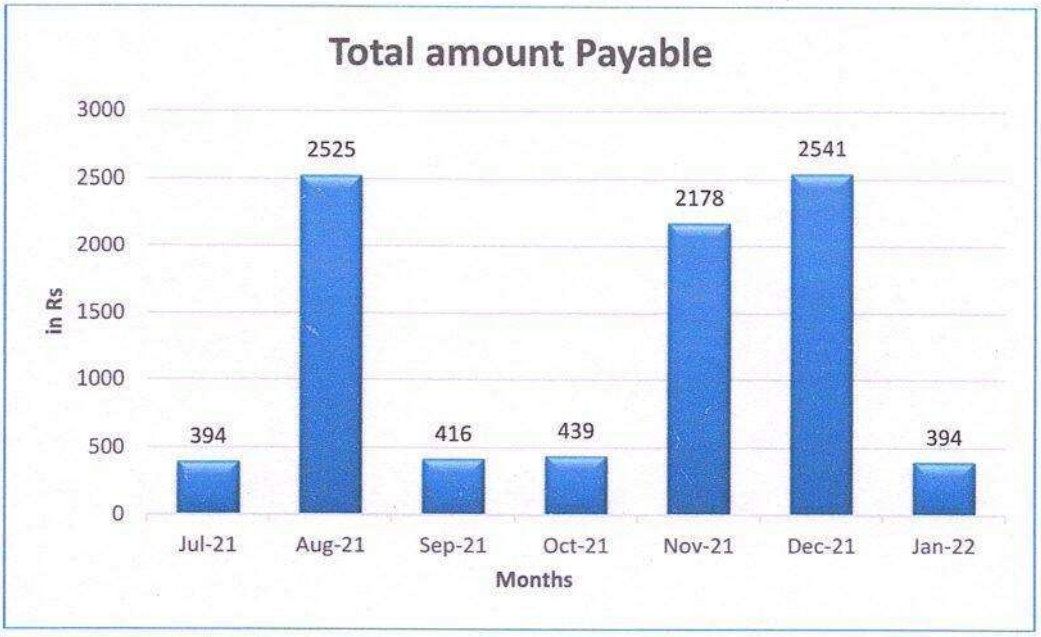

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Chapter 03: Lighting System

Conventional Fluorescent Tube lights, LED lights and LED Tubelights are installed around the campus.

Type of Light	Location	Rating	Quantity	Number of Hours being turned on
LED Tubelight	Main Gate	50W	2	4
LED Tubelight	Classroom	20W	120	4
LED Tubelight	Laboratory	20W	87	6
LED Tubelight	Library	20W	25	6
LED Tubelight	Annex buildings (canteen, Union room, Gym, NSS, post office)	20W	20	4
LED Tubelight	Others (Principals room, offices, stair cases, cooridors, Bursar's room, attached toilets and others)	20W	46	6
Conventional Tube/ Tubelight	Main Gate	NIL	NA	NA
Conventional Tube/ Tubelight	Classroom	40W	NA	6
Conventional Tube/ Tubelight	Laboratory	40W	123	6
Conventional Tube/ Tubelight	Library		Nil	
Conventional Tube/ Tubelight	Annex buildings (canteen,Union room,Gym,NSS,post office)	40W	1	5
Conventional Tube/ Tubelight	Others (Principals room, offices, stair cases, cooridors, Bursar's room, attached toilets and others)		Nil	6

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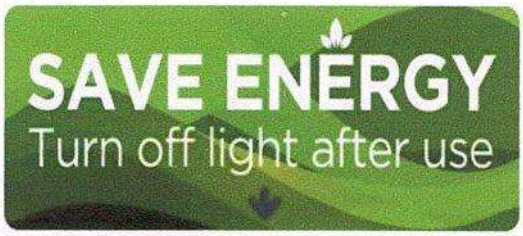
Observation:

Most of the lighting used are LED lights. Conventional lights are also used at various locations. It was informed that college is in process of replacement of old conventional lights with energy efficient LED lights.

Recommendation:

- Sticker to SWITCH OFF LIGHT and SAVE ENERGY to be displayed.
- Regular cleaning of light fixtures to be done to get maximum lux level.



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Chapter 04: Pumps and Motors

Submersible pumps and other pumps are used for pumping of water. The details of the pumps and motors are given below:

- Submersible pump used for ground water pumping.
- BE Pump Hikson.
- NEC motor.

Observation:

All pumps and motors are functioning properly and well maintained.

Recommendation:

Proper maintenance and upkeep of pumps and motors to be done.

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Chapter 05: Air Conditioning

Windows and Split AC's are used in facility for air conditioning. Temperature maintained is 26 degree C which is a good practice. Following is the list of ACs present in the campus:

Type of Air Conditioners	Capacity in Ton	Whether any star rating available	Set temperature	Running Hours	Whether AC performance is satisfactory Yes/No
Split Air conditioner/Carrier/Smart Classroom, Laboratories (Math, Commerce, Physics, Comp.Sc, BOOST, Chemistry, Geography), IQAC, Library*, Principal's Chamber, Office I&II.	1.5, 2	3	26	4 hrs	Yes

Observation:

- All air conditioners are found to be functioning properly and well maintained.

Recommendation:

- All doors to be kept closed while using the air conditioners and regular annual service of AC's should be carried out.
- Set Temperature of Air Conditioner shall be maintained at 26°C.
- A reduction in 1°C set point temperature, the energy cost comes down by 5%. By carefully selecting the seasonal temperature in different areas as per requirement considerable saving on account of power consumption can be achieved.
- Whenever Air Conditioners are replaced in future, BEE 5 star rated air conditioners shall be considered which are energy efficient.

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Conclusion

The energy audit conducted at Sammilani Mahavidyalaya has revealed that the college is doing good work in having sustainable supply of energy. The Campus has a fully functional solar power plant. To further reduce energy consumption, the college should implement the recommendations made in report.

End of Report

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