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Green Audit Report

S. P. Mandal's Arts and Commerce College, Raibag.

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GREEN, ENERGY AND ENVIRONMENT AUDIT CERTIFICATE

This Certificate is Presented To

S. P. Mandal's Arts and Commerce College, Raibag.

Our team of Environmental Engineers visited the campus and analyzed Green, Energy and Environment practices followed by the college.

PRADEEP NAGAMALLI
B.E., M.TECH. (ENV. ENGG.)
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Ref. No.: NC/2020-21/1204/GA

To,
The Principal,
SPM's Arts and Commerce College,
Raibag.

Sub: Submission of Green Audit Report for your campus.

Respected Sir,

As per your request for Green Audit of the SPM's Arts and Commerce College, our team of Environmental Engineers visited the above said premises on 04.01.2022. We have analyzed and taken all the necessary data required for Green Audit of the campus. After assimilated study of all the data and analysis, we hereby submit the 'Green Audit Report' for the year 2020-21.

Please feel free to contact us for any clarification. We expect a long term, healthy association with your institution in the future.

Thanking You, Assuring you of our best service always,

Pradeep Nagamalli
B.E., M.Tech. (Env. Engg.)
Nisarga Consultants
Date: 22.01.2022

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Certificate

This is to certify that Nisarga Consultants, Belagavi has conducted **'Green Audit'** at S. P. Mandal's Arts and Commerce College, Raibag on 04.01.2022. Our team of Environmental Engineers visited the campus and analyzed green practices followed by the college. Observations made during our visit and recommendations have been discussed with the college staff. Details of the same has been mentioned in the 'Green Audit Report'.

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Date: 22.01.2022

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Acknowledgement

We express our gratitude for calling upon us for this audit, towards the whole Green Audit Team mainly the Principal, Prof. P. B. Munyal, who was the driving force. The team members mainly Prof. S. T. Dhanode, *Associate Professor,* Dr. Y. B. Himmadi, *Assistant Professor,* Prof. I. S. Gokak, *Assistant Professor,* who were ever helpful and supported us with all the inputs needed for this audit.

Green Audit Team

Mr. Pradeep N. V., M. Tech. (Env. Engg.)

Mr. Vijay S. Kumbar, M. Tech. (Env. Engg.)

Ms. Yashaswi K., B. E. (Civil Engg.)

Mr. Omkar M., M. Tech. (Strs.)

Mr. Sadanand M., B. Sc.

About the College

The S. P. Mandal's Arts and Commerce College Raibag is established in the year 1974 with an object to develop education in all spheres life, specially providing educational facilities for the deprived sections of society for their progress and upliftment. The college provides education in Arts, Commerce UG Programmes and PG Programmes in Commerce. The college is permanently affiliated to Rani Channamma University Belagavi. The college is recognized by University Grant Commission (UGC) under 2(f) & 12(B). Since the inception of our college it is proving quality higher education in this rural and backward area.

Mission

To provide excellent and competent teaching to our students which would help them to shape their own character and career suitable to the development of the nation and that enables them to the self-reliant and to invite and be successful in greater global challenges and enterprise in their own lives. To provide life skills and value based higher education with sound moral values.

Vision

As the very name of our trust "Shikshan Prasarak Mandal" suggested to spread education and to offer maximum opportunities to rural area students to come up and scale higher achievements in academic excellence and sports by affording quality education and coaching facilities

Our Vision is: "Value Based Education for Nation Building and Global Competencies"

Core Values

- To provide to our students such knowledge skills in their programmes to creativity and innovation in teaching, learning, evaluation that would help and prepare them to face the ever changing global challenges and enterprises in their own lives.
- To produce graduates of excellence competence and characters both UG (B.A. & B.Com) and PG (M.Com) who would venture into right vocations, professions, enterprise and made their own mark in the nation building activities.
- To impart quality education to rural youths.

Introduction to Green Audit

The green audit helps in analyzing environmental practices within and outside the institutional campuses, which will have an impact on the eco-friendly atmosphere. Green audit comprises of systematic identification, quantification, recording, reporting and analysis of components of environmental conditions in the campus.

Need for Green Auditing

Green auditing is the method of recognizing and determining whether the institutions' practices are environmentally friendly and sustainable in a long run. Primarily, we are good and efficient users of resources available naturally. Subsequently, excess use of energy, water, have become habitual to everyone.

Green audit provides an approach to check whether

- Our processes are consuming more resources than required?
- Whether we are handling resources carefully?

Continuous monitoring of such processes regulates and gives an efficient way of natural resource utilization.

Recent issues such as climate change and resource depletion are of greater concern. To combat such issues at institute level, it is necessary to verify the processes and convert it into green and clean one. Green audit also increases overall consciousness among the people working in the institution towards a sustainable environment.

Goals of Green Audit

Our team has conducted a green audit with specific goals, such as:

- Recognizing and documenting of green practices followed by the institute.
- Note strength and weakness in green practices presently followed.
- Analyze and suggest solution for the drawbacks identified.
- Evaluate facility of different types of waste management.

- Increase environmental awareness throughout campus.
- Inspire staff for optimized sustainable use of available resources.

Objectives of Green Audit

- To inspect the current practices, which can impact the environment.
- To recognize and analyze significant environmental issues.
- Establish and implement Environment Management in various departments.
- Continuous evaluation for betterment of performance in this regard.

Benefits of Green Audit to Educational Institutions

There are many advantages of green audit to an Educational Institution:

- It would help to protect the environment in and around the campus.
- Empower the organization to frame a better environmental performance.
- It portrays good image of institution through its clean and green campus.

Executive Summary

A Green Campus or an Eco-friendly Campus is a place where environmental friendly practices and education combine to promote sustainable and eco-friendly practices in the campus. It is a campus which is sustainable because of its resource utilization and minimum waste discharge into the environment. Green Audit or Environmental Audit is an assessment of the extent to which an organization is observing practices which minimize harm to the environment. It assesses the campus performance in complying with applicable environmental laws and regulations. This audit report comprises of observations and recommendations for improvement of environmental conditions in the campus. It mainly focuses on the environmental management plan in the campus with environmental factors like quality of water, ventilation, vegetation, waste management practices, consumption of energy, harmful radiations of the campus, etc.,

For this purpose, to assess the quality of the different environmental factors, samples were analyzed at different places in the campus, viz., water quality, light intensity, air quality, noise pollution and electro-magnetic radiation. The data which was collected were assorted, scrutinized, analyzed and documented.
Campus related preliminary interviews with the concerned staff were conducted. Student interaction also was carried out for this purpose. A report based on all these studies with regards to an environmental management plan at the campus with recommendations for further improvement is prepared.

Objectives and Scope

The purpose of this audit was to note that the campus follows environmental friendly approaches in its regular routine. The implementation of these methods are done in the campus, across all departments, administrative bodies and students and were analyzed.

Following issues were noted during our visit:

- Present conditions at the campus.
- Environmental education through systematic environmental management approach.
- Improving environmental standards.
- Benchmarking for environmental protection initiatives.
- Sustainable use of natural resource in the campus.
- Financial savings through a reduction in resource use.

Based on the available data, sampling and information provided by the college staff and officials, this report has been prepared and recommendations for betterment of campus environment are provided.

Summary of Findings

The main findings of the audit show that, all the students are aware about the need for environmental protection at a general level. It was also observed that a number of best practices such as water conservation, cleanliness, waste segregation, plantation, vermicomposting etc., are followed in the campus. There is also an Eco-Club, the NSS unit, actively involved in environment related activities.

However, on detailed review, it was observed that, the college is following green practices at various levels. But certain processes could benefit from further review in order to improve their efficiency, fairness and consistency.

Infrastructure and college details

- The college has sufficient infrastructure for curricular and co-curricular activities.
- Rooms - Total 42 rooms including 18 classrooms, 02 Computer laboratories, 01 library, 02 reading rooms, 06 department rooms, 01 common staffroom, 01 ladies room etc.
- Reading room with facilities of 100 students seating capacity.
- Sufficient reading materials for students.
- Administrative building such as principal chamber, president room, office room and department rooms.
- Computer laboratory with internet facility. The total numbers of PCs are 112.
- Computers with internet facilities in office, principal chamber, department rooms and library.

Waste Management:

Anthropogenic activities generate waste, and it is the way these wastes are managed and disposed of, which can cause risks to the nature and to health. Waste generated causes pollution which is unpleasing and results in large amounts of litter which in turn cause environmental problems. Solid waste is generally classified into three categories: bio-degradable, non-biodegradable and hazardous waste.

Bio-degradable wastes include food wastes, canteen waste, wastes from toilets, etc.,

Non-biodegradable wastes include what is usually thrown away in homes and schools such as plastic, tins and glass bottles, etc.,

Hazardous waste is waste that is likely to be a threat to health or the environment like chemicals from research labs, batteries, etc.,

Improper handling of these wastes such as dumping in pits or burning them, may cause harmful discharge of contaminants into soil and water supplies. Special attention should be given to the handling and management of such waste generated in the institutions.

Observations:

In this campus, the waste generated is managed as mentioned below:

Bio-degradable Waste:

- Dry leaves from plants and trees are collected and are used in vermicomposting. Food waste from canteen is also used in vermicomposting unit.
- Bio-degradable waste (sewage) from toilets is connected to a septic tank.
- Dry leaves from plants and trees are collected and are left aside. This heap is watered regularly. This turns into dry leaf compost. Dry leaf compost is used for plants and trees in the campus.

Non Bio-degradable Waste:

- Paper, plastics generated by the campus is collected by the waste collection vehicle of the Municipality.

Hazardous Waste:

- The college does not have any courses related to science, hence there are no laboratories generating any chemical waste, broken glassware, hazardous chemicals, etc.,

Recommendations:

Based on the observations made during our site visit, following recommendations have been made by us:

- More Dry leaf bins/pits can be made for composting.
- Paper waste can be sent for recycling.
- Electronic waste can be sent to a certified recycler.
- Educational posters related to water conservation, waste minimization, waste segregation can be put in the campus to create awareness.

Sl. No.	Details	Remarks
1	Wastewater Source	Toilets and canteen
2	Use of waste water	NA
3	Fate of waste water from labs	NA
4	Weather waste water from labs is mixed with other wastewater sources	NA
5	Any treatment for lab waste?	NA

Vermicomposting at Campus

Energy Management:

Energy management is an important aspect in institutions. Saving of electric power is a major part to minimize the greenhouse gas emissions to the environment. This can be achieved by using 5 star electrical appliances. Renewable energy can be harvested and be used in the campus.

Observations:

- Average Electricity consumption is found to be 100 to 200kWh units per month
- Use of energy efficient LED lights were observed in many of the class rooms.
- Solar lamp has been installed in the campus. Panel 65 Watts, 65 Ah Battery and is connected to a 12 Volts bulb.

Recommendations:

- Few more solar lamps can be installed to make the campus more sustainable
- Further replacement of LED bulbs can be done.

Solar Powered Lamp

Water Management

Quality and Quantity of water is one of the most important parameters in a Green Campus. Water Quality and Quantity differs from place to place depending on the condition of the water source from which it is drawn. Presence of contaminants in the water can lead to health issues of the consumers. Basic monitoring of the quality of water is necessary from the health point of view of the campus occupants. Meticulous Water Management plan of the water available is also imperative for sustainable resource utilization.

Observation:

The main source of water for the campus is three bore wells and one open well with sufficient water for the college throughout the year. The water from the source is pumped to the overhead tank situated on the top floor of the building and then supplied to the toilets, hand wash place, one Water Filter cum Cooler situated at the ground floor of the building. Drinking water from the Filter cum Cooler was tested for TDS, temperature and pH.

Source	Inlet			Outlet		
	TDS (ppm)	pH	Temperature (^{O}C)	TDS (ppm)	pH	Temperature (^{O}C)
1	363	7.66	25.5	83.5	7.2	25.1

Recommendations:

- Roof Top Rainwater harvesting can be done for further sustainability of water. The rainwater should be passed through a filter before storing/recharging ground water/recharging well. This water if stored, can be used for all purposes other than drinking (cleaning, gardening, etc.,).
- Periodic inspection of water filters has to be done.

Sl. No.	Details	Remarks
1	Source of water	Open well and borewells
2	No. of Wells/Borewells	1 Open well and 3 borewells
3	No. of motors used	3 pump sets
4	Horse power – Motor	5 hp, 3 hp, 5 hp
5	Depth of open well –Total	30 feet
6	Water level	15 feet in open well 150 feet in borewells
7	Number of water tanks (Overhead)	04
8	Capacity of tank	1000 lts X 2 tanks 500 lts X 2 tanks
9	Quantity of water pumped every day	1000 – 1500 lts per day
10	Any water wastage/why?	No
11	Water usage for gardening	300 lts to 500 lts
12	No. of drinking water filters/water coolers	03
13	Rain water harvest available?	Yes
14	No. of units and amount of Rain water harvested	01
15	Any leaky taps	No
16	Are there any signs reminding peoples to turn off the water?	No

Water Filter and Cooler

Borewells

Filter Inlet and Outlet Water testing (TDS, pH, Temperature)

Green Cover

Plants and trees are essential for any educational institution. Green cover makes the campus aesthetically pleasing and also helps in providing good environment for the students. Planting saplings and maintaining the same has to be done periodically.

Observations:

This campus has a green area with various plants and trees of different species. The Eco club, NSS unit of the college have been moving a step towards creating a greener campus with different programs and plantation activities.

A botanical garden is also maintained in the campus increasing the aesthetics of the college and maintaining the greenery.

A small Greenhouse has also been erected in the garden area so as to make ready saplings for further plantations.

The list of few trees/plants is as follows:

Sl. No.	Trees/Plants	Numbers
1	*Tectona grandis*	115
2	*Azadirachta indica*	29
3	*Saraca asoca*	63
4	*Artocarpus heterophyllus*	39
5	*Prunus amygdalus*	23
6	*Santalum album*	119
7	Annona reticulate	47
8	*Psidium guajava*	01
9	*Eucalyptus globulus*	04
10	*Moringa oleifera*	02
11	*Cocos nucifera*	01
12	*Grevillea robusta*	02

The campus has a numerous species of shrubs, herbs and flowering plants. Such as *Aloe vera, Aegle mermelose, Abrus precatorius, Achyranthus aspera, Allium*

sativum, Curcuma longa, Calotropis procera, Eclipta alba, Ficus religiosa, Ficus bengalensis, Hibiscus rosa-sinensis, and so on.

The campus is rich in biodiversity. Staff and students have maintained a green house in the campus. Green house has ample space for growing saplings of various plants.

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Air Quality

Air quality plays a major role in day to day life. People spend more time indoors. Indoor air quality is the air quality within and around buildings and structures. Indoor air quality is known to affect the health, comfort, and well-being of building occupants. Poor indoor air quality has been linked to sick building syndrome, reduced productivity, and impaired learning in schools and colleges.

Observations:

Particulate matter was measured in all the classrooms, staff rooms and library. It was observed that the concentrations of PM 1, PM 2.5 and PM 10 were found to be negligible at that instant.

Sl. No.	Room	Light intensity in lux		
		PM 1	PM 2.5	PM 10
1	Principal's Chamber	10	15	18
2	Office	12	14	20
3	Class Room	11	13	21
4	Class Room	10	12	22
5	Computer Lab	13	15	21
6	Class Room	10	14	25
7	Class Room	11	12	20
8	Class Room	11	12	20
9	Class Room	12	13	18
10	Class Room	11	15	19
11	Class Room	13	15	21
12	Gym	11	14	22
13	Staff Room	10	14	25
14	Staff Chamber	10	14	24
15	Staff Chamber	11	14	23
16	Staff Chamber	11	15	21

17	Staff Chamber	11	14	21
18	Library	12	14	21
19	Library (Reading Section)	13	13	22
20	Class Room	11	12	23
21	Class Room	12	12	24
22	Class Room	11	12	24
23	Class Room	11	12	25
24	Class Room	12	13	24
25	Staff Room	13	14	22

The readings mentioned above are measured at that instant.

Light

The main part of the learning process is visual. The classroom is an arena for many activities, such as reading and writing, student or teacher presentations, tests, etc., hence, light plays a major role in classrooms. Well lit classrooms are utmost essential in colleges. Working desks of the students require a minimum of light of 200 lux. Further, there may be certain zones that require specialized lighting. For example, the area in front of the board should have proper and separately switched presentation lighting.

Observations:

It was observed that all the Classrooms are well lit. The light intensity was observed to be ranging from 260 lux to 320 lux.

Sl. No.	Room	Light intensity in lux
1	Principal's Chamber	260
2	Office	270
3	Class Room	280
4	Class Room	280
5	Computer Lab	260
6	Class Room	268
7	Class Room	300
8	Class Room	310
9	Class Room	295
10	Class Room	300
11	Class Room	320
12	Gym	260
13	Staff Room	275
14	Staff Chamber	275
15	Staff Chamber	275

16	Staff Chamber	275
17	Staff Chamber	280
18	Library	310
19	Library (Reading Section)	320
20	Class Room	300
21	Class Room	300
22	Class Room	295
23	Class Room	295
24	Class Room	295
25	Staff Room	300

Noise

Noise is unwanted sound considered unpleasant, loud or disruptive to hearing. Unwanted sound is not preferred in any classroom. The Noise levels in the class room should be below 35 dB in an unoccupied classroom. Higher levels of noise in the classroom may distract the students.

Observations:

Noise levels were measured in the classrooms and were found to be in the range of 30 dB to 55 dB in an unoccupied classroom. The noise levels in classrooms with students were ranging about 55 dB to 70 dB.

Sl. No.	Room	Noise in decibel	
		Minimum	Maximum
1	Principal's Chamber	30	50
2	Office	40	70
3	Class Room	50	60
4	Class Room	45	55
5	Computer Lab	30	40
6	Class Room	45	55
7	Class Room	45	60
8	Class Room	50	60
9	Class Room	45	55
10	Class Room	50	70
11	Class Room	55	60
12	Gym	30	40
13	Staff Room	35	45
14	Staff Chamber	30	40
15	Staff Chamber	35	45
16	Staff Chamber	30	40

17	Staff Chamber	35	45
18	Library	30	40
19	Library (Reading Section)	30	40
20	Class Room	45	55
21	Class Room	60	70
22	Class Room	45	65
23	Class Room	45	60
24	Class Room	45	65
25	Staff Room	35	45

Electro Magnetic Radiations

Electromagnetic radiation (EMR) consists of waves of the electromagnetic (EM) field, propagating through space, carrying electromagnetic radiant energy. EMR is generated by electronic devices and constant exposure to EM radiations is not advisable.

Observations:

Electromagnetic radiations were measured in all the classrooms, staff rooms, and library. It was observed that the Electromagnetic radiations were zero in all these places.

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Measuring Noise levels, Light, Air quality (PM) and
EMR in classrooms

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Measuring Noise levels, Light, Air quality (PM) and
EMR in Staffroom and Library

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Measuring Noise levels, Light, Air quality (PM) and
EMR in Principal's Chamber

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Interaction with students of the college

Eco-Club Activities

An Eco-Club is functional at the college. This Eco-Club and the NSS unit are active with environment related activities throughout the year. Few of the activities of the Eco-Club were:

- Workshop on Awareness of Waste Management.
- Tree Plantation Drive to make the campus greener.
- Swatch Bharat Abhiyan activities to keep the campus clean.
- A Greenhouse also has been erected in the garden area to ready the saplings needed for plantations.

Composition of Eco-Club for the year 2021-22

Sl. No.	Name of the Faculty	Designation
1	Prof. P. B. Munyal	President
2	Dr. Y. B. Himmadi	Member
3	Prof. S. S. Chougule	Member
4	Dr. P. R. Ramatheerth	Member
5	Prof. R. J. Basanaik	Member
6	Miss Sujatha Kuralachi	Student Representative

Eco-club activities

Eco-club activities

Eco-club activities

Eco-club activities

College Staff and Nisarga Consultants Team During
Green Audit Visit

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