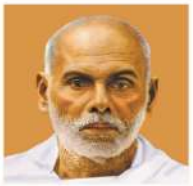


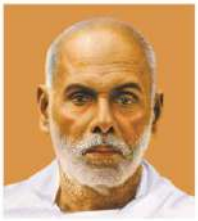
Criterion 7.1 - Institutional Values and Social responsibilities

7.1.3 Quality Audits on Environment and Energy regularly undertaken by the institution. The institutional environment and energy initiatives are confirmed through the following

1. **Green audit/Environment audit**
2. **Energy audit**
3. **Clean and green campus initiatives**
4. **Beyond the campus environmental promotion activities**

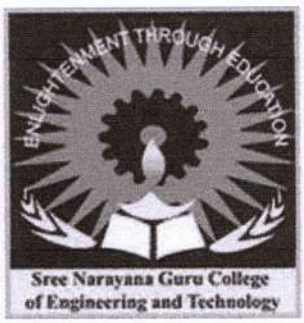
Table of Contents

Sree Narayana Guru College
of Engineering & Technology
CHALAKKODE P.O., KOROM, PAYYANUR, KANNUR-670 307



ENERGY AUDIT

ENERGY AUDIT – 2023



SREE NARAYANA GURU COLLEGE OF ENGINEERING AND TECHNOLOGY

PAYYANUR, KANNUR, KERALA

Conducted By

ATHUL ENERGY CONSULTANTS PVT LTD

4th Floor, Capital Legend Building,
Korappath Lane, Round North, Thrissur, Kerala-680020
Ph: +91 735611199/0-6 Web: www.athulenergy.com E-Mail: info@athulenergy.com

SEPTEMBER 2023

Dr. LEENA A V
PRINCIPAL
SREE NARAYANA GURU COLLEGE OF
ENGINEERING & TECHNOLOGY
PAYYANUR, KANNUR

TABLE OF CONTENTS

Dr. LEENA A V
PRINCIPAL
SREE NARAYANA GURU COLLEGE OF
ENGINEERING & TECHNOLOGY
PAYYANUR, KANNUR

LIST OF TABLES

Dr. LEENA A V
PRINCIPAL
SREE NARAYANA GURU COLLEGE OF
ENGINEERING & TECHNOLOGY
PAYYANUR, KANNUR

LIST OF FIGURES

Dr. LEENA A V
PRINCIPAL
SREE NARAYANA GURU COLLEGE OF
ENGINEERING & TECHNOLOGY
PAYYANUR, KANNUR

ACKNOWLEDGEMENTS

We express our sincere gratitude to **Sree Narayana Guru College of Engineering and Technology, Payyanur** for giving us an opportunity to carry out an Energy Audit. We are extremely thankful to the management and staff for their support throughout the audit process. The onsite visit for the energy audit was conducted on 30th Oct 2023.

SNGCET Team

1	Dr. Leena A V	Principal
2	Ms. Mary Sonia George	HOD – CE
3	Mr. Sundar V	HOD – CSE
4	Mr. Abilash Krishnan	HOD – EEE
5	Dr. Sudhin Chandran	HOD – ME
6	Mr. Manu C	Assistant Professor – EEE

ATHUL ENERGY CONSULTANTS PVT LTD
THRISSUR
680 020

Yours faithfully

Authorised signatory
Athul Energy Consultants Pvt Ltd

Dr. LEENA A V
PRINCIPAL
SREE NARAYANA GURU COLLEGE OF
ENGINEERING & TECHNOLOGY
PAYYANUR, KANNUR

GENERAL DETAILS – COLLEGE

The general details of the college are given in the table below

Sl. No:	Particulars	Details
1	Name of the College	Sree Narayana College of Engineering and Technology
2	Address	Chalakkode P.O, Payyanur, Kannur Pin - 670307, Kerala, India.
3	Contact Number &	04985-201989
	E mail of the college	info@sngcet.org, admission@sngcet.org
4	Web site	www.sngcet.ac.in
5	Type of Building	Educational Institution
6	Annual Working Days	210
7	No: of students enrolled	414
8	No: of teaching & non-teaching staff	110
9	Total Built Up area	25929 Sq. m
10	Average power consumption per month. (kWh/month)	5548
11	Average electricity charges per month. (Rs. /month)	66,300

FIGURE 1: COLLEGE BUILDING

Dr. LEENA A V
PRINCIPAL
SREE NARAYANA GURU COLLEGE OF
ENGINEERING & TECHNOLOGY
PAYYANUR, KANNUR

EXECUTIVE SUMMARY

1. PRESENT ANNUAL ENERGY CONSUMPTION

The present annual energy consumption has been analysed with the available data from the facility for the period July 2022- June 2023.

TABLE 1: ANNUAL ENERGY CONSUMPTION

Particulars	Unit	Gross calorific value (kCal)	Values	Toe	% of distribution
Electricity	kWh	860	66574	5.73	16.0
Diesel	Kg	11840	24243	28.70	80.2
LPG	Kg	12500	972	1.22	3.4
Wood	Kg	2500	637	0.16	0.4
Total				**35.8**	**100.0**

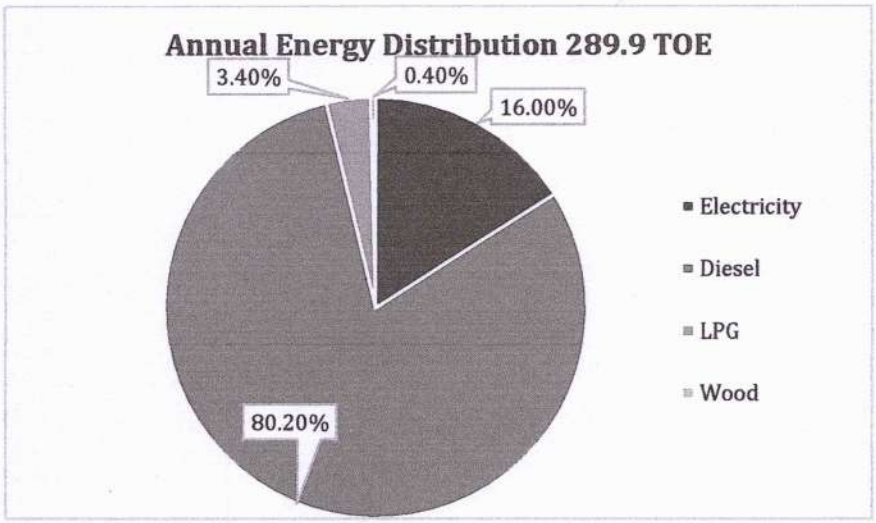


FIGURE 2: ANNUAL ENERGY DISTRIBUTION

Dr. LEENA A V
PRINCIPAL
SREE NARAYANA GURU COLLEGE OF
ENGINEERING & TECHNOLOGY
PAYYANUR, KANNUR

2. ANNUAL ENERGY COST

Annual cost for energy consumption during July 2022- June 2023 is done in table below.

TABLE 2: ANNUAL ENERGY COST

Particulars	Unit	Rs/unit	Values	Rs in lakhs	% Of distribution
Electricity	kWh	7.36	66574	4.9	14.4
Diesel	litres	96	29340	28.17	82.8
LPG	Kg	90	972	0.87	2.6
Wood	Kg	12	667	0.08	0.2
Total				**34.02**	**100.0**

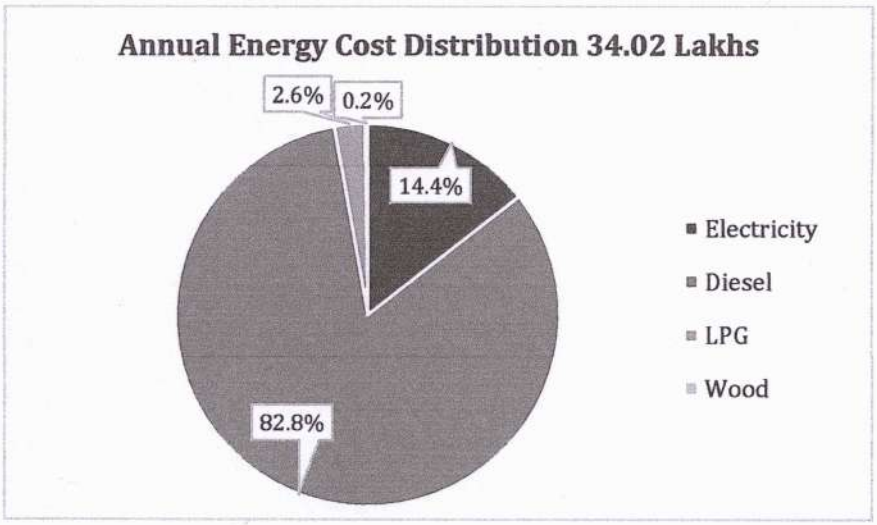


FIGURE 3 : ANNUAL ENERGY COST DISTRIBUTION

Dr. LEENA A V
PRINCIPAL
SREE NARAYANA GURU COLLEGE OF
ENGINEERING & TECHNOLOGY
PAYYANUR, KANNUR

3. ENERGY CONSERVATION MEASURES

The following table shows the energy conservation measures and renewable energy integration possibility in the college its energy savings, financial savings & the payback period against the investment.

TABLE 3: ENERGY CONSERVATION MEASURES

Sl.	*Energy conservation measures*	*Annual Energy Savings*	*Annual Financial Savings*	*Investment*	*Simple payback period*
		kWh	*Rs*	*Rs*	*Months*
1	*Replacement of old ceiling fans with BLDC fans*	*11,236*	*84269*	*7,10,500*	*101*
2	*Replacement of fluorescent lights with energy efficient LED lights*	*8,010*	*60077*	*1,72,200*	*34*
Total Savings		*19,246*	*1,44,346*	*8,82,700*	
Sl	*Renewable energy integration*	*Annual Energy Savings*	*Annual Financial Savings*	*Investment*	*Simple payback period*
		kWh	*Rs*	*Rs*	*Year*
1	*Installation of 10kw on- grid solar PV system*		*91,816*	*6,50,000*	*7 (Years)*

3. AUDIT SUMMARY - ACTIONS

Sl No:	Particulars	Location	Action to be taken	Remarks
1	Energy efficiency – Replacement of ceiling fans with BLDC fans	Office, staff rooms, Classrooms	Change the existing old ceiling fans with BLDC fans	Power Consumption will get reduced
2	Energy efficiency – Replacement of fluorescent lights with LED lights	Office, staff rooms, Classrooms	Change the existing lights with LED lights	Power Consumption will get reduced
3	Energy consumption – Set temperature of AC in between 24 – 27 °C		Adjust the temperature using the remote	Power consumption will reduce.
4	Installation of 10kW on-grid solar System	Rooftop	Solar plant can be installed	Energy charges would reduce

Dr. LEENA A V
PRINCIPAL
SREE NARAYANA GURU COLLEGE OF
ENGINEERING & TECHNOLOGY
PAYYANUR, KANNUR

4. ENERGY PERFORMANCE INDEX

Energy performance index (EPI) was based on the energy consumption in the period **July 2022-June 2023,** is summarised in the table below.

TABLE 4: ENERGY PERFORMANCE INDEX

Energy Performance and climate impact	**Unit**	**Baseline**	**Projection**
Annual Electricity Consumption	KWh	66,574	47,328
	TOE	5.7	4.1
	CO_2 emission (Tons)	53	37
Annual Diesel consumption	kg	24243	24243
	TOE	28.7	28.7
	CO_2 emission (Tons)	74.79	74.79
Annual LPG consumption	kg	972	972
	TOE	1.2	1.2
	CO_2 emission (Tons)	2.91	2.91
Annual Wood consumption	kg	637	637
	TOE	0.16	0.16
	CO_2 emission (Tons)	2.1	2.1
Number of students	Number	414	414
Specific Electricity consumption	**TOE/Student**	0.0138	0.0098
Energy performance index	**TOE/Number**	0.08648	0.08248
Annual energy cost	**Rs in Lakhs/annum**	34.0	32.6
Carbon footprint – net (all energy input)	CO_2 emission (Tons)	132	117
Specific carbon footprint	CO_2 emission (Tons)/number of production	0.3198	0.2831

Tonne of oil equivalent (TOE) — *1 TOE = 10 million kCal*

CO_2 conversion

Diesel — *1kg of HSD = 3.085 kg of CO_2 at 11840 kCal/kg of HSD*

Electricity — *0.79 kg CO_2 per unit of electricity at 860 kCal/kWh*

LPG — *1kg of LPG = 2.99kg of of CO_2 at 12500 kcal/kg*

Wood — *1kg of furnace oil = 3.3 kg of CO_2 at 2500 kcal/kg*

Dr. LEENA A V
PRINCIPAL
SREE NARAYANA GURU COLLEGE OF
ENGINEERING & TECHNOLOGY
PAYYANUR, KANNUR

INTRODUCTION

ABOUT ATHUL ENERGY CONSULTANTS (AEC)

Athul Energy Consultants Pvt Ltd (AEC) is an Accredited Energy Auditing Firm (AEA) recognized by BEE and also empaneled with Energy Management Centre (EMC), Govt of Kerala. Established in 2010 as Athul Engineering Systems and Energy Consultants, (AEC since 2016), is one of the leading consultancy firms concentrating mainly in Energy and safety audits across pan India. The motto of AEC is to deliver services at quality and in time. The basic priority given is for energy conservation and sustainable development.

AEC has wide experience in the energy audit sector and have conducted the same in Chemical, Textile, Steel, petrochemical, rubber, mines, food and beverages, DISCOM and buildings, hotels, hospitals, air ports, institutions etc. The safety audits are another sector in which the AEC has experience and have conducted more than 3000 safety audits in the banks, industries and buildings such as hotels, hospitals. AEC specialized in finding root cause of chronic issues pertinent in industries.

AEC have conducted various power quality audit in many industries as in industries, IT sector, hotels, hospitals, testing laboratories, solar installations, Banking institutions etc . Conducted more than 200 studies in its portfolio

NAME AND DETAILS OF ENERGY AUDIT TEAM MEMBERS

The contact details of energy audit team from AEC are given in the table below.

TABLE 5: CONTACT DETAILS OF ENERGY AUDIT TEAM

Sl	Name	Certification	EM/EA/AEA/ Registration	Phone no	Email
1	Santhosh A	• Accredited Energy Auditor	AEA-0275	7356111990	santhosh@athulenergy.com
2	Harikrishnan K	• Certified Energy Manager	EM-11755/23	7356111996	hari@athulenergy.com
3	Keerthana C	• Project Engineer	Nil	7356111995	keerthana@athulenergy.com

Dr. LEENA A V
PRINCIPAL
SREE NARAYANA GURU COLLEGE OF
ENGINEERING & TECHNOLOGY
PAYYANUR, KANNUR

BACKGROUND

ENERGY AUDIT

An energy audit is a key to assessing the energy performance of an energy consuming facility and for developing an energy management program. The typical steps of an energy audit are:

- Preparation and planning
- Data collection and review
- Plant surveys and system measurements
- Observation and review of operating practices
- Data documentation and analysis
- Reporting of the results and recommendations

1.1. Definition of energy auditing

In the Indian Energy Conservation Act of 2001 **(BEE 2008)**, an energy audit is defined as:

"The verification, monitoring and analysis of the use of energy and submission of technical report containing recommendations for improving energy efficiency with cost-benefit analysis and an action plan to reduce energy consumption."

1.2. Objectives of Energy Auditing

The objectives of an energy audit can vary from one plant to another. However, an energy audit is usually conducted to understand how energy issued within the plant and to find opportunities for improvement and energy saving. Sometimes, energy audits are conducted to evaluate the effectiveness of an energy efficiency project or program. In college as per the request from the institution, we have assessed the energy consumption and saving opportunities at present scenario.

Methodology for the study

The methodology adopted for energy audit starts from historical energy data analysis, power quality analysis, monitoring of operational practices, system evaluation, cost benefit analysis of the energy conservation opportunities, and prepare plan for implementation. The proposals given in the report includes economical energy efficiency measures to reduce facilities unnecessary energy consumption and cost. The energy conservation options, recommendations and cost benefit ratio, indicating payback period are included in this report.

Scope of Work

The Scope of Work includes:

1. Historical energy data analysis.
2. Power Quality Analysis.
3. Identification of Energy saving opportunities.
4. Cost Benefit Analysis.

Dr. LEENA A V
PRINCIPAL
SREE NARAYANA GURU COLLEGE OF
ENGINEERING & TECHNOLOGY
PAYYANUR, KANNUR

FACILITY DESCRIPTION

ABOUT SREE NARAYANA GURU COLLEGE OF ENGINEERING AND TECHNOLOGY

Sree Narayana Guru College of Engineering & Technology, one of the prestigious technical institutions in North Malabar, was established in 2003. The engineering college is fully equipped to meet the rising demands for greater facilities in the scenario of higher education. Since its inception, it has been true to do the mission and the prophetic vision of the great Saint Sree Narayana Guru. With its emphasis on quality education augmented by exposure and training in other individual skills, the institute's focus is on creating individuals who are all-round performers and true professionals.

Sree Narayana Guru was a great Saint Philosopher and Social Reformer of Kerala. His thoughts and work have universal significance. His message "Educate that you may be free, organise that you may be strong, and industrialize that your financial status may improve" has relevance all the times and places. Guruji was instrumental in uplifting the people of Kerala and in the formation of Sree Bhakthi Samvardhani Yogam in 1907. Sree Sundareshwara Temple, Talap, Kannur, consecrated by Sree Narayana Guru in 1916 is the pivot of all the activities of Yogam. The Yogam upholds the Guru's vision to enrich the people educationally, socially, culturally and spiritually.

Sree Bhakthi Samvardhini Yogam is working towards fulfilling Guru's vision, establishing educational institutions, women's hostels and has been offering financial aid and endowments to deserving students. The Yogam embarked on a noble project - Sree Narayana Guru College of Engineering & Technology an Engineering college in Malabar in 2003.

VISION

A knowledge society promoting human excellence and enlightenment through technical education

MISSION

To provide technical education of the highest quality and standard of excellence for socio-economic progress embedded in clearly articulated values and supported by commitments

Dr. LEENA A V
PRINCIPAL
SREE NARAYANA GURU COLLEGE OF
ENGINEERING & TECHNOLOGY
PAYYANUR, KANNUR

UTILITY FLOW DIAGRAM

This section shows the basic single line diagram of the major utility which is electricity.

ELECTRICITY

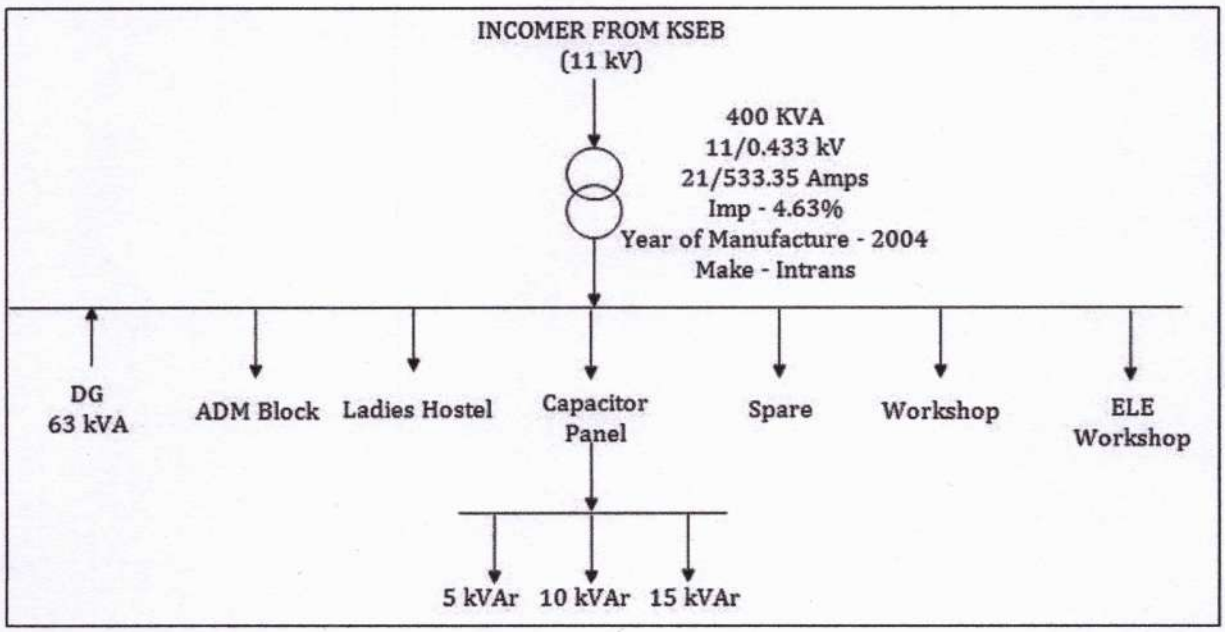


FIGURE 4: SINGLE LINE DIAGRAM

Dr. LEENA A V
PRINCIPAL
SREE NARAYANA GURU COLLEGE OF
ENGINEERING & TECHNOLOGY
PAYYANUR, KANNUR

WATER FLOW DIAGRAM

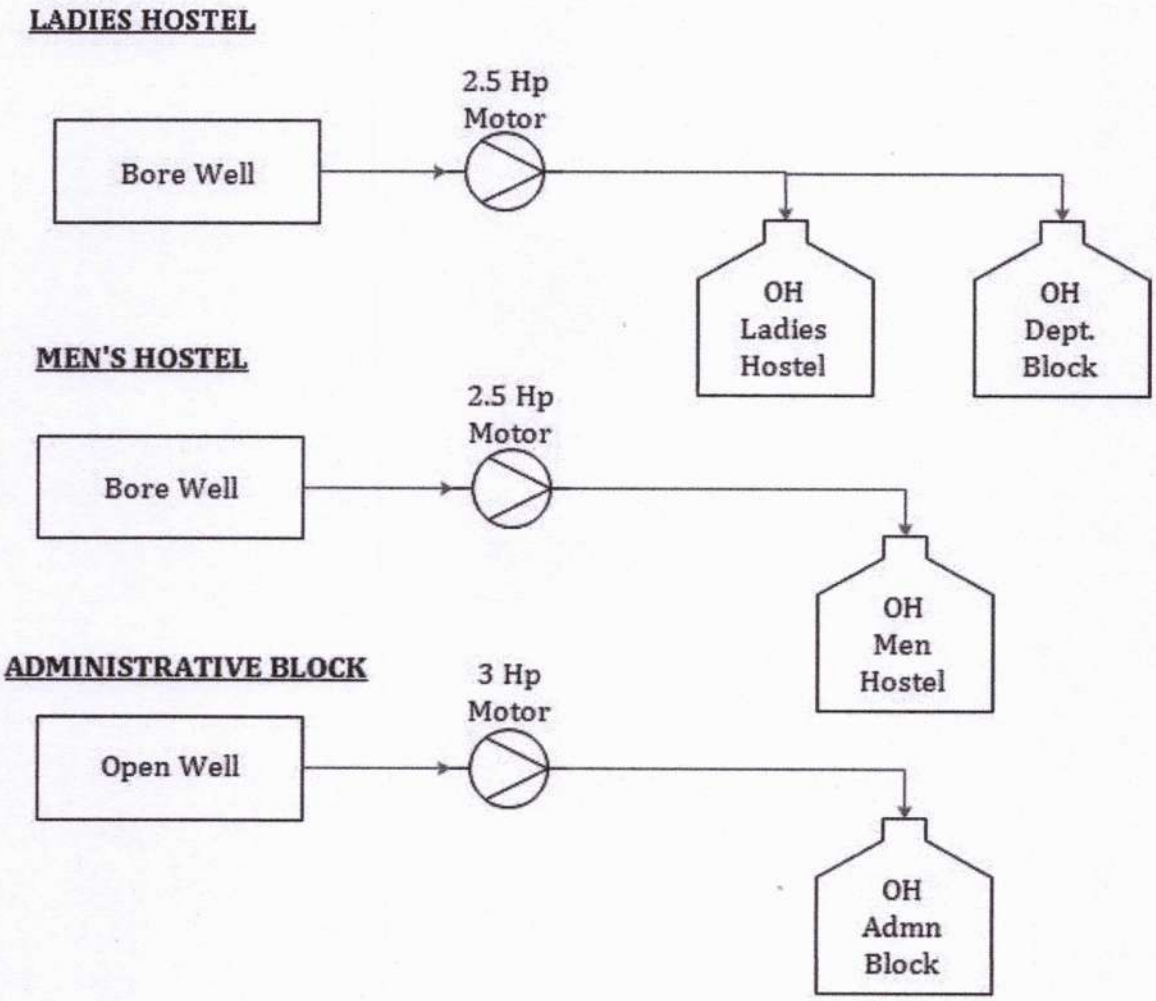


FIGURE 5: WATER FLOW DIAGRAM

Dr. LEENA A V
PRINCIPAL
SREE NARAYANA GURU COLLEGE O
ENGINEERING & TECHNOLOGY
PAYYANUR, KANNUR

HISTORICAL ENERGY CONSUMPTION ANALYSIS

The major energy that is presently being used in the college are:

1. Electricity
2. Diesel
3. LPG
4. Wood

This section analyses the consumption of each energy in the facility for the period **July 2022 - June 2023**

ELECTRICITY CONSUMPTION ANALYSIS

This section gives the detail analysis of electricity consumption in the building.

BASELINE DATA & CONSUMPTION: 12 MONTHS

The electricity baseline data, based on the bills, and the recorded, is summarized in the table below.

TABLE 6 : BASELINE DATA

Base Line Data (Based on 12 months – July 2022 to June 2023)			
1	Electricity provider	KSEBL	
2	Supply Voltage	11 kV	
3	Tariff	HT II (B) General	
4	Consumer number	LCN :17/4252	
5	Section office	110 kV Section	
6	Contract demand (kVA)	65	
7	Maximum demand registered (kVA)	38	
8	Average monthly electricity consumption (kWh/month)	5548	
9	Average demand charges (Rs/month)	24,500	
10	Average power factor	0.97	
11	Annual Power factor incentives (Rs/annum)	4,287	
12	Annual Power factor penalties	Nil	
13	Tariff rate for energy consumption (Rs / kWh)	Normal – 6.8 Peak – 10.2 Off Peak – 5.1	Average – 7.36
14	Demand charge (Rs / kVA)	500	
15	Average monthly electricity cost (Rs)	66,300	

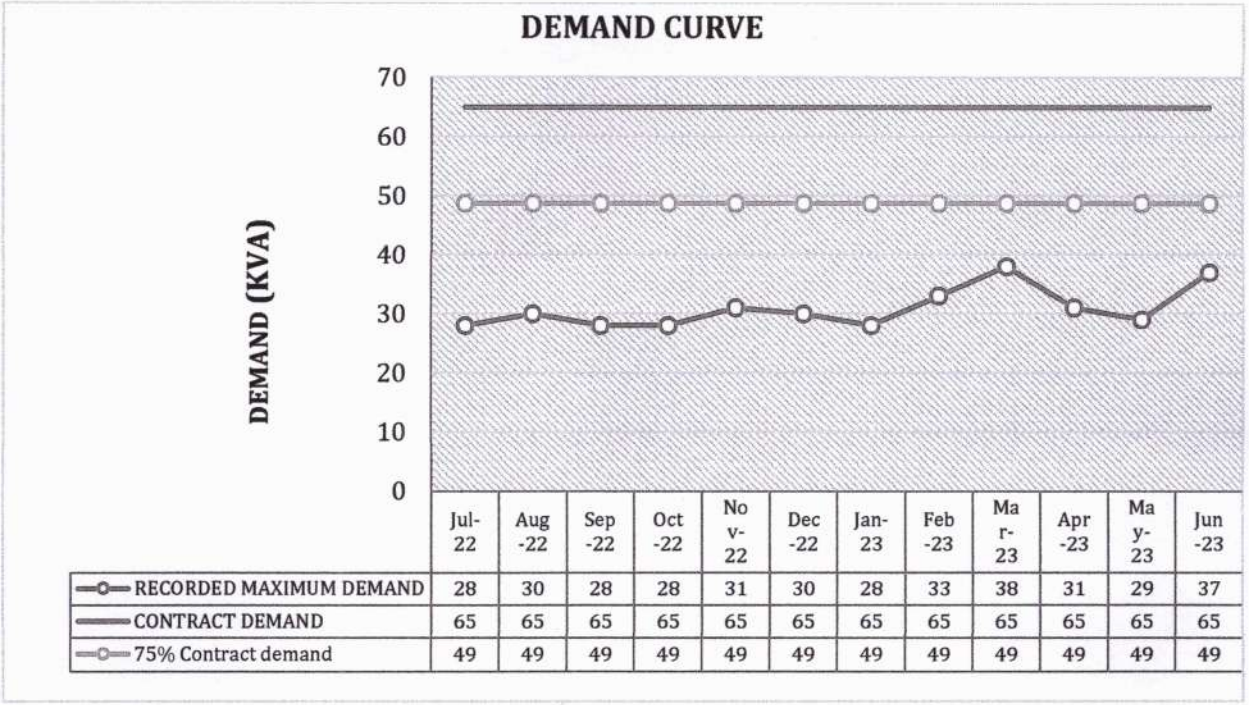
Dr. LEENA A V
PRINCIPAL
SREE NARAYANA GURU COLLEGE OF
ENGINEERING & TECHNOLOGY
PAYYANUR, KANNUR

Inference & suggestions	i. *Recorded maximum demand (RMD) during the past year was **38 kVA,** which is **58.46%** of the contract demand.* ii. *The average PF for the past 12 months was 0.97 lagging and the company received an incentive of around **Rs 4,287** during last 12 months.*

Dr. LEENA A V
PRINCIPAL
SREE NARAYANA GURU COLLEGE O
ENGINEERING & TECHNOLOGY
PAYYANUR, KANNUR

DEMAND ANALYSIS

This section analyses the trend for the maximum demand versus the Contract Demand (CD) over the period June 2022 to July 2023.



	Jul-22	Aug-22	Sep-22	Oct-22	Nov-22	Dec-22	Jan-23	Feb-23	Mar-23	Apr-23	May-23	Jun-23
RECORDED MAXIMUM DEMAND	28	30	28	28	31	30	28	33	38	31	29	37
CONTRACT DEMAND	65	65	65	65	65	65	65	65	65	65	65	65
75% Contract demand	49	49	49	49	49	49	49	49	49	49	49	49

FIGURE 6: DEMAND ANALYSIS

Inference

i. *Average demand charges came as **Rs. 24,500 per** month.*
ii. *The recorded maximum demand was found to be less than 75% of the contract demand in all months*
iii. *The recorded maximum demand was found to be 38 kVA which is 58.4% of the contract demand.*

Dr. LEENA A V
PRINCIPAL
SREE NARAYANA GURU COLLEGE
ENGINEERING & TECHNOLOGY
PAYYANUR, KANNUR

ELECTRICITY DEMAND IN VARIOUS TIME ZONES

The variations of demands in the time zones in the past 12 months are given in the figure below.

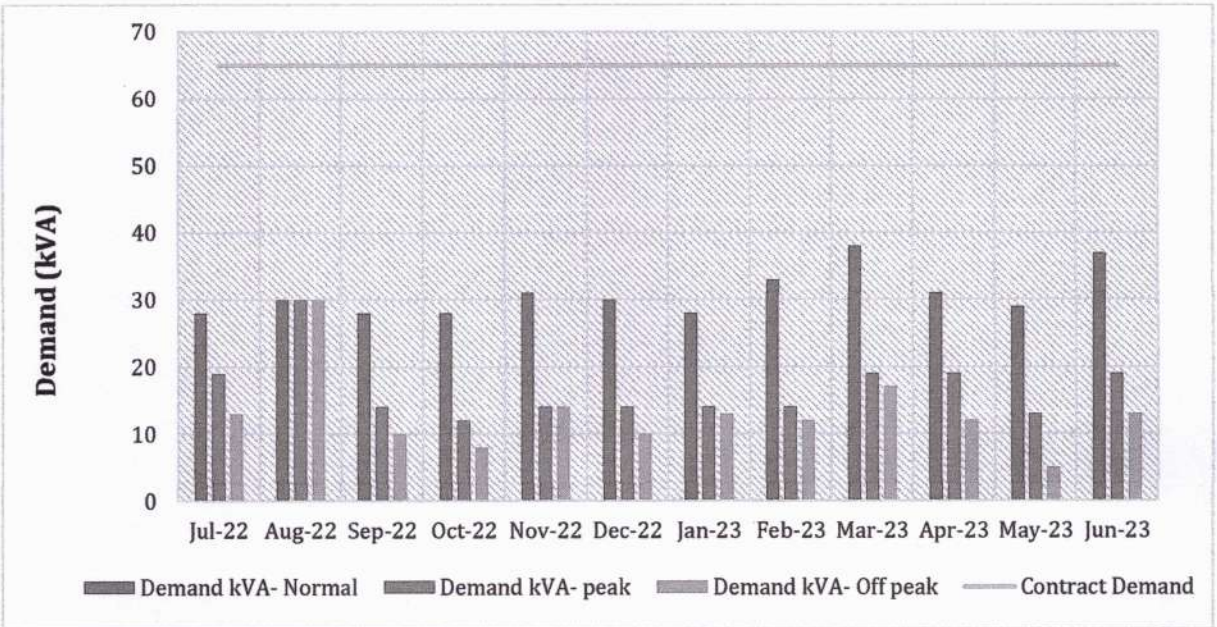


FIGURE 7: DEMAND IN VARIOUS TIME ZONES

Inference

i. *The maximum demand in the normal, Peak and off-peak period registered with respect to the contract demand (65kVA) are 47.6%, 25.8% and 20.1% respectively.*

ii. *The percentage of maximum demand in the normal, Peak and off-peak period registered with respect to the minimum demand (48 kVA) is 58.46%, 46.15%, and 46.15% respectively.*

Dr. LEENA A V
PRINCIPAL
SREE NARAYANA GURU COLLEGE OF
ENGINEERING & TECHNOLOGY
PAYYANUR, KANNUR

POWER FACTOR ANALYSIS IN KSEB BILL

The Power factor is the ratio of Active power or energy (kWh) to apparent power or energy (kVA).

$$PF = Active\ energy kWh / Apparent energy\ (kVAh)$$

The power factor variations during June 2022 to July 2023 is given below in figure.

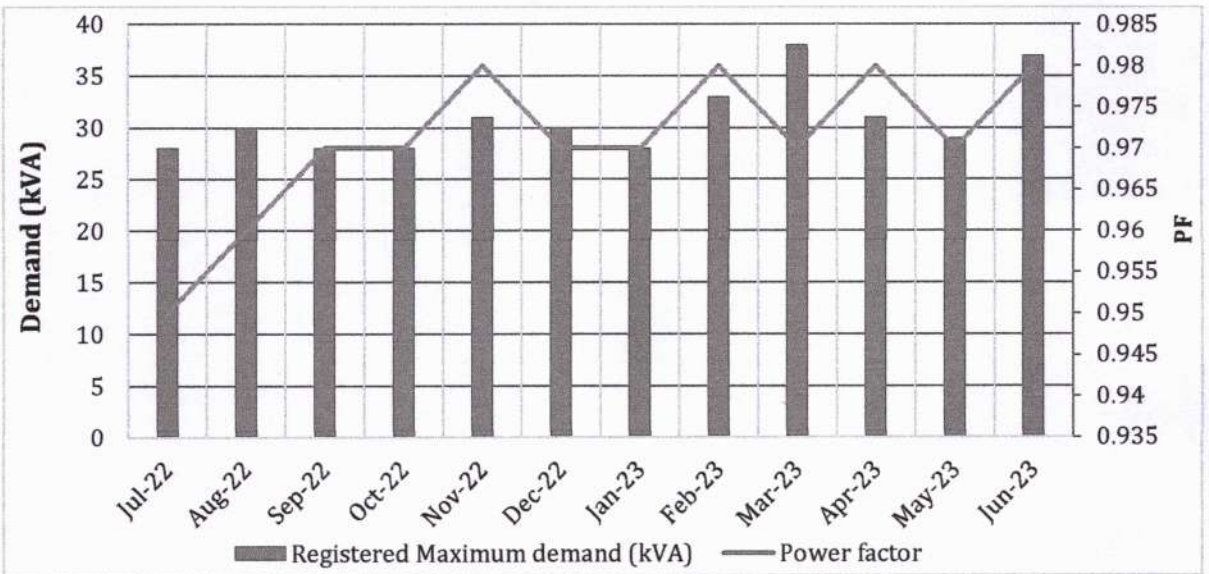


FIGURE 8: POWER FACTOR ANALYSIS

Inference

i. Average power factor from the KSEB bills during the past year is found to be 0.97 lagging.

ii. The company received an incentive of around **Rs 4,287** in last 12-month period.

Dr. LEENA A V
PRINCIPAL
SREE NARAYANA GURU COLLEGE
ENGINEERING & TECHNOLOGY
PAYYANUR, KANNUR

TARIFF RATES ANALYSIS

The average monthly energy and demand charges in rupees for the past year is represented in the figure below.

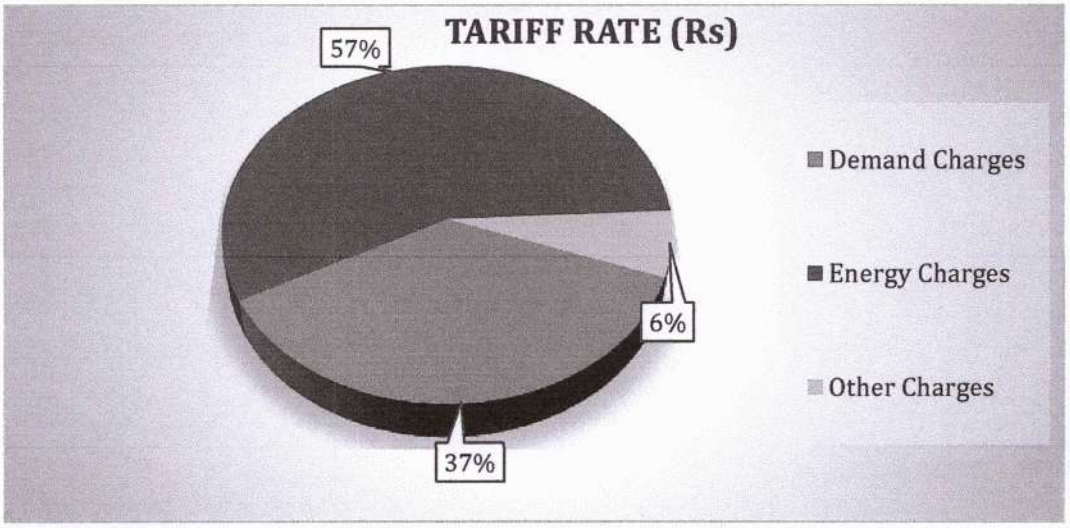


FIGURE 9: TARIFF RATE

Inference

i. Average demand charges for the past one year were **Rs 24,500** per month and energy charges was Rs **36,960** per month.

ii. The energy charges came about **57%** of the total bill which is good comparing with the standards.

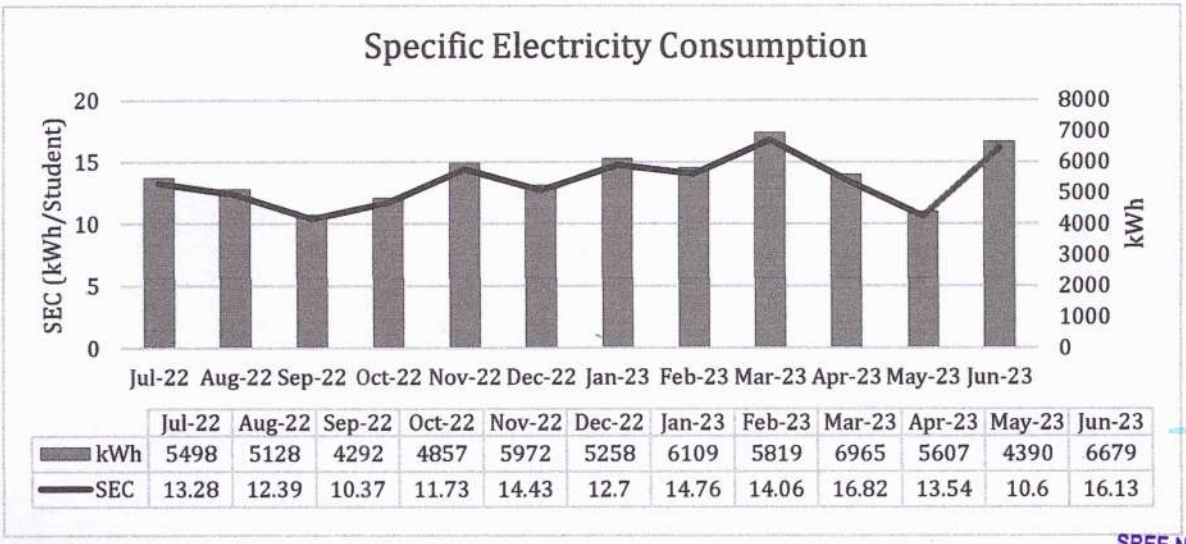
Dr. LEENA A V
PRINCIPAL
SREE NARAYANA GURU COLLEGE
ENGINEERING & TECHNOLOGY
PAYYANUR, KANNUR

SPECIFIC ELECTRICITY CONSUMPTION

The electricity consumption from the June 2022- July 2023 taken for the benchmarking. Here the comparison done with electricity consumption and building area, number of students.

TABLE 7: SPECIFIC ELECTRICITY CONSUMPTION

Month	Electricity Consumption	Number of Students	Building Area	SEC	SEC
	kWh	Number	m^2	kWh/Student	kWh/ m^2
Jul-22	5498	414	25929	13.28	0.21
Aug-22	5128	414	25929	12.39	0.20
Sep-22	4292	414	25929	10.37	0.17
Oct-22	4857	414	25929	11.73	0.19
Nov-22	5972	414	25929	14.43	0.23
Dec-22	5258	414	25929	12.70	0.20
Jan-23	6109	414	25929	14.76	0.24
Feb-23	5819	414	25929	14.06	0.22
Mar-23	6965	414	25929	16.82	0.27
Apr-23	5607	414	25929	13.54	0.22
May-23	4390	414	25929	10.60	0.17
Jun-23	6679	414	25929	16.13	0.26
Average	**5547.83**			**13.40**	**0.21**
Annual Specific Electricity consumption				**160.807**	**2.57**
Annual Electricity Consumption(kWh)				**66574**	



	Jul-22	Aug-22	Sep-22	Oct-22	Nov-22	Dec-22	Jan-23	Feb-23	Mar-23	Apr-23	May-23	Jun-23
kWh	5498	5128	4292	4857	5972	5258	6109	5819	6965	5607	4390	6679
SEC	13.28	12.39	10.37	11.73	14.43	12.7	14.76	14.06	16.82	13.54	10.6	16.13

FIGURE 10: SPECIFIC ELECTRICITY CONSUMPTION

Dr. LEENA A V
PRINCIPAL
SREE NARAYANA GURU COLL
ENGINEERING & TECHNO
PAYYANUR, KANNUR

DIESEL CONSUMPTION ANALYSIS

Diesel is primarily utilized to fuel vehicles at the college and as a power source for the generator. The major portion of diesel is dedicated to vehicle usage. The consumption details of diesel over the past year are provided in the table below.

TABLE 8: ANNUAL DIESEL CONSUMPTION

Month	Diesel Consumption	Amount	Cost of Diesel
	Liters	Rs	Rs/Litre
Jul-22	2679.60	254615.54	95.02
Aug-22	2015.57	191560	95.04
Sep-22	2024.50	192408.08	95.04
Oct-22	2261.64	214946.4	95.04
Nov-22	3191.35	303305.72	95.04
Dec-22	2335.15	221932.77	95.04
Jan-23	2797.82	265904.73	95.04
Feb-23	2582.81	245470.05	95.04
Mar-23	3036.31	288570.95	95.04
Apr-23	2230.51	216470.99	97.05
May-23	1336.07	129666.02	97.05
Jun-23	2848.49	276446.22	97.05
Total diesel consumed (L)	**29,3340**		

The table below summarizes the annual diesel consumption in the college

TABLE 9: DIESEL CONSUMPTION - SUMMARY

Annual consumption (L)	Calorific value (TOE)	Tonne of Oil Equivalent (TOE)
29,3340	11840	80.14

Calorific value of Diesel is 11840 Kcal/kg and 1 TOE means 10000000 Kcal.

Dr. LEENA A V
PRINCIPAL
SREE NARAYANA GURU COLLEGE
ENGINEERING & TECHNOLOGY
PAYYANUR, KANNUR

LPG CONSUMPTION ANALYSIS

LPG (Liquid Petroleum Gas) is used at the college for cooking purposes, primarily in the college canteen, men's hostel, and women's hostel. The annual consumption details are as follows.

TABLE 10: LPG CONSUMPTION ANALYSIS

Particulars	Annual consumption (Kg)	Calorific value (kcal)	Tonne of Oil Equivalent (TOE)
Ladies Hostel	278	12,500	0.29
Men's Hostel	278	12,500	0.29
Canteen	417	12,500	0.44
Total	**972**		**1.02**

1 TOE equals 10000000 Kcal.

WOOD CONSUMPTION ANALYSIS

The wood consumption details are summarized in the following tale

Particulars	Annual consumption (Kg)	Calorific value (kcal)	Tonne of Oil Equivalent (TOE)
Men's Hostel	667	2500	0.23
Total	**667**		**0.23**

1 TOE equals 10000000 Kcal.

Dr. LEENA A V
PRINCIPAL
SREE NARAYANA GURU COLLEGE
ENGINEERING & TECHNOLOGY
PAYYANUR, KANNUR

ELECTRICITY SUPPLY & DISTRIBUTION PERFORMANCE

The objective of this section is to establish how the facility is performing in terms of energy consumption.

MAIN LOGGING – TRANSFORMER – MEASUREMENT EVALUATION

Electricity is provided by KSEB through a 11-kV line feeder. The college is equipped with main transformer rated at 400 kVA, which steps down the voltage to 0.415 kV before further distribution across the college. The logging was conducted at the secondary side (415V) of the transformers using the Krykard ALM 35 power quality analyser. The measured data for the transformers is summarized in following table.

TABLE 11: TRANSFORMER LOGGING

Particulars		**Details**
Make		Intrans
Rating (kVA)		400
Voltage ratings (kV)		11/0.433
Current ratings (A)		21/533.35
Volt impedance - %		4.63
Year		2004
Parameters		**Value**
Voltage line (V)	Min	380
	Avg	405
	Max	424
Current (A)	Min	3.53
	Avg	15.25
	Max	51
Frequency (Hz)	Min	49.8
	Avg	49.9
	Max	50.1
Energy consumed (kWh)	Total	230.31
Energy received (kVAh)	Total	254.98
Power factor		0.90
Active power (kW)	Min	3.49
	Avg	9.67
	Max	26.56
Parameters		**Value**
Apparent power (kVA)	Min	4.53
	Avg	10.70
	Max	27.89
Reactive power (kVAr)	Min	-3.57
	Avg	-1.19

Dr. LEENA A V
PRINCIPAL
SREE NARAYANA GURU COLLEGE OF
ENGINEERING & TECHNOLOGY
PAYYANUR, KANNUR

	Max	6.87
Voltage imbalance %	Min	0.6
	Avg	1.27
	Max	2.6
Current imbalance %	Min	2.3
	Avg	24.6
	Max	54.9
THDv %	Min	0.9
	Avg	2.75
	Max	4.4
THDa %	Min	4.1
	Avg	18.18
	Max	32.7

TRANSFORMER EFFICIENCY

The transformer efficiency was calculated by measuring the parameters at the secondary side and is tabulated below.

TABLE 12: TRANSFORMER EFFICIENCY

Particulars	Unit	Value
Rated capacity of transformer	kVA	400
Rated no load loss	Watts	3400
Rated full load loss	Watts	1000
Average loading of transformer	%	2.6
Measured unit per day (24 hours)	kWh	230.319
Total transformer unit loss calculated	kWh	24
Transformer efficiency	%	**90.56**

Dr. LEENA A V
PRINCIPAL
SREE NARAYANA GURU COLLEGE OF
ENGINEERING & TECHNOLOGY
PAYYANUR, KANNUR

ANALYSIS: VOLTAGE VARIATION DURING MEASUREMENT PERIOD

The Voltage profile at the LT side is plotted below in figure.

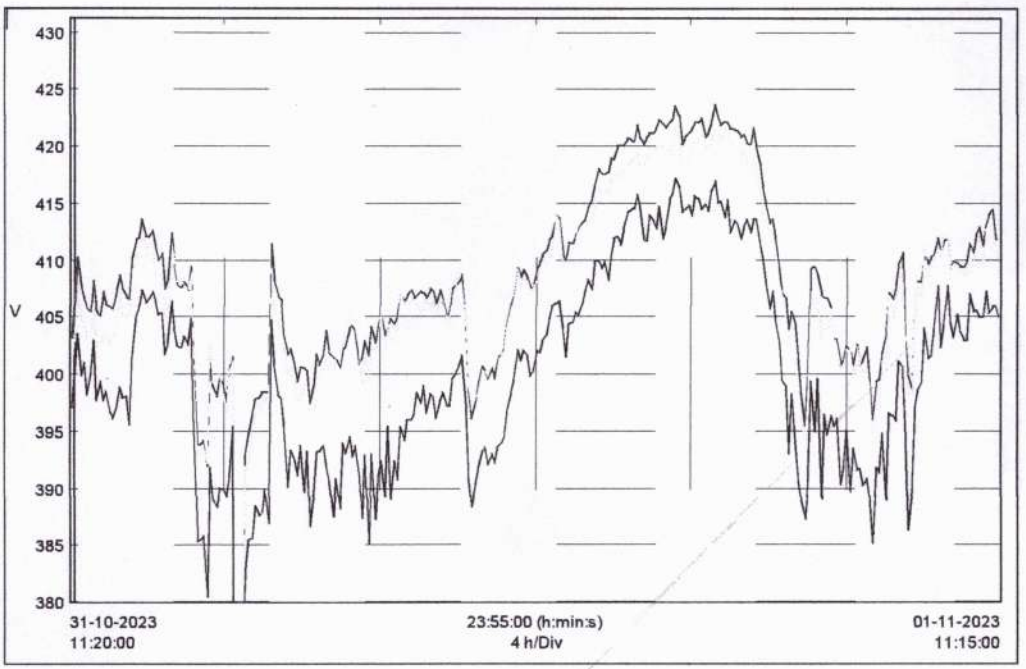


FIGURE 11: VOLTAGE VARIATION

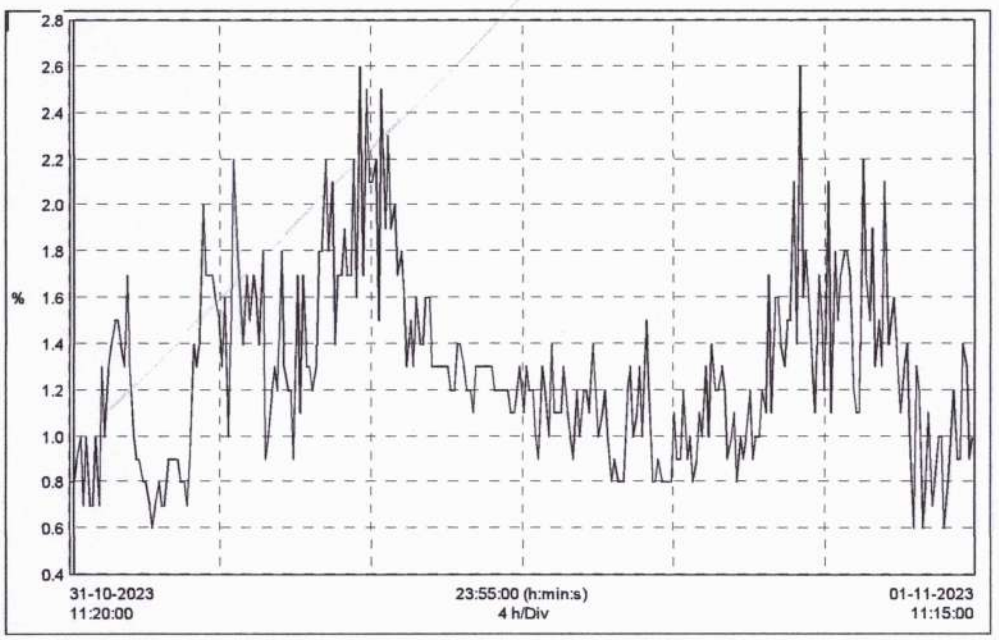


FIGURE 12: VOLTAGE UNBALANCE

Inference

I. The voltage varied between 380V and 424V during the period of measurement.

II. The voltage unbalance registered an average value of 1.27%.

Dr. LEENA A V
PRINCIPAL
SREE NARAYANA GURU COLLEGE OF
ENGINEERING & TECHNOLOGY
PAYYANUR, KANNUR

ANALYSIS: CURRENT VARIATIONS IN MEASUREMENT PERIOD

The current variation during the measurement period is shown in the figure below

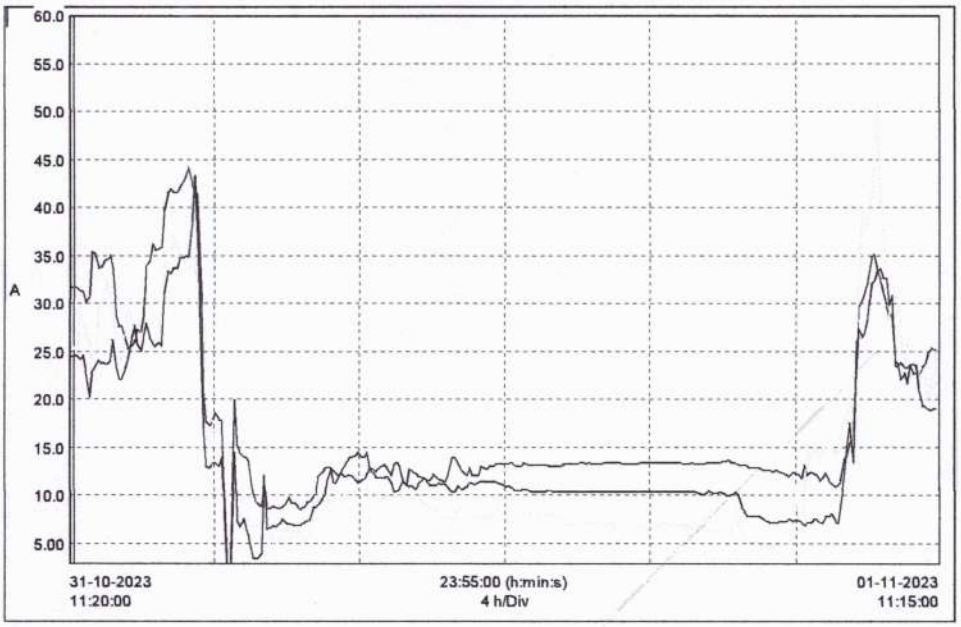


FIGURE 13: CURRENT VARIATIONS

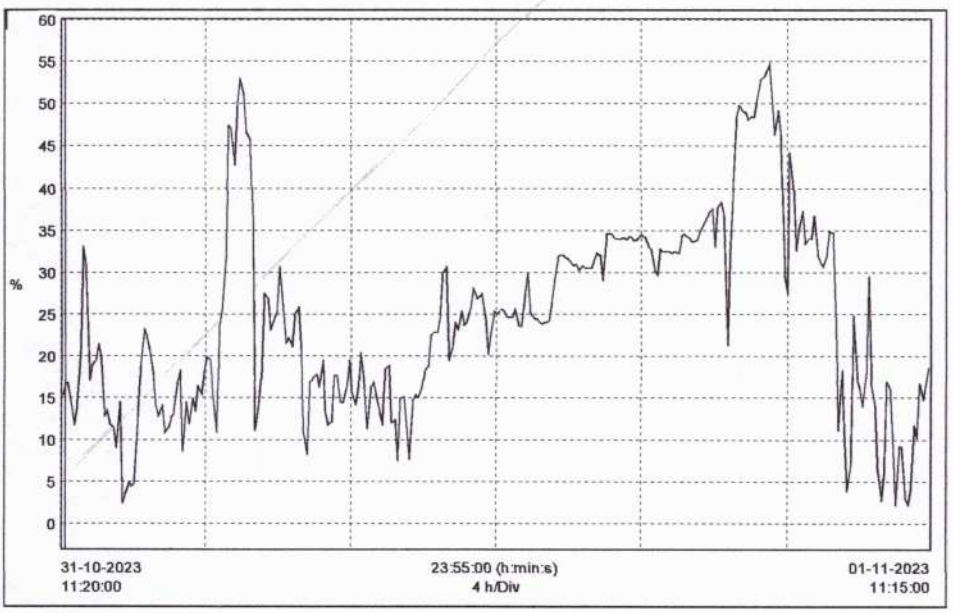


FIGURE 14: CURRENT UNBALANCE

Inference

I. The current varied between 3.53A and 51A during the period of measurement.

II. The current unbalance registered an average value of 24.6% which is above the recommended limits.

Dr. LEENA A V
PRINCIPAL
SREE NARAYANA GURU COLLEGE OF
ENGINEERING & TECHNOLOGY
PAYYANUR, KANNUR

INFERENCE & OBSERVATION – DISTRIBUTION TRANSFORMERS EVALUATION

TABLE 13: DISTRIBUTION TRANSFORMER ANALYSIS – INFERENCE & OBSERVATION

<table>
<tr><th colspan="2">DISTRIBUTION TRANSFORMER - ANALYSIS</th></tr>
<tr><th>Inference</th><th>Observation</th></tr>
<tr><td>➢ The maximum and average loading of each transformer during the period of audit is:
<table>
<tr><th></th><th>Max load %</th><th>Avg load %</th></tr>
<tr><td>TR (400kVA)</td><td>6.97</td><td>2.6</td></tr>
</table></td><td>➢ The present loading pattern of the transformer is lower than the designed ones. The best loading point to have maximum efficiency for the transformer is in the range of 45 to 55% of rated load</td></tr>
<tr><td>➢ The load factor [(Load factor (%) =Energy used during the period (kWh) × 100 ÷ {Maximum demand (kW) × Time under consideration (hr)}] of the transformer during the audit period is:
<table>
<tr><th></th><th>Load factor %</th></tr>
<tr><td>TR (400kVA)</td><td>36.13</td></tr>
</table></td><td>➢ Load factor of the transformer is low during the audit period. The load factor shall be greater than 50% for better performance of the transformer.</td></tr>
<tr><td>➢ Efficiency of the transformers calculated are tabulated below;
<table>
<tr><th></th><th>Efficiency</th></tr>
<tr><td>TR (400kVA)</td><td>90.56</td></tr>
</table></td><td>➢ The efficiency of the transformer is found to be low since the loading was pretty low during the time of audit</td></tr>
</table>

Dr. LEENA A V
PRINCIPAL
SREE NARAYANA GURU COLLEGE OF
ENGINEERING & TECHNOLOGY
PAYYANUR, KANNUR

HARMONICS ASSESSMENT – AT DISTRIBUTION TRANSFORMER LV SIDE

Harmonics study revolves around the use of non-linear loads that are connected to electric power systems including static power converters, arc discharge devices, saturated magnetic devices and to a lesser degree, rotating machines. Static power converters of electric power are the largest non-linear loads and are used in industry for a variety of purposes such as electro- chemical power supplies, adjustable speed drives, and uninterruptible power supplies. These devices are useful because they can convert ac to dc, dc to dc, dc to ac, and ac to ac. Non-linear loads change the sinusoidal (a succession of waves or curves) nature of the ac power current (and consequently the ac voltage drop) thereby resulting in the flow of harmonic currents in the ac power system that can cause interference with communication circuits and other types of equipment. Classification, effects and standards are given below:

TABLE 14: HARMONICS CLASSIFICATION

	1st order	2nd order	3rd order	3rd order	4th order	5th order	6th order
Frequency Hz	50	100	150	200	250	300	350
Sequence	+	-	0	+	-	0	+

TABLE 15: EFFECTS OF HARMONICS (IEEE 519)

Effect on - Motor & generator	**-Transformers**	**- Cables**	**- Electronic equipment**	**- Metering**
Rotor heating, causes Reverse rotating magnetic field, causes pulsating torque output, Mechanical oscillations, increases Cogging & Crawling	Increase in copper & stray losses, increase in iron losses, transformer heating	Voltage stress & corona, I^2R losses increases	Voltage notching, Electromagnetic interference, Shifting of the voltage zero crossing	Erroneous reading

Dr. LEENA A V
PRINCIPAL
SREE NARAYANA GURU COLLEGE OF
ENGINEERING & TECHNOLOGY
PAYYANUR, KANNUR

TABLE 16: CURRENT HARMONICS LIMIT (IEEE 519-2022)

Maximum harmonic current distortion in percent of I_L						
Individual harmonic order (odd harmonics)[a, b]						
I_{SC}/I_L	$3 \le h < 11$	$11 \le h < 17$	$17 \le h < 23$	$23 \le h < 35$	$35 \le h \le 50$	TDD
<20[c]	4.0	2.0	1.5	0.6	0.3	5.0
$20 < 50$	7.0	3.5	2.5	1.0	0.5	8.0
$50 < 100$	10.0	4.5	4.0	1.5	0.7	12.0
$100 < 1000$	12.0	5.5	5.0	2.0	1.0	15.0
>1000	15.0	7.0	6.0	2.5	1.4	20.0

[a]Even harmonics are limited to 25% of the odd harmonic limits above.

[b]Current distortions that result in a dc offset, e.g., half-wave converters, are not allowed.

[c]All power generation equipment is limited to these values of current distortion, regardless of actual I_{sc}/I_L.

where

I_{sc} = maximum short-circuit current at PCC

I_L = maximum demand load current (fundamental frequency component) at the PCC under normal load operating conditions

TABLE 17: VOLTAGE HARMONICS LIMIT (IEEE 519-2022)

Voltage distortion limits		
Bus voltage at PCC	**Individual voltage distortion %**	**Total voltage harmonics distortion %**
V ≤ 01 kV	5.0	8.0
01 kV < V ≤ 69 kV	3.0	5.0
69.001 kV < V ≤ 161 kV	1.5	2.5
161.001 kV and above	1.0	1.5

HARMONICS MEASUREMENT

1. **Standard for harmonics** - IEEE 519-2022
2. **Normal range of Isc/I_L** - $20 < x \leqq 50$
3. **Maximum standard Total demand distortion – current** - 8%
4. **Maximum standard Total harmonic distortion – voltage** - 8%

TABLE 18: TOTAL HARMONIC DISTORTION

Particulars	Thdv max	Thda max	Remarks	Status with IEEE 519-2022
	%	%		
Transformer (400Kva)	4.4	32.7	Current harmonics is above limit	Above the limit

Where:

- *THDv – Total harmonic distortion voltage*
- *THDa – Total harmonic distortion current*

Dr. LEENA A V
PRINCIPAL
SREE NARAYANA GURU COLLEGE OF ENGINEERING & TECHNOLOGY
PAYYANUR, KANNUR

VOLTAGE HARMONICS ANALYSIS

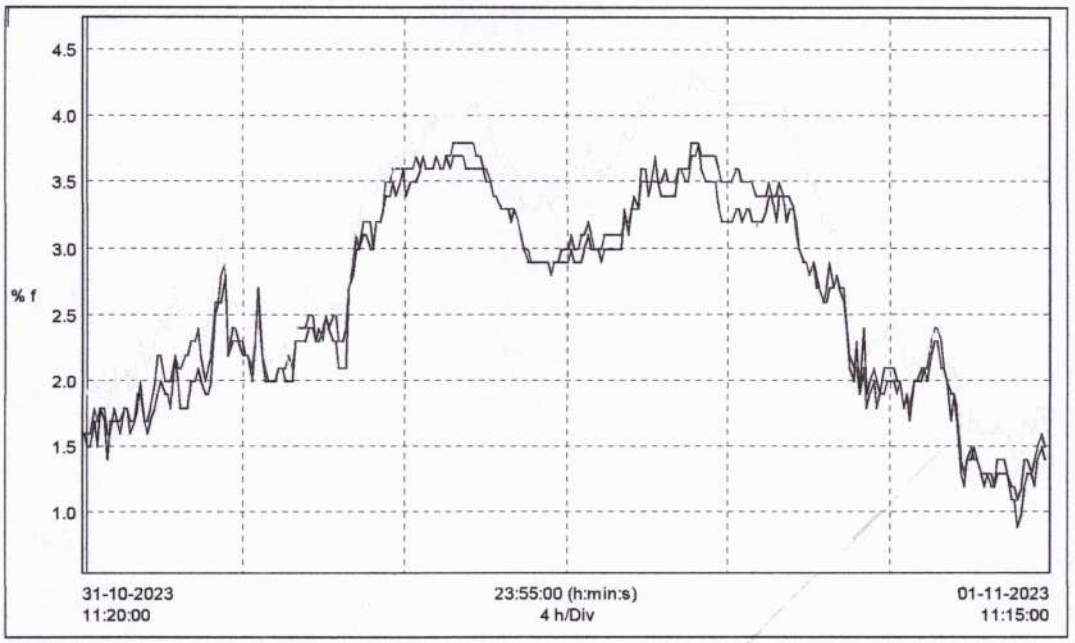


FIGURE 15: THDV

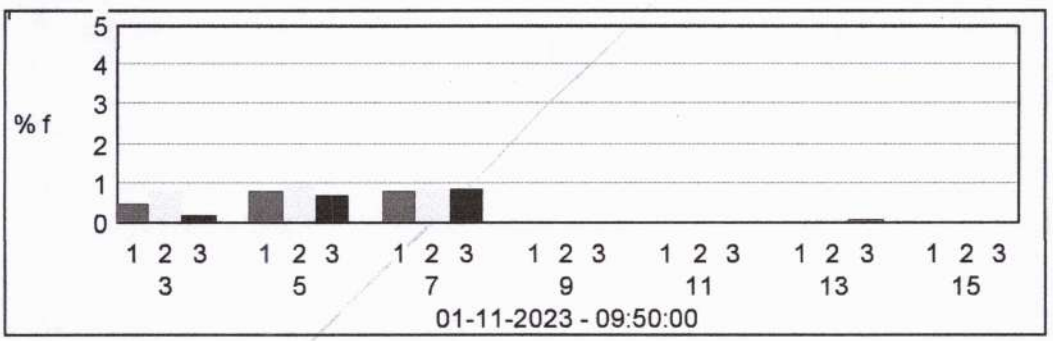


FIGURE 16: HARMONIC SPECTRUM VOLTAGE

Dr. LEENA A V
PRINCIPAL
SREE NARAYANA GURU COLLEGE OF
ENGINEERING & TECHNOLOGY
PAYYANUR, KANNUR

CURRENT HARMONICS ANALYSIS

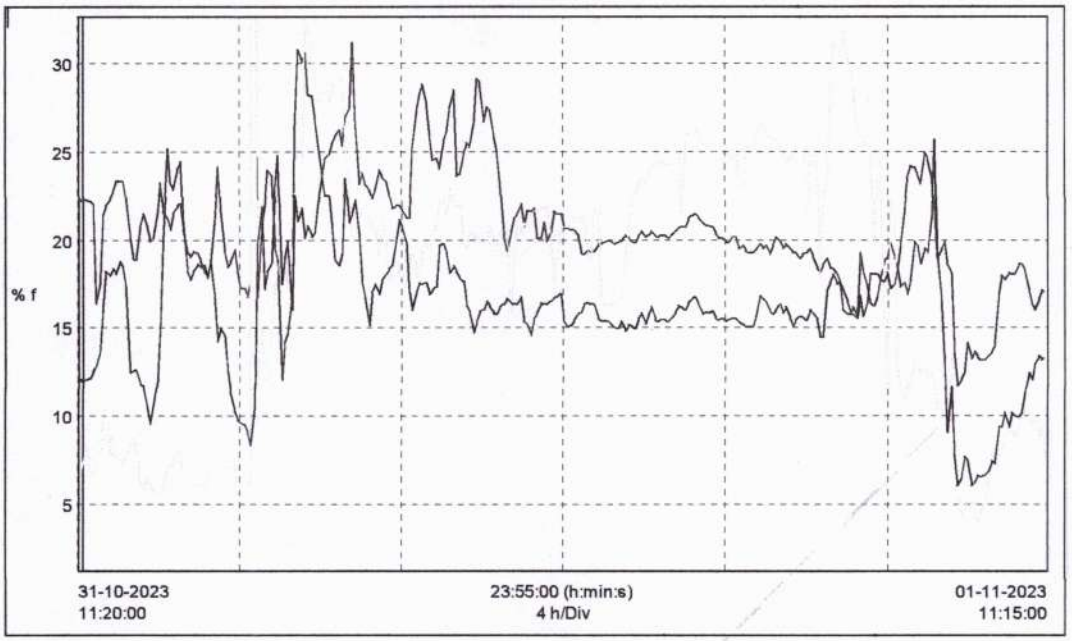


FIGURE 17: THDa

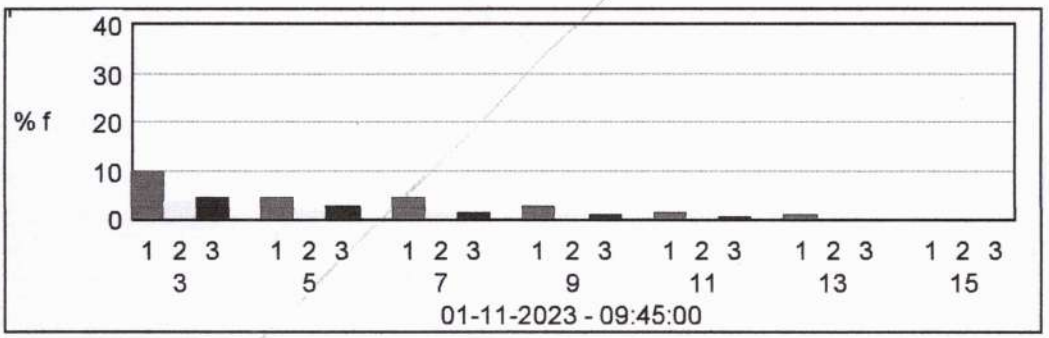


FIGURE 18: HARMONIC SPECTRUM CURRENT

Dr. LEENA A V
PRINCIPAL
SREE NARAYANA GURU COLLEGE OF
ENGINEERING & TECHNOLOGY
PAYYANUR, KANNUR

INFERENCE & OBSERVATION – HARMONIC ASSESSMENT AT DISTRIBUTION TRANSFORMERS

TABLE 19: INFERENCE & OBSERVATION – HARMONIC ASSESSMENT

Harmonics	
Observation	**Suggestion**
➢ *The present harmonic THD voltage value at the LV side of the distribution transformers is within the prescribed limit of 8%. Also, the individual voltage harmonic values are within the prescribed limit of 3%.* ➢ *The maximum value of current THD value is found to be above limit*	➢ *To maintain the harmonic within the limits, in future, ensure that the equipment satisfies the harmonics standards as per the IEEE 519. This will reduce the effects of non-linear loads in the system.*

Dr. LEENA A V
PRINCIPAL
SREE NARAYANA GURU COLLEGE OF
ENGINEERING & TECHNOLOGY
PAYYANUR, KANNUR

ANALYSIS OF MAJOR EQUIPMENT

This section analysis the major equipment in the college

DIESEL GENERATOR

The college employs a diesel generator with a capacity of 62.5 kVA as a backup power supply. The details about the diesel generator can be found in the table provided below:

TABLE 20: DIESEL GENERATOR

Alternator Details			Engine Details			Year of mfg
Rated power (kVA)	Make	Serial No:	Rated power (kW)	Make	Serial No:	
63	Kel	0308PB580040	61	Kirloskar	4H 2454/0300148	2003

Dr. LEENA A V
PRINCIPAL
SREE NARAYANA GURU COLLEGE OF
ENGINEERING & TECHNOLOGY
PAYYANUR, KANNUR

LIGHTS AND FANS

The lights and fans are provided in various rooms and areas of the building to improve human comfort conditions. The installed Fan load details of the facility is as given in table shown below. The types of fans installed in the building include ceiling fans, wall fans, exhaust fans and pedestal fans.

Area	T12	T8	T5	LED	LED	LED	LED	Led	CFL	Flood light	Ceiling Fan	Pedastal fan	Wall fan	Exhaust fan
Watts	40	36	28	20	15	6	40	9	18	100	60	60	60	60
EEE	22	32		6			2				80	1	1	
CS		44						16	6		87	1	2	
CE		81							11		96			
ME	57	23							3		73	2	5	
EC		47						2			63	1	1	
Admin block		35		7				2	7		51	3	3	
Board Room					23	19		2			3			1
Corridor and Toilet	3	27	2	9				32						
Canteen and Seminar Hall		23						12	4		35			
Men's Hostel	4	83		29						2	54			2
Ladies Hostel	6	85		28				64	12	3	59	1		
Total (no's)	92	480	2	79	23	19	2	130	43	5	601	9	12	3
Total (kW)	3.68	17.28	0.056	1.58	0.345	0.114	0.08	1.17	0.774	0.5	36.06	0.54	0.72	0.18
Net Total kW	**63.07**													

Inference

I. Majority of the lights are of fluorescent type lights, which can be replaced with energy efficient LED lights. Detailed calculations are given in Annexure 1

II. Continuous working conventional fans can be replaced with energy efficient BLDC fans

37

Dr. LEENA A V
PRINCIPAL
SREE NARAYANA GURU COLLEGE OF ENGINEERING & TECHNOLOGY
PAYYANUR, KANNUR

AIR CONDITIONERS

Air conditioners are installed to maintain the comfort level of occupants. The Human comfort level as per the ASHRAE standard 60.1 is in the temperature range 23- 27 °C with 50- 60% Relative humidity. The details of installed ACs are given below

TABLE 21: AIR CONDITIONERS

Location	Make	Type	Capacity (Tr)	Star rating	Rated power (W)	Year
Board room	Blue star	Split	1	2	1200	2010
Board room	Blue star	Split	1.5	2	1950	2010
Board room	Blue star	Split	2	3	2515	2010
Principal	Voltas	Split	1.5	5	939	2023
Total			**6.604**			

Inference

I. Run ACs at 23°C to 26°C.
II. Every degree below 26°C increases energy consumption of AC.
III. If lower temperature is preferred, it would be wiser to use the AC along with a ceiling fan.
IV. Clean the filter of the AC's occasionally as it can help to reduce energy consumption.

Dr. LEENA A V
PRINCIPAL
SREE NARAYANA GURU COLLEGE OF
ENGINEERING & TECHNOLOGY
PAYYANUR, KANNUR

UNINTERUPPTED POWER SUPPLY

An uninterruptible power supply, UPS is an electrical apparatus that provides emergency power to a load when the input power source fails. The table describes the ups/inverter in the college.

Location	UPS Details		Battery Details	
	Rated KVA	Make	Make/Type/Nos	Volt/Ah
Department Block				
DBG(11)	6	APC	Amaron/SMF/16	12/42
IQAC, DB(F)12	2	Luminous	Exide/Tubular/4	12/150
Admn Block				
Office	3	APC	Exide/Tubular/4	12/75
Computer lab, AB(F)04	7.5	Luminous	Exide/Tubular/6	12/105
	7.5	Luminous	Exide/Tubular/6	12/105
	7.5	Luminous	Exide/Tubular/6	12/105
	7.5	Luminous	Exide/Tubular/6	12/40
Programming lab, AB(F)08	7.5	Luminous	Exide/Tubular/6	12/40
Internet Lab, AB(F)08	10	LiV fast Solar	LiV Fast Solar/Tubular/4	12/135
Digital Signal processing lab, AB(G)07	7.5	Luminous	Exide/Tubular/6	12/40
	7.5	Luminous	Exide/Tubular/6	12/40
CAD Lab	7.5	Luminous	Exide/Tubular/6	12/40

Inference

I. Ensure that adequate ventilation is provided for the UPS and batteries
II. Neutral to Earth voltage was more in the output of UPS at different locations. UPS earthing needs to be checked

Dr. LEENA A V
PRINCIPAL
SREE NARAYANA GURU COLLEGE OF ENGINEERING & TECHNOLOGY
PAYYANUR, KANNUR

ANNEXURE-1

ENERGY SAVING PROPOSAL - 1

REPLACEMENT OF OLD CEILING FANS WITH BLDC FANS

Background

A BLDC fan takes in AC voltage and internally converts it into DC using SMPS. The main difference between BLDC and ordinary DC fans is the commutation method. All the fans used in the building are ordinary fans. In security cabin and examination cell the fans are running throughout the day.

Proposal

Replace the ceiling fans with BLDC in areas such as security cabin, Examination cell, Classrooms, Staff rooms, etc

Detailed calculation is shown in the table given below.

TABLE 22: ECM 1

Particulars	Unit	Continuous working fans	Others
Present Power Consumption	Watts	60	60
Proposed Power Consumption	Watts	28	28
Reduction in power	Watts	32	32
Operating hours per day	Hrs/day	24	8
No: of working Days	days/annum	210	210
No: of fans operating	Nos	3	200*
Annual energy savings	kWh/annum	484	10,752
Cost per kWh	Rs	7.5	7.5
Annual Financial Saving	Rs/annum	3,629	80,640
Cost of BLDC fan	Rs	3,500	3,500
Investment	Rs	10,500	7,00,000
Simple payback period	**Months**	35	104

SUMMARY		
Annual unit savings	kWh	11,236
Total savings	Rs	84,269
Total investment	Rs	7,10,500
Simple Payback period	**Months**	**101**

Replace as and when existing fans reach end of life

Dr. LEENA A V
PRINCIPAL
SREE NARAYANA GURU COLLEGE OF
ENGINEERING & TECHNOLOGY
PAYYANUR, KANNUR

ENERGY SAVING PROPOSAL - 2

REPLACEMENT OF FLUROSCENT LIGHTS WITH ENERGY EFFICIENT LED LIGHTS

BACKGROUND

The installed light fittings are mainly LED and fluorescent light of different ratings. Replacement of Fluorescent lights (T8, T5 & T12) to be done in phase manner with LED lights.

PROPOSAL

By replacing the light fitting with LEDs as per preference of operating hours in the class rooms, hostel, office area, faculty rooms, canteen, etc, the power consumption will reduce by approximate 50% with the present operating hours. The calculation for the savings, approximate investment cost and payback period is given in the table below.

TABLE 23: ECM 2

Particulars	Units	T12	T8	T5
Power of Fluorescent lights	**Watts**	40	36	28
Power of proposed LED tube	Watts	20	20	20
Difference in Wattage	Watts	20	16	8
Operating hours per day	Hrs/day	4	4	4
No: of working days per year (Average)	Nos	210	210	210
No: of working hours per annum	Hrs	840	840	840
Number of Lights operating	Nos	92	480	2
Annual Consumption for Fluorescent lights	kWh/Year	3091	14515	47
Annual Consumption for LED lights	kWh/Year	1546	8064	34
kWh Saving per Annum	kWh/Year	1546	6451	13
Cost per kWh (Average)	Rs	7.5	7.5	7.5
Annual Financial Savings	Rs. / Year	11592	48384	101
Cost of LED light	Rs	300	300	300
Investment for LED lights	Rs	27600	144000	600
Simple Payback period	**Months**	29	36	71

SUMMARY		
Annual unit savings	kWh	8010
Total savings	Rs	60076.8
Total investment	Rs	172200
Simple Payback period	**Months**	34

Dr. LEENA A V
PRINCIPAL
SREE NARAYANA GURU COLLEGE OF
ENGINEERING & TECHNOLOGY
PAYYANUR, KANNUR

INSTALLATION OF 10kW On- grid Solar PV System

Background

The college has ample free space at the rooftop with sunlight throughout the day. The solar energy potential in India is immense due to its convenient location near the Equator. India receives nearly 3000 hours of sunshine every year, which is equivalent to 5000 trillion kWh of energy.

Proposal

A 10kW on-grid solar system can be installed atop the building.

Calculations

TABLE 24: RENEWABLE ENERGY INTEGRATION

Particular	Units	Value
Proposed system	kW	10
Approximate available units for utilisation	kWh/day	49.9
Approximate annual unit generation @ 250days per annum	kWh /year	12,475
Average utility electricity cost*	Rs	7.36
Annual Financial Savings	Rs/Annum	91,816
Investment (subsidized & in grid tied mode)	Rs	6,50,000
Simple payback period	Years	7

Dr. LEENA A V
PRINCIPAL
SREE NARAYANA GURU COLLEGE O
ENGINEERING & TECHNOLOGY
PAYYANUR, KANNUR

ANNEXURE-2

ELECTRICITY BILL SAMPLE COPY

KERALA STATE ELECTRICITY BOARD LIMITED

Office of the Special Officer(Revenue), Pattom,Thiruvananthapuram

DEMAND NOTICE FOR MAY 2021

(As per CHAPTER VII OF KERALA ELETRICITY SUPPLY CODE -2014)

Con. Code	1368360002734	Bill Date	04-May-2021	Due Date	11-May-2021	Bill.No	2102811879466 Ver : 0
Tariff	HT II (B) GENERAL			Last Date	26-May-2021	CD(cash)	173360 BG 0

SREE NARAYANA GURU COLLEGE OF ENG.& TECH

PAYYANNUR,CHALAKODE P O,
Kannur,,
Mobile no--9495001988

LCN :17/4252

SBI Virtual A/c No(IFS Code:SBIN0070493)-KSEBHT17C4252

Consumer GSTIN_ID- /KSEB (L)GST ID=32AAECK2277N8Z1

Arrears as on 31-Mar-2021			
Disputed	0	Undisputed	0

Contract Demand(kVA)	75% of CD (KVA)	130% of CD (KVA)	Connected Load (KW)
65.0	48.75	84.5	542.845

Date of Previous Reading	31-Mar-2021	Email: info@sngcet.org	
Date of Present Reading	30-Apr-2021	Supply Voltage	11 kV HT
Average		Billing Type	DPS
MD (kVA) / Consumption (kWh) / PF	23.64 / 3752 / 0.98	Section	Payyanur
		Circle	Sreekandapuram

Reading Details of meter 174252MM-Working (KVA,KWh,KVAh & KVArh) for 04-2021

1. Energy Consumption(KWh)

Zone	FR	IR	MF	Units
1	226151.00	224341.00	1.000	1810
2	55100.00	54590.00	1.000	510
3	98140.00	97139.00	1.000	1001
			Total	3321

2. Energy Consumption(KVAh)

Zone	FR	IR	MF	Units
1	230378.00	228517.00	1.000	1861
2	55843.00	55324.00	1.000	519
3	99054.00	98035.00	1.000	1019
			Total	3399
Ave.PF=KWh/KVAh		0.98		

3. Energy Consumption(KVArh) Lag and kVARh (Lead)

Zone	FR	IR	MF	Units	FR	IR	Units
1	11799.00	11700.00	1.000	99	25842.00	25572.00	270
2	3007.00	2990.00	1.000	17	6179.00	6117.00	62
3	4081.00	4057.00	1.000	24	8725.00	8596.00	129
			Total kVArh(Lag)	140	kVArh(Lead)		461

4. Demand (KVA)

	Readings	MF	Units
1	20.636	1.000	20.64
2	7.9403	1.000	7.94
3	6.6646	1.000	6.66
5.Factory Lighting			0.0
6.Colony Lighting			0.0
7.Generator			0

INVOICE

	Unit	Rate (Rs)	Amount (Rs)
1.Total Demand Charge			
a. Demand Charge - Normal	49.0	440.000	21560.00
b. Demand Charge - Peak	0.0	440.000	0.00
c. Demand Charge - Off peak	0.0	440.000	0.00
d. Excess Demand Charge (Normal)	0.0	220.000	0.00
e. Excess Demand Charge(Peak)	0.0	220.000	0.00
f. Excess Demand Charge (Off peak)	0.0	220.000	0.00
Sub Total (a+b+c+d+e+f)			21560.00
2.Total Energy Charges			
a. Energy charges - Normal	1810.0	6.200	11222.00
b. Energy charges - Peak	510.0	9.300	4743.00
c. Energy charges - Off peak	1001.0	4.650	4654.65
Sub Total(a+b+c)			20619.65
3.PF Incentive / Disincentive			0.00
Total Energy Charge			20619.65
4.Energy Charges on Lighting load			
a.Factory Lighting	0	0.2	
b.Colony Lighting	0	0.2	0.00
Sub Total(a+b)			
5.Electricity Duty	20620	0.100	2061.97
6.Ele. Surcharge	3321	0.025	83.03
7.Duty on self generated energy	0	0.012	0.00
8.Penalty for non-segn. of light load			

	Amount
9.Other Charges	
Reconnection Fee	0.00
10.Total(add 1 to 9)	44324.65
Plus/Minus (Round off)	0.35
UnDisputed Arr Amount	0.00
Less 1. Advance / Credit	
2. CD Interest	0.00
3. CD Refund	0.00
Net Payable	**44325.00**

(Rupees Forty Four Thousand Three Hundred Twenty Five Only)

E & O.E

Balance Advance at Credit, if any

Please follow our official Facebook page fb.com/ksebl for information & announcements.

(Instructions overleaf)

SPECIAL OFFICER (REVENUE)

Please Detach and enclose with the DD

1368360002734 2102811879466 Rs.44325.00 May 2021

SREE NARAYANA GURU COLLEGE OF ENG.& TECH

Date

DD/Payment Instruction

Name of the Bank

Signature

Dr. LEENA A V
PRINCIPAL
SREE NARAYANA GURU COLLEGE OF ENGINEERING & TECHNOLOGY
PAYYANUR, KANNUR

CONSOLIDATED KSEBL BILL – ANALYSIS PERIOD

TABLE 25: CONSOLIDATED KSEBL BILL

Sree Narayana Guru College of Engineering and Technology												
CONTRACT DEMAND = 65 KVA												
Tarif: HT II (B) General												
Consumer No: LCN 17/4252												
75% OF CONTRACT DEMAND												
kVA Normal	28	30	28	28	31	30	28	33	38	31	29	37
kVA Peak	19	30	14	12	14	14	14	14	19	19	13	19
kVA Off Peak	13	30	10	8	14	10	13	12	17	12	5	13
CONTRACT DEMAND CHARGE	24500	24500	24500	24500	24500	24500	24500	24500	24500	24500	24500	24500
KWH NORMAL	3548	3240	2681	3145	3865	3255	3584	3645	4348	3597	2875	4473
KWH PEAK	690	662	557	612	760	739	916	772	927	718	531	775
KWH OFFPEAK	1260	1226	1054	1100	1347	1264	1609	1402	1690	1292	984	1431
TOTAL KWH	5498	5128	4292	4857	5972	5258	6109	5819	6965	5607	4390	6679
KWH CHARGE	37590.40	35037.00	29287.60	33238.40	40903.70	36118.20	41920.30	39810.60	47640.80	38372.40	29984.60	45619.50
PF	0.95	0.96	0.97	0.97	0.98	0.97	0.97	0.98	0.97	0.98	0.97	0.98
PF INCENTIVE/PENALTY	0	-175.19	-292.88	-332.38	-613.56	-361.18	-419.20	-597.16	-476.41	-575.59	-299.85	-684.29
DUTY	3759.04	3503.70	2928.76	3323.84	4090.37	3611.82	4192.03	3981.06	4764.08	3837.24	2998.46	4561.95
ELEC SURCHARGE	137.45	128.20	107.30	121.43	149.30	131.45	152.73	145.48	174.13	140.18	109.75	166.98
OTHERS TOTAL	3896.49	3631.90	3036.06	3445.27	4239.67	3743.27	4344.76	4650.25	5565.06	4482.05	3942.31	5930.93
GRAND TOTAL	65986.89	62993.71	56530.78	60851.29	69029.81	64000.29	70345.86	68363.69	77229.45	66778.86	58127.06	75366.14

Dr. LEENA A V
PRINCIPAL
SREE NARAYANA GURU COLLEGE OF
ENGINEERING & TECHNOLOGY
PAYYANUR, KANNUR

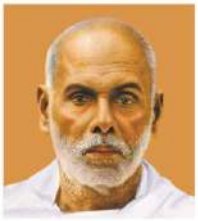
ABBREVIATIONS

APFC	:	Automatic Power Factor controller
AVG	:	Average
BDV	:	Breakdown voltage
BEE	:	Bureau of energy efficiency
CEA	:	Central electrical authority
CFL	:	Compact fluorescent lamp
CFM	:	Feet cube per minute
DB	:	Distribution Board
DG Set	:	Diesel Generator Set
EC	:	Energy Conservation
FD	:	Forced draft
FY	:	Financial year
HPSV	:	High-pressure sodium vapour
HT	:	High Tension
ID	:	Induced draft
IEC	:	International electro technical commission
IEEE	:	The Institute of electrical and electronics engineers
IS	:	Indian Standard
KG	:	Kilogram
KSEB	:	Kerala state electricity board
KVA	:	Kilo Volt Ampere
KVAH	:	Kilo volt Ampere Hour
KVAR	:	Kilo volt-ampere
KW	:	Kilo Watts
KWH	:	Kilowatt-hour
LED	:	Light emitting diode
MAX	:	Maximum
MH	:	Metal halide
NEMA	:	National Electrical Manufacturers Association
OLTC	:	On load tap changer
ONAN	:	Oil natural air natural
PCC	:	Point of common coupling
PSI	:	Pound square inch
RMD	:	Registered Maximum demand
SEC	:	Specific electricity consumption
SFU	:	Switch Fuse Unit
SLD	:	Single Line Diagram
TDD	:	Total demand distortion
THD	:	Total harmonics distortion
TOE	:	Tonne of oil equivalent
UPS	:	Uninterruptible power supply
VFD	:	Variable frequency drive

REFERENCES

1. BEE energy audit books
2. CEA regulations of grid connectivity-2007
3. IEEE Std. 519-1992.
4. National lighting code - 2010

Dr. LEENA A V
PRINCIPAL
SREE NARAYANA GURU COLLEGE OF
ENGINEERING & TECHNOLOGY
PAYYANUR, KANNUR



GREEN AUDIT

GREEN AUDIT – 2022-23

SREE NARAYANA GURU COLLEGE OF ENGINEERING AND TECHNOLOGY

PAYYANUR, KANNUR, KERALA

EXECUTED BY

ATHUL ENERGY CONSULTANTS PVT LTD
4th FLOOR, CAPITAL LEGEND BUILDING,
KORAPPATH LANE, ROUND NORTH, THRISSUR, KERALA-680020
Ph: +91 735611199/0-6 Web: www.athulenergy.com E-Mail: info@athulenergy.com

September 2023

Dr. LEENA A V
PRINCIPAL
SREE NARAYANA GURU COLLEGE OF
ENGINEERING & TECHNOLOGY
PAYYANUR, KANNUR

TABLE OF CONTENTS

Dr. LEENA A V
PRINCIPAL
SREE NARAYANA GURU COLLEGE OF ENGINEERING & TECHNOLOGY
PAYYANUR, KANNUR

LIST OF TABLES

LIST OF FIGURES

Dr. LEENA A V
PRINCIPAL
SREE NARAYANA GURU COLLEGE OF
ENGINEERING & TECHNOLOGY
PAYYANUR, KANNUR

PREFACE

Every institution should be imparting knowledge about the campus environment and its surroundings through activities that follows the principles of sustainability. Hence an evaluation is needed to understand where it stands in the path to be an environment friendly, talent nurturing educational institution. This Green Audit was done with the aim to assess and rate the sustainable nature of the campus. The college vision is "to enlighten and empower women in rural and suburban society and enable them to act as agents of social transformation and acquire knowledge of self and surroundings and to make the world a better place". And in the **social goals**, it is written as **"to make the students aware of the pressing global issues and the moral responsibility to handover to the coming generation an eco-friendly life style and an earth free from pollution, filth, bigotry and corruption".** It was observed by us from the students' participation during the green audit.

Dr. LEENA A V
PRINCIPAL
SREE NARAYANA GURU COLLEGE OF
ENGINEERING & TECHNOLOGY
PAYYANUR, KANNUR

ACKNOWLEDGEMENTS

We express our sincere gratitude to the management of M/s Sree Narayana Guru College of Engineering and Technology Payyannur for giving us an opportunity to carry out the project of Green Audit. We are extremely thankful to all the staffs for their support to carry out the studies and for input data, and measurements related to the project of Green audit.

1	Dr. Leena A V	Principal
2	Ms. Mary Sonia George	HOD – CE
3	Mr. Sundar V	HOD – CSE
4	Mr. Abilash Krishnan	HOD – EEE
5	Dr. Sudhin Chandran	HOD – ME
6	Mr. Manu C	Assistant Professor – EEE

Also congratulating our Green audit team members for successfully completing the assignment in time and making their best efforts to add value.

GREEN AUDIT TEAM

1. **Mr. Santhosh A**
   Registered Energy Auditor of Bureau of Energy Efficiency (BEE – Govt. of India)
   Accredited Energy Auditor No – EA 7597

2. **Mr. Ashok KMP**
   Energy Auditor of Bureau of Energy Efficiency, GRIHA Certified Professional

3. Ms. Keerthana Project Engineer

Yours faithfully

ATHUL ENERGY CONSULTANTS PVT. LTD. THRISSUR 680 020

Managing Director
Athul Energy Consultants Pvt Ltd

Dr. LEENA A V
PRINCIPAL
SREE NARAYANA GURU COLLEGE OF
ENGINEERING & TECHNOLOGY
PAYYANUR, KANNUR

GREEN AUDIT SUMMARY

- Sree Narayana Guru College of Engineering and Technology Payyannur taken considerable effort for maintaining the green and sustainable campus.
- Staff and student's collaboration of NSS unit is held responsible for maintenance of greenery inculcating a sustainable culture among the student's community.
- By recognizing the importance of making healthy youth, management taken initiatives and built a badminton and volleyball courts, food ball ground in the college surrounded with lush of greeneries.
- Roof water is from buildings and surface water from grounds also collected and used for ground water recharging by suitable mechanism.

Suggestions for improvement

- Water meter to be installed for measuring water consumption per day.
- College can create vegetable garden , Ornamental Garden , etc in the college
- College can create living boundary wall on the ground and path ways by trees,
- Crete a garden Library in the college in its open nature atmosphere
- Practice Institutional Ecology- Set an example of environmental responsibility by establishing institutional ecology policies and practices of resource conservation.
- Road map for the tree plantation to be done along with the master plan of the college. Gave importance for the oxygen generating plants and lush green trees.
- Display boards are to be placed in the, herbal, botanical garden areas with name of trees in that areas.

Dr. LEENA A V
PRINCIPAL
SREE NARAYANA GURU COLLEGE OF
ENGINEERING & TECHNOLOGY
PAYYANUR, KANNUR

general details

The general details of the s Sree Narayana Guru College of Engineering and Technology Payyannur are given below in table.

Table 1 GENERAL DETAILS

Sl. No:	Particulars	Details
1	Name of the College	Sree Narayana Guru College of Engineering and Technology
2	Address	Sree Narayana Guru College of Engineering and Technology Chalakkode P.O. Payyanur, Kannur Kerala 670307 04985 20201987, 04985 201988
3	Contact Person	Dr. Leena A V (Principal)
4	Contact Phone number & E mail	9447008398, 9746766440
		principal@sngcet.org
5	Web site	www.sngcet.ac.in
6	Type of Building	Educational Institution
7	Annual Working Days	210
8	No: of Shifts	Day Shift (One) (9AM -4PM)
9	No: of students enrolled	414
10	No: of teaching staff	56
11	No: of non-teaching staff	54
15	Total campus area	60 acre
16	Total Built Up area	25929m²
17	No: of hostel	01 for Women and 01 for men
18	Bio gas plant	01 (Fixed concrete 10m3)

Dr. LEENA A V
PRINCIPAL
SREE NARAYANA GURU COLLEGE OF ENGINEERING & TECHNOLOGY
PAYYANUR, KANNUR

SREE NARAYANA GURU COLLEGE OF ENGINEERING AND TECHNOLOGY

Sree Narayana Guru College of Engineering & Technology, one of the prestigious technical institutions in North Malabar, was established in 2003. The engineering college is fully equipped to meet the rising demands for greater facilities in the scenario of higher education. Since its inception, it has been true to do the mission and the prophetic vision of the great Saint Sree Narayana Guru. With its emphasis on quality education augmented by exposure and training in other individual skills, the institute's focus is on creating individuals who are all-round performers and true professionals.

Sree Narayana Guru was a great Saint Philosopher and Social Reformer of Kerala. His thoughts and work have universal significance. His message "Educate that you may be free, organise that you may be strong, and industrialize that your financial status may improve" has relevance all the times and places. Guruji was instrumental in uplifting the people of Kerala and in the formation of Sree Bhakthi Samvardhani Yogam in 1907. Sree Sundareshwara Temple, Talap, Kannur, consecrated by Sree Narayana Guru in 1916 is the pivot of all the activities of Yogam. The Yogam upholds the Guru's vision to enrich the people educationally, socially, culturally and spiritually.

Sree Bhakthi Samvardhini Yogam is working towards fulfilling Guru's vision, establishing educational institutions, women's hostels and has been offering financial aid and endowments to deserving students. The Yogam embarked on a noble project - Sree Narayana Guru College of Engineering & Technology an Engineering college in Malabar in 2003.

Vision

A knowledge society promoting human excellence and enlightenment through technical education.

Mission

To provide technical education of the highest quality and standard of excellence for socio-economic progress embedded in clearly articulated values and supported by commitments

Dr. LEENA A V
PRINCIPAL
SREE NARAYANA GURU COLLEGE OF
ENGINEERING & TECHNOLOGY
PAYYANUR, KANNUR

GREEN AUDIT

The whole world is on the road to a sustainable development, and the environment conservation is the top priority among the list as every human activity has its effect on their surroundings, which is the environment. Hence be it a house, a commercial building, an industrial building, or any other construction will disturb the balance of the environment. It is very important to do a detailed study about the effects on the environment. This is conducted under the name of *Green Audit*, which can be defined as *the official examination of the effects a company or other organization has on the environment, especially the damage that it causes.* The objectives of the green audit can be listed as follows:

- Including participants from every section of the organization in the auditing process.
- Understanding the environment by drawing a simple sketch of the total area.
- Identifying the activities in the premises and listing them.
- Calculating the resource consumption like the land and water.
- Assessing the waste management and disposal.
- Study the energy usage pattern.
- Identify the good practices.
- Suggest the viable solutions to improve the sustainable nature of the institution.
- Compile the report with the above-mentioned details.
- Conduct a walkthrough audit to check the suggestions implemented by the institution and suggest for further improvements
- Verify all the points with actual measurements is it is meeting the performance and gave suggestions for improvement

Dr. LEENA A V
PRINCIPAL
SREE NARAYANA GURU COLLEGE OF
ENGINEERING & TECHNOLOGY
PAYYANUR, KANNUR

CAMPUS ENVIRONMENT

The environment in and around the college campus plays an important part in maintaining a healthy atmosphere in nurturing talents. Trees are the major source of the oxygen we breathe, and receiver of the carbon dioxide we exhale. The sustainability of an ecosystem depends on the number of plants and trees in and around the surroundings. The open space in the college is used for gardening, , buildings are built up without disturbing the sustainable nature of land scape of the area.

Ultimately the campus is maintaining natural equilibrium with open spaces, buildings, trees, birds along with human interactions

Figure 1 CAMPUS VIEW

Scientific studies are proved that the nature can able to cure any diseases and this will reduce the stress among students during theirs studies and also increase the compassion among them and to nature. Ultimately the campus is maintaining natural equilibrium trees, birds and water bodies with human beings. Gardens and landscape are an aesthetic delight and it promotes attentiveness of students. Persons exposed to plants have higher level of positive feelings (pleasant, calm) as opposed to negative feelings (anger, fear).

Dr. LEENA A V
PRINCIPAL
SREE NARAYANA GURU COLLEGE OF
ENGINEERING & TECHNOLOGY
PAYYANUR, KANNUR

SUSTAINABLE CONSTRUCTION OF BUILDINGS

Energy consuming devices installed to achieve the comfort levels for the occupants of the building gives rise to heat generation which adversely affects the environment within the building and in the surrounding. Buildings are thus the major pollutants that affect the urban air quality and contribute to climate change. Buildings are the major consumers of energy during their construction, operation and maintenance.

Sree Narayana Guru College of Engineering and Technology Payyannur has developed an ecological design in their buildings and adopted minimum negative impact on ecosystem. Their approach to the constructional activities consciously is to conserve energy and ecology and avoid the adverse effects of ecological damage.

Sree Narayana Guru College of Engineering and Technology Payyannur management constructed the building to optimum utilisation of land and classrooms and with abundant light and natural ventilation. Maximum day light ingression and natural ventilation increases the indoor air quality and avoid the sick building syndrome. The whole facility and buildings are designed to maximum and optimum utilisation of land without affecting the nature

FIGURE 2: BUILDING VIEW

Dr. LEENA A V
PRINCIPAL
SREE NARAYANA GURU COLLEGE OF
ENGINEERING & TECHNOLOGY
PAYYANUR, KANNUR

CARBON DIOXIDE LEVELS

Air quality is a major area of concern inside a building. The percentage share of oxygen and carbon dioxide should be such that the occupants are able to perform their tasks without any discomfort. This is generally done through a provision of fresh air duct for the air conditioning systems or by providing windows. Numerous factors need to be considered for the design and fabrication of the fresh air supply system like the number of occupants, weather pattern and air quality of the location, and so on. For the human comfort, production of carbon-dioxide (CO2) within a building space is the prime area of consideration. This is associated with respiration which produces CO2. As a result, the carbon-dioxide levels will increase if ventilations are not provided.

As per various standards (like the ASHRAE Standard 62.1-2016), indoor CO2 concentrations up to 1200 ppm is considered acceptable. For a typical outdoor condition, this value may change from 300 to 500 ppm.

The measurements were recorded along different locations inside the campus and the peak values are given in the following sections. The key concentration was on the study of carbon dioxide levels.

Table 2 CO2 LEVELS IN BUILDING

Sl. No.	AREA	Measured CO2	Standard CO2 level (Range)	Remarks
Main Block				
1	Class room in First Floor	550	300-500	**Good**
2	Corridor	625	300-500	**Good**
3	Staff room	600	300-500	**Good**
4	Class room Second Floor	550	300-500	**Good**
5	Corridor	550	300-500	**Good**
6	Computer lab	530	300-500	**Good**
7	Principal Office	480	300-500	**Good**
8	Office	460	300-500	**Good**

1. TYPE OF TREES IN THE CAMPUS

Trees release oxygen when they use energy from sunlight to make glucose from carbon dioxide and water. Like all plants, trees also use oxygen when they split glucose back down to release energy to power their metabolisms. Averaged over a 24-hour period, they produce more oxygen than they use up; otherwise there would be no net gain in growth. SNGET have 44 varieties of trees are in its campus

Dr. LEENA A V
PRINCIPAL
SREE NARAYANA GURU COLLEGE OF
ENGINEERING & TECHNOLOGY
PAYYANUR, KANNUR

Table 3 TREES IN THE CAMPUS

Sl.no.	Name of trees	Botanical name
1	Ashoka tree	Saraca asoca)
2	Champak	(Magnolia champaca
3	Guava	(Psidium guajava)
4	Mango tree	Mangifera indica)
5	Kumpil tree	(Gmelina arborea)
6	Sandal wood	(Santalum album)
7	Orchid tree	(Bauhinia variegate
8	Mahogany tree	(Swietenia macrophylla)
9	Indian almond	Terminalia catappa
10	Spanish cherry	(Mimosops elengi
11	Black jamun	(Syzyyium cumini)
12	Golden shower	(Cassia fistula
13	Sacred fig	(Ficus religiosa)
14	Indian gooseberry	(Phyllanthus emblica
15	Golden apple	(Aegle marmelos)
16	Coastal she-oak	Casuarina equisetifolia
17	Golden flamboyant	(Peltophorum pterocarpum
18	Njara	(Syzygium caryophyllatum
19	Queen's flower tree	(Lagerstroemia speciosa
20	Royal poinciana	(Delonix regia)
21	Paradise tree	(Simarouba glauca)
22	Pomelo	(Citrus maxima
23	Chandada	(Macaranga peltata)
24	Indian rock fig	(Ficus arnottiana)
25	Thampakam	(Hopea parviflora
26	Kassod tree	(Senna siamea)
27	Royal palm	(Roystonea regia
28	Teak	Tectona grandis)
29	Drumstick tree	(Moringa oleifera)
30	Kassod tree	(Senna siamea
31	Soursop	(Annona muricata
32	Weeping fig	(Ficus benjamina)
33	Tamarind	Tamarindus indica)
34	Neem tree	Azadirachta indica
37	Golden shower tree	(Cassia fistula)
38	Amboyna wood	(Pterocarpus indicus
39	Indian gooseberry	(Phyllanthus emblica
40	Tamarind	(Tamarindus indica

41	Wild jack	Artocarpus eterophyllus)
42	Star gooseberry	(Phyllanthus acidus
43	Red frangipani	Plumeria rubra)

2. VEGETABLE GARDEN

It is a garden that exists to grow vegetables and other plants useful for human consumption. Gardening can provide students with hands-on learning opportunities while increasing environmental awareness and vital experience in problem-solving. The vegetable gardens are changing the eating habits of the students

Gardens are a wonderful way to use the college campus as a classroom, reconnect students with the natural world and the true source of their food, and teach them valuable gardening and agriculture concepts and skills that integrate with several subjects, such as math, science, art, health and physical education, and social studies, as well as several educational goals, including personal and social responsibility.They gain self-confidence and a sense of "capableness" along with new skills and knowledge in food growing — soon-to-be-vital for the 21st century students become more fit and healthy as they spend more time active in the outdoors and start choosing healthy foods over junk food.

Figure 3 LOCATION FOR VEGETABLE GARDEN

Dr. LEENA A V
PRINCIPAL
SREE NARAYANA GURU COLLEGE OF
ENGINEERING & TECHNOLOGY
PAYYANUR, KANNUR

3. HERBAL GARDEN

The literal meaning of Ayurveda is "science of life," because ancient Indian system of health care focused on views of man and his illness. It has been pointed out that the positive health means metabolically well-balanced human beings. Ayurveda is also called the "science of longevity" because it offers a complete system to live a long healthy life. It is an interactive system that is user-friendly and educational. It teaches the patient to become responsible and self-empowered. It is a system for empowerment, a system of freedom, and long life. A significant part of knowledge and tradition is currently being eroded due to modernization, acculturation and availability of alternatives. Therefore, it is urgent to inculcate young minds to realize the fascinating knowledge and tradition associated with these resources, and help them understand the immense potentials the Kerala medicinal plants possess for the future.

Figure 4 LOCATION FOR HERBAL GARDEN

The "Promoting Herbal Gardens in Schools and colleges" has been a fun-filled learning activity for the students where they got the opportunity to learn about the medicinal plants by actually planting the medicinal herbs and watching them grow in their gardens, and by exploring information about them from various sources.

The task of making the garden itself has been enriching in terms of making students realize the importance of teamwork such as detailed planning, and allocation of tasks within a team. For the teachers, herbal garden project has been useful in terms of ease with which they could integrate the concept with other subject matter activities, such as writing essays, poems and stories, making posters, drawing and painting, making herbariums, and even preparing food recipe using some of the culinary herbs students have planted in their gardens. Kerala Government is also making lot of initiatives to developing and inculcating the herbal gardens in schools and colleges.

4. ORNAMENTAL GARDEN

The beauty of the flower garden is clearly evident through the ornamental plants grown here. They provide us with visual delight and beauty is their main trait. They are grown mainly for decorative Purposes and create a pleasant atmosphere throughout the garden

Figure 5 LOACTION FOR ORNAMENTAL GARDEN

Dr. LEENA A V
PRINCIPAL
SREE NARAYANA GURU COLLEGE OF
ENGINEERING & TECHNOLOGY
PAYYANUR, KANNUR

5. GREENERY IN THE COLLEGE

Sree Narayana Guru College of Engineering and Technology Payyannur located 10 km away of Payannur town 60 acre hilly of land mainly covered by trees and it is well protected by management. This laterite soil area of college now constructing contours for diverting the rain water to charge the ground water to increase the ground water table. This will help the deep rooted trees will get water during summer. Educational institutions serve as important incubators for developing a 'green 'sense among students and teachers and create a new generation of professionals to drive the future change. Green sense is the sensitivity towards environment that is addressed in our decisions, practices and general lifestyle. In Sree Narayana Guru College of Engineering and Technology teaching sustainability and environment not in books but it is demonstrated in the campus.

FIGURE 6: SCENIC COLLEGE PERIPHERALS

6. LIVE BOUNDARY WALL OF THE COLLEGE

The college can maintained a separate microclimatic zone by maintaining a thin and in certain areas thick boundary layer of trees around the college. Due to this boundary layer protects the college from dust and noise pollution to large extent. In this microclimate zone the temperature and humidity, particulate matter, oxygen concentration, carbon dioxide levels are different from the city and thus maintaining a comfort atmosphere to students.

Figure 7 LOCATION FOR LIVING BOUNDARY WALL

Dr. LEENA A V
PRINCIPAL
SREE NARAYANA GURU COLLEGE OF
ENGINEERING & TECHNOLOGY
PAYYANUR, KANNUR

7. OXYGEN PARK

Green space in the college where you can go for morning and evening walks, as well as for picnics. Oxygen Park is a location where we can rest and release all our stress by nature. In this aesthetic location with ample ventilation take us into heaven in the earth. This park is anything but regular with its many sections for, children, fitness enthusiasts, and just about anyone who wants to spend some quiet time amidst nature. Fitness enthusiasts, get here for some fresh air and undisturbed yoga sessions. Undisturbed nature along with water bodies enhances your creativity due to comfort feeling to mind along with abundant supply of oxygen. In this oxygen park classes are conducted by college which are increasing the creativity and it is practical way of learning methods to understand nature

Figure 8 OXYGEN PARK

8. SILENT ZONE

Now a day's silent zones are getting important in academic institutions. The noise pollution leads to stress and other medical and neurotic problems to children's and also creativity and absorption capacity of knowledge is also going down. For reduction of academic stress level there is apace for complete relaxation which gives the importance of silence zone Sree Narayana Guru College of Engineering and Technology have aerated certain silent zones in the college itself. . Natural silence zones are also crated in the college campus where there is no sound other than natures sound.

Dr. LEENA A V
PRINCIPAL
SREE NARAYANA GURU COLLEGE OF
ENGINEERING & TECHNOLOGY
PAYYANUR, KANNUR

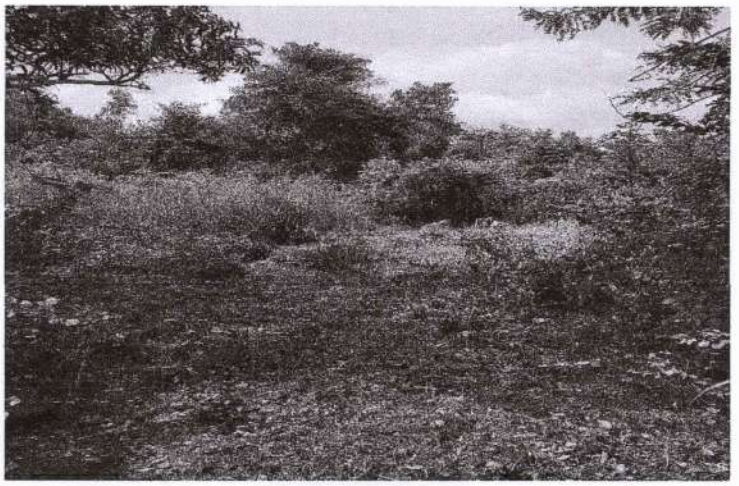


Figure 9 SILENT ZONE

9. OPEN GROUNDS

Education is incomplete without sports and games. Sports and games **are beneficial in teaching us punctuality, responsibility, patience, discipline, and dedication towards our goal.** The importance of games and sports in student's life is immense. It has proved to be very therapeutic in nature. Sports help improve stronger social skills, such as dispute management and sport-based interaction. **Sports inculcate the feeling of fairness in a child and it encourages them to be committed, taking defeat in a positive manner.** It teaches us to be joyful, united, and appreciative in life. Students are the youth of our Nation, and they need to be energetic, physically active, and mentally fit. By understanding the responsibility to make its students as healthy s Sree Narayana Guru College of Engineering and Technology Payyannur built and maintained football ground, volley and badminton court in a greenery surroundings. .

Figure 10 OPEN PLAY GROUND

Dr. LEENA A V
PRINCIPAL
SREE NARAYANA GURU COLLEGE OF
ENGINEERING & TECHNOLOGY
PAYYANUR, KANNUR

10. SPECIAL INITIATIVES OF COLLEG

I. DISABLED FRIENDLY:

Disability is only disabling when it prevents someone from doing what they want or need to do. Government of India signed the UNCRPD (United Nations Convention on the Right of Persons with Disabilities) on 1st October 2007. In this article 9 says about the requirements of disabled persons on accessibility to buildings. As per the signed UNCRPD Indian Parliament passed an act as RPD (Right to Persons Disability) act on March 2016. As per new act, all buildings should have ramps at the entry, exit, lifts for higher floors, separate toilet with suitable arrangements such as hand rails etc.

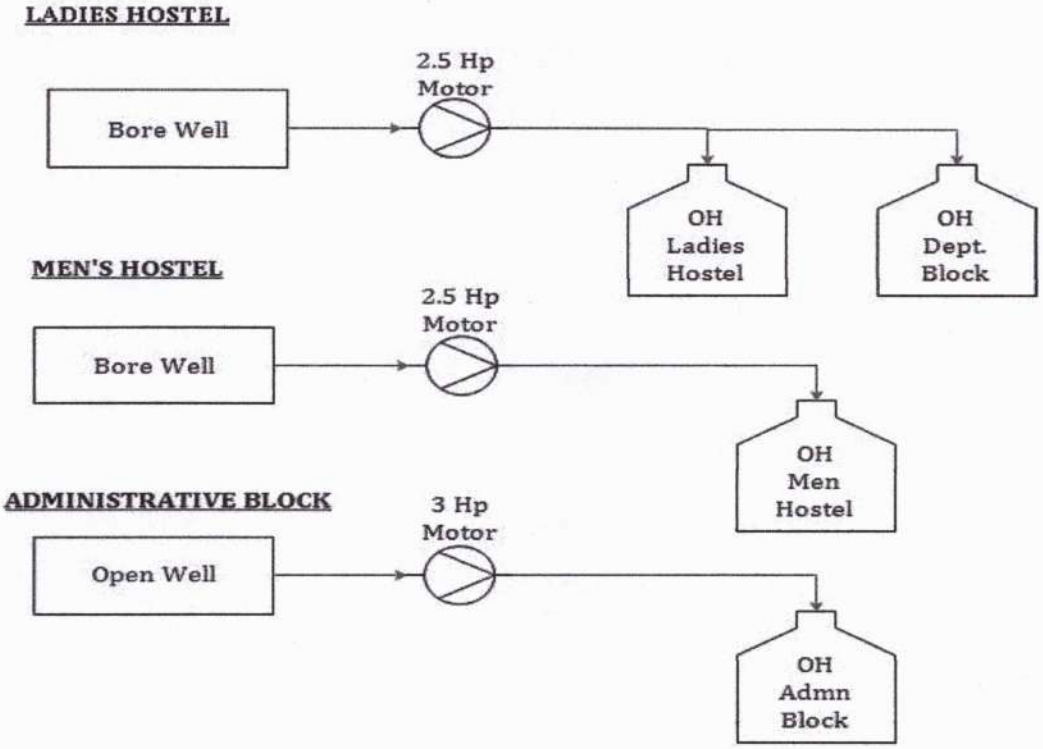
Figure 11 WHEEL CHAIR

WATER AUDIT

The requirement of water for the college, hostels and gardening etc are met by supply from one OPEN well and two bore well for emergency requirements. . The water from OPEN are mainly used for administrative block by using 3.5HP motor pump. . This water is pumped into Overhead tank of capacity 8KL using 1.5HP motor .The borewell pumps as one is used for ladies hostel and another one for men hostel. .

The water from different wells are checked in an accredited laboratory in time to time to ensure its portability.

Dr. LEENA A V
PRINCIPAL
SREE NARAYANA GURU COLLEGE OF
ENGINEERING & TECHNOLOGY
PAYYANUR, KANNUR



1. WATER USAGE AREAS

UTILITIES

The labs have the highest tap points whereas the toilet accounts for the major consumption. The water outlet points in the college campus and hostel are listed in the following table.

Table 4 LIST OF WATER TAPS

Location	No: of taps
Washing area taps	25
Toilets for students	40
College compound and garden	12
Kitchen	16
Staff rooms	93
Total	**186**

2. RAIN WATER HAVESTING

Rainwater harvesting (RWH) is a technique of collection and storage of rainwater into natural reservoirs or tanks, or the infiltration of surface water into subsurface aquifers (before it is lost as surface runoff). There are different methods for artificial rain water harvesting. Ground water Recharging by different means and collection of rain water for direct use by installation of rain water Collection tank. Ground water recharging methods are decided by detailed study of rain fall, geological and hydrogeological

Dr. LEENA A V
PRINCIPAL
SREE NARAYANA GURU COLLEGE OF
ENGINEERING & TECHNOLOGY
PAYYANUR, KANNUR

mapping of the area etc. Another method of rainwater harvesting is rooftop harvesting. With rooftop harvesting consists of installation of pipes, filtration unit, by pass valve, tanks pumps etc.

Rainwater harvesting for ground water recharge.

Advantages

➢Conservation of water for future use

➢Biological purity of water is good

➢It is environment friendly, controls soil erosion and flood and provides sufficient soil moisture even during summer months

➢It provides a natural distribution system between recharge and discharge points

➢Quality improvement by infiltration through the permeable media

➢Water stored underground is relatively immune to natural and man-made catastrophes

Figure 12 COLLECTING ROOF RAIN WATER

Dr. LEENA A V
PRINCIPAL
SREE NARAYANA GURU COLLEGE OF
ENGINEERING & TECHNOLOGY
PAYYANUR, KANNUR

Students Initiatives and Out Reach Activities

World Environment day celebration June 5

Nature club of college crested the environment day June 2, 2022 with various activities such cleaning of campus, planting trees and an invited talk by Pandoli Ravi an environment activist.

Figure 13 WORLD ENVIRONMENT DAY JUNE 5 on 2022

Nature club

Plantation drive initiated by Nature club to plant more than 200 samplings in the college campus. Photography session as theme beat plastic pollution also conducted in connection with this initiatives.

Figure 14 WORLD ENVIRONMENT DAY JUNE 5 2023.

Dr. LEENA A V
PRINCIPAL
SREE NARAYANA GURU COLLEGE OF
ENGINEERING & TECHNOLOGY
PAYYANUR, KANNUR

Tree Identification programme

The 60 acre campus have lot of trees and identification these plants are initiated by Nature club from 15/03/2023.Identification and its importance to create awareness among engineering students is better way to connect with nature

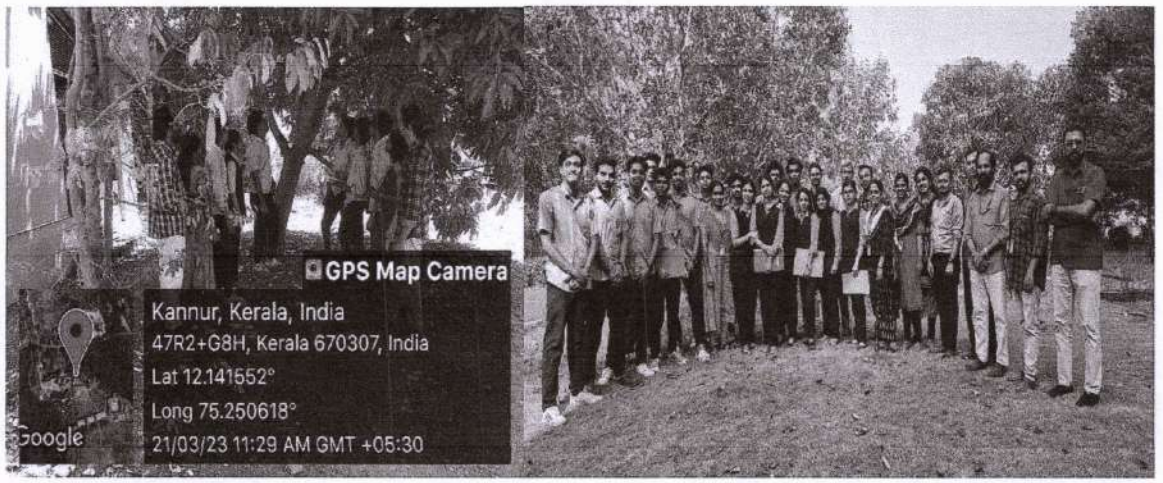


Figure 15 TREE INDENTIFICATION PROGRAMME

Paravalkalkoru Thaneerkudam

On 22/03/2023 Nature started to place water pots in different places of campus for birds and animals. This will help to bridge the gap with students and nature inhabitants.

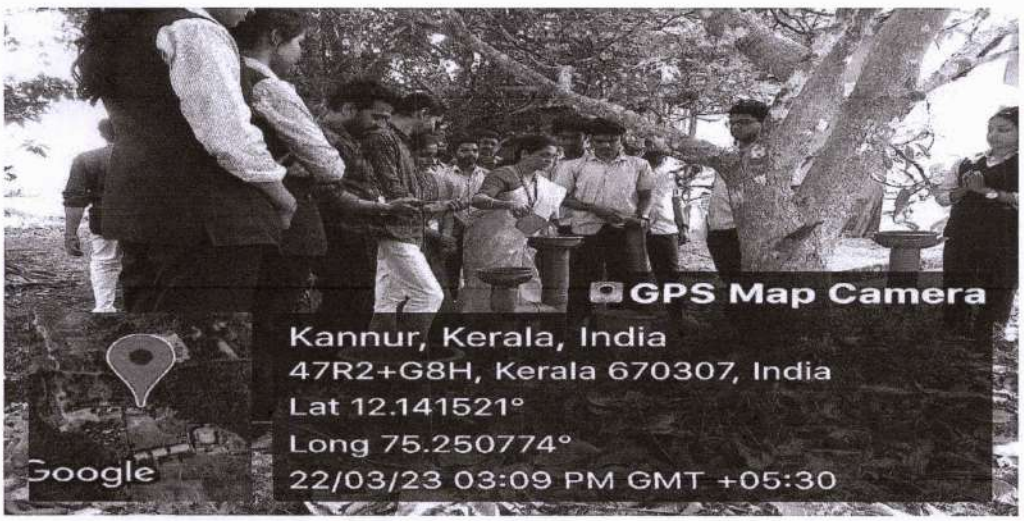


Figure 16 PARAVALKAKORU THANEERKUDAM.

Dr. LEENA A V
PRINCIPAL
SREE NARAYANA GURU COLLEGE OF
ENGINEERING & TECHNOLOGY
PAYYANUR, KANNUR

CONCLUSION

Green Audit is the most efficient & ecological way to solve such an environmental problem. Green Audit is one kind of professional care which is the responsibility of each individual who are the part of economic, financial, social, environmental factor. Green audits can "add value" to the management approaches being taken by the college and is a way of identifying, evaluating and managing environmental risks (known and unknown). The green audit reports assist in the process of attaining an eco-friendly approach to the development of the college.

The auditors observed during the campus visit and after the conversation with the staff and students of M/s Sree Narayana Guru College of Engineering and Technology Payyannur that they have taken continuous and considerable effort in several years for nurturing and maintaining the green coverage over the campus which is being well appreciated by us.

Dr. LEENA A V
PRINCIPAL
SREE NARAYANA GURU COLLEGE OF
ENGINEERING & TECHNOLOGY
PAYYANUR, KANNUR

CERTIFICATE

GRIHA

GREEN RATING FOR INTEGRATED HABITAT ASSESSMENT

GRIHA CERTIFIED PROFESSIONAL CERTIFICATE

This is to certify that

Ashok K M P

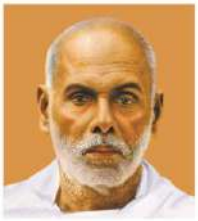
has qualified as a **GRIHA** Certified Professional For V. 2015

Date of issue: 19th June 2020

Note : This certification is valid only for GRIHA version 2015.

Chief Executive Officer
GRIHA Council

Dr. LEENA A V
PRINCIPAL
SREE NARAYANA GURU COLLEGE OF
ENGINEERING & TECHNOLOGY
PAYYANUR, KANNUR



ENVIRONMENT AUDIT

ENVIRONMENT AUDIT – 2022-23

SREE NARAYANA GURU COLLEGE OF ENGINEERING AND TECHNOLOGY

PAYYANUR, KANNUR, KERALA

EXECUTED BY

ATHUL ENERGY CONSULTANTS PVT LTD

4th FLOOR, CAPITAL LEGEND BUILDING,

KORAPPATH LANE, ROUND NORTH, THRISSUR, KERALA-680020

Ph: +91 735611199/0-6 Web: www.athulenergy.com E-Mail: info@athulenergy.com

September- 2023

Dr. LEENA A V
PRINCIPAL
SREE NARAYANA GURU COLLEGE OF
ENGINEERING & TECHNOLOGY
PAYYANUR, KANNUR

BRIEF CONTENTS

LIST OF TABLES

LIST OF FIGURES

Dr. LEENA A V
PRINCIPAL
SREE NARAYANA GURU COLLEGE OF
ENGINEERING & TECHNOLOGY
PAYYANUR, KANNUR

PREFACE

Every institution should be imparting knowledge about the campus environment and its surroundings through activities that follows the principles of sustainability and waste management. Hence an evaluation is needed to understand where it stands in the path to be an environment friendly, and in talent nurturing educational institution.

This Environment Audit was done with the aim to assess mainly on waste management of the campus. The college vision is "To become a centre par excellence of learning, where the best in humans is unveiled, based on human values, focused on life enhancement and constructive in adapting to the needs of the world". The mission of college is "to mould individuals into successful and vibrant professionals facilitating comprehensive and rounded formation, to function as effective and empathetic human beings, grounded with courage of conviction, personal integrity, professional ingenuity and social commitment "and it was we observed by us from the students' participation during the environmental audit.

This report is compiled by the BEE certified energy auditor along with the project engineers who are experienced in the field of energy, environment and management. The student volunteers made a mammoth contribution with data collection and in preparing an initial skeleton for the report.

Dr. LEENA A V
PRINCIPAL
SREE NARAYANA GURU COLLEGE OF
ENGINEERING & TECHNOLOGY
PAYYANUR, KANNUR

ACKNOWLEDGEMENTS

We express our sincere gratitude to the management of M/S Sree Narayana Guru College of Engineering and Technology Payyannur for giving us an opportunity to carry out the project of Environment Audit. We are extremely thankful to all the staffs for their support to carry out the studies and for input data, and measurements related to the project of Environment audit.

1	Dr. Leena A V	Principal
2	Ms. Mary Sonia George	HOD – CE
3	Mr. Sundar V	HOD – CSE
4	Mr. Abilash Krishnan	HOD – EEE
5	Dr. Sudhin Chandran	HOD – ME
6	Mr. Manu C	Assistant Professor – EEE

ENVIRONMENT AUDIT TEAM

1. **Mr. Santhosh A**
   Registered Energy Auditor of Bureau of Energy Efficiency (BEE – Govt. of India)
   Accredited Energy Auditor No – EA 7597

2. **Mr. K ,Krishnakumar. Lead auditor ISO 50001, Certified energy auditor of BEE**

ATHUL ENERGY CONSULTANTS PVT. LTD. THRISSUR 680 020

Yours faithfully

Managing Director
Athul Energy Consultants Pvt Ltd

Dr. LEENA A V
PRINCIPAL
SREE NARAYANA GURU COLLEGE OF
ENGINEERING & TECHNOLOGY
PAYYANUR, KANNUR

ENVIRONMENT AUDIT SUMMARY

- College segregated the waste from college, canteen, and hostels and treated in a scientific manner.
- Separate storage provisions are done for metal and plastics in college.
- Biodegradable wastes are treated in a biogas plant installed behind the canteen.
- Non-biodegradable wastes are incinerated which installed near the playground.

Suggestions for improvement

- Internal inspection team to be formed which comprises of staff and students for internal auditing of the waste management in the campus
- Introduce 'refuse plastic' concept in college inventories. This will increase the awareness among students and staffs and will seep into their behaviour.
- Display the weight of segregated wastes that collected from the canteen, hostels and college in prominent locations which will be an eye-opener for all and it will help in reduce the waste generation.
- Monthly Records should be kept for segregated wastes which will give the administration to pinpoint the source and can take necessary steps to reduce it.

Dr. LEENA A V
PRINCIPAL
SREE NARAYANA GURU COLLEGE OF
ENGINEERING & TECHNOLOGY
PAYYANUR, KANNUR

GENERAL DETAILS

The general details of the Sree Narayana Guru College of Engineering and Technology are given below in table.

Table 1 GENERAL DETAILS

Sl. No:	Particulars	Details
1	Name of the College	Sree Narayana Guru College of Engineering and Technology
2	Address	Sree Narayana Guru College of Engineering and Technology Chalakkode P.O. Payyanur, Kannur Kerala 670307 04985 20201987, 04985 201988
3	Contact Person	Dr. Leena AV (Principal)
4	Contact Phone number&E mail	9447008398, 9746766440
		principal@sngcet.org
5	Web site	www.sngcet.ac.in
6	Type of Building	Educational Institution
7	Annual Working Days	210
8	No: of Shifts	Day Shift (One) (9AM -4PM)
9	No: of students enrolled	414
10	No: of teaching staff	56
11	No: of non-teaching staff	54
15	Total campus area	60 acre
16	Total Built Up area	25929m²
17	No: of hostel	01 for Women and 01 for men
18	Bio gas plant	01 (Fixed concrete 10m3)

Dr. LEENA A V
PRINCIPAL
SREE NARAYANA GURU COLLEGE OF
ENGINEERING & TECHNOLOGY
PAYYANUR, KANNUR

SREE NARAYANA GURU COLLEGE OF ENGINEERING AND TECHNOLOGY

Sree Narayana Guru College of Engineering & Technology, one of the prestigious technical institutions in North Malabar, was established in 2003. The engineering college is fully equipped to meet the rising demands for greater facilities in the scenario of higher education. Since its inception, it has been true to do the mission and the prophetic vision of the great Saint Sree Narayana Guru. With its emphasis on quality education augmented by exposure and training in other individual skills, the institute's focus is on creating individuals who are all-round performers and true professionals.

Sree Narayana Guru was a great Saint Philosopher and Social Reformer of Kerala. His thoughts and work have universal significance. His message "Educate that you may be free, organise that you may be strong, and industrialize that your financial status may improve" has relevance all the times and places. Guruji was instrumental in uplifting the people of Kerala and in the formation of Sree Bhakthi Samvardhani Yogam in 1907. Sree Sundareshwara Temple, Talap, Kannur, consecrated by Sree Narayana Guru in 1916 is the pivot of all the activities of Yogam. The Yogam upholds the Guru's vision to enrich the people educationally, socially, culturally and spiritually.

Sree Bhakthi Samvardhini Yogam is working towards fulfilling Guru's vision, establishing educational institutions, women's hostels and has been offering financial aid and endowments to deserving students. The Yogam embarked on a noble project - Sree Narayana Guru College of Engineering & Technology an Engineering college in Malabar in 2003.

Vision

A knowledge society promoting human excellence and enlightenment through technical education.

Mission

To provide technical education of the highest quality and standard of excellence for socio-economic progress embedded in clearly articulated values and supported by commitments

Dr. LEENA A V
PRINCIPAL
SREE NARAYANA GURU COLLEGE OF
ENGINEERING & TECHNOLOGY
PAYYANUR, KANNUR

Figure 1 CAMPUS BUILDING

ABOUT ENVIRONMENT AUDIT

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."**

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 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 awareness helps the institution to set environmental examples for the community and to educate young learners.

Here we can mainly divide this report waste management initiatives and installations of systems such as bio gas plant, vermin-compost, incinerator and collection and segregation of waste in the campus etc and students initiates in waste management as a social cause

Dr. LEENA A V
PRINCIPAL
SREE NARAYANA GURU COLLEGE OF
ENGINEERING & TECHNOLOGY
PAYYANUR, KANNUR

WASTE MANAGEMENT

Waste is generally termed as 'a resource at the wrong place'. The college authorities are aware of the possible methods and have installed waste management measures like biogas systems. The waste clearance measures associated with different types of wastes are briefly given below. In this college normally three types of wastes are generated and we can divide the same as,

1. Bio degradable
2. Non bio degradable and
3. E-waste

1. BIODEGRADABLE WASTES

Biodegradable waste includes any organic matter in waste which can be broken down into carbon dioxide, water, methane or simple organic molecules by micro-organisms and other living things by composting, aerobic digestion, anaerobic digestion or similar processes also includes some inorganic materials which can be decomposed by bacteria. These materials are non-toxic to the environment and mainly include the natural substances like Plants and animals waste, even the dead plants and animals, fruits, paper, vegetables, etc. get convert into the simpler units, which further get into the soil and are used as manures, biogas, fertilizers, compost, etc.

The biodegradable wastes are mainly from the college canteen and pushed it to the Biogas plant. The bio-slurry is used as manure to the plantation.

I. BIO GAS PLANT

Biogas is the mixture of gases produced by the breakdown of organic matter in the absence of oxygen (anaerobically), primarily consisting of methane and carbon dioxide. Biogas is a renewable energy source Biogas is produced by anaerobic digestion with methanogen or anaerobic organisms, which digest material inside a closed system, or fermentation of biodegradable materials. This closed system is called an anaerobic digester, bio digester or a bioreactor.

Biogas is a renewable, as well as a clean, source of energy. Gas generated through bio digestion is non-polluting; it actually reduces greenhouse emissions. No combustion takes place in the process, meaning there is zero emission of greenhouse gasses to the atmosphere; therefore, using gas from waste as a form of energy is actually a great way to combat global warming. Another biogas advantage is that, unlike other types of renewable energies, the process is natural, not requiring energy for the generation process. In addition, the raw materials used in the production of biogas are renewable.

Bio gas plant reduces soil and water pollution. Consequently, yet another advantage of biogas is that biogas generation may improve water quality. Moreover, anaerobic digestion deactivates pathogens and parasites; thus, it's also quite effective in reducing the incidence of waterborne diseases.

Dr. LEENA A V
PRINCIPAL
SREE NARAYANA GURU COLLEGE OF
ENGINEERING & TECHNOLOGY
PAYYANUR, KANNUR

Bio gas generation produces organic fertiliser. The by-product of the biogas generation process is enriched organic (digest ate), which is a perfect supplement to, or substitute for, chemical fertilizers. The fertilizer discharge from the digester can accelerate plant growth and resilience to diseases, whereas commercial fertilizers contain chemicals that have toxic effects and can cause food poisoning, among other things.

Figure 2 BIO GAS PLANT

The biogas plant converts food wastes into methane gas and usable bio fertilizers which will used for plants. The methane gas from the biogas plant is used in the canteen for cooking purpose and for heating drinking water hot water. Approximately 100 kg of LPG /month is saved by using biogas plant. The bio maneuver from the biogas plant is used for gardening, agriculture and for trees. This bio waste is also act as best bio insecticide and thus the college avoided the usage environmentally toxic precipices for environment. Here college is using floating fixed dome concrete dome Type biogas plant of size 10 M^3 for treating bio waste. The slurry coming from the plant is collected in drums and reused after diluting with water for agriculture and for gardens. The methane gas is used in the canteen

VERMI-COMPOST

It is the product of the decomposition process using various species of worms, usually red wigglers, white worms, and other earthworms, to create a mixture of decomposing vegetable or food waste, bedding materials, and vermin-cast. Vermicomposting contains water-soluble nutrients and is an excellent, nutrient-rich organic fertilizer and soil conditioner.[3] It is used in farming and small scale sustainable, organic farming.

The major source of raw material for vermi-compost is the leaves in the college campus and also the wastes generated which are not fed into biogas such as Chicken bones etc. The vermi-compost plants installed near to the scrap yard in the college campus

Dr. LEENA A V
PRINCIPAL
SREE NARAYANA GURU COLLEGE OF
ENGINEERING & TECHNOLOGY
PAYYANUR, KANNUR

Benefits of Vermi-compost

a. For Soil

- Improves soil aeration
- Enriches soil with micro-organisms (adding enzymes such as phosphatase and cellulose)
- Microbial activity in worm castings is 10 to 20 times higher than in the soil and organic matter that the worm ingests
- Attracts deep-burrowing earthworms already present in the soil
- Improves water holding capacity

b. For Plant growth

- Enhances germination, plant growth, and crop yield.
- Improves root growth, Enriches soil with micro-organisms, adding plant hormones such as auxins and gibberellic acid.

c. For Economic

- Bio wastes conversion reduces waste dumping in landfills.
- Elimination of bio wastes from the waste stream reduces contamination of other recyclables collected in a single bin (a common problem in communities practicing is single-stream recycling)
- Creates low-skill jobs at local level.
- Low capital investment and relatively simple technologies make vermicomposting practical for less-developed agricultural regions.

d. For Environmental

- Helps to close the "metabolic gap" through recycling waste on-site.
- Large systems often use temperature control and mechanized harvesting, however other equipment is relatively simple and does not wear out quickly
- Production reduces greenhouse gas emissions such as methane and nitric oxide (produced in landfills or incinerators when not composted).

II. WASTE GENERATED FROM PETS

The wastes generated from Pets (Different varieties of birds, rabbit etc) are collected separately and used as base manure after mixing with vermi compost as bio fertilizer for plants in the college. **NON-BIODEGRADABLE WASTE**

Materials that remain for a long time in the environment, without getting decompose by any natural agents, also causing harm to the environment are called non-biodegradable substances. These materials are metals, plastics, bottles, glass, poly bags, chemicals, batteries, etc. But as these are readily available, convenient to use, and are of low cost, the non-biodegradable substances are more often used. But instead of returning to the environment, they become solid waste which cannot be broken down and

become hazardous to the health and the environment. Hence are regarded as toxic, pollution causing and are not considered as eco-friendly.

Many measures are taken these days, concerning the use of non-biodegradable materials. The **three 'R'** concept which says **Reduce-Recycle -Reuse** is in trend, which explains the use of the non-biodegradable materials. As we already discuss that these substances do not decompose, or dissolve easily so can be recycled and reuse. And one can help in reducing this waste by instead of throwing the plastics and poly bags in the garbage; it can be put in the recycling bags to use again.

Non-recyclable wastes are collected and burned once in a month using incinerator places inside the campus itself. The recyclable wastes are sorted out into categories and supplied it to the collecting units.

I. INCINERATOR

The objective of waste incineration, in common with most waste treatments, is to treat waste to reduce its volume and hazard, whilst capturing (and thus concentrating) or destroying potentially harmful substances. Incineration processes can also provide a means to enable recovery of the energy, mineral and/or chemical content from waste. Basically, waste incineration is the oxidation of the combustible materials contained in the waste. Waste is generally a highly heterogeneous material, consisting essentially of organic substances, minerals, metals and water. During incineration, flue-gases are created that will contain most of the available fuel energy as heat. The organic substances in the waste will burn when they have reached the necessary ignition temperature and come into contact with oxygen. The actual combustion process takes place in the gas phase in fractions of seconds and simultaneously releases energy. Where the calorific value of the waste and oxygen supply is enough, this can lead to a thermal chain reaction and self-supporting combustion, i.e. there is no need for the addition of other fuels.

The incinerator is used for incinerating non-biodegradable waste such as paper, plastic, sanitary napkins etc. The ash generated are as for manoeuvre after mixing with cow dung for plants. The ash generated from plastic will be treated separately.

The ash generated from canteen were wood is used as a fuel is used as manoeuvre for plants. The college campus promoting biodegradable packaging and reducing the consumption of plastic to a large extent.

Dr. LEENA A V
PRINCIPAL
SREE NARAYANA GURU COLLEGE OF
ENGINEERING & TECHNOLOGY
PAYYANUR, KANNUR

Figure 3 INCINERATOR

2. ELECTRONIC WASTE

Electronic waste or e-waste describes discarded electrical or electronic devices. E-waste or electronic waste is created when an electronic product is discarded after the end of its useful life. The rapid expansion of technology and the consumption driven society results in the creation of a very large amount of e-waste in every minute. Used electronics which are destined for refurbishment, reuse, resale, salvage recycling through material recovery, or disposal are also considered e-waste. Informal processing of e-waste in developing countries can lead to adverse human health effects and environment pollution. Certain components of some electronic products contain materials that render them hazardous, depending on their condition and density.

Recommendation

College has to sign an agreement for disposing the electronic wastes with a approved agency of Kerala State Pollution board for the same. For the time being it can be collected and stored in a fixed space near to common toilet and herbal garden area.

Dr. LEENA A V
PRINCIPAL
SREE NARAYANA GURU COLLEGE O
ENGINEERING & TECHNOLOGY
PAYYANUR, KANNUR

FACILITIES PROVIDED BY COLLEGE FOR WASTE MANAGEMENT COLLECTION

- Toilets in every floor of all buildings separately for girls, and staff.
- There is separate toilet facility for department heads, staff rooms, administrative department and common facility.
- Certain toilets are facilitated for disable friendly with suitable hand rails and support mechanisms.
- Bins are provided in various areas of Campus for segregated collection of bio degradable (food,) and non-bio degradable wastes (Plastic, bottles)
- Separate team is maintained by college for maintain the clean campus, collection wastes from bins etc.

Figure 4 COLLECTION OF WASTES

Dr. LEENA A V
PRINCIPAL
SREE NARAYANA GURU COLLEGE OF
ENGINEERING & TECHNOLOGY
PAYYANUR, KANNUR

CONCLUSION

Environment audit is the best way to analyse and solving the critical issues of waste management. Environment audit can add value to management approach being taken by college for identifying, collecting, segregating and processing of waste generated in the college campus. By analysing the waste generation in each segment such as biodegradable, non-degradable, R waste etc. gave an indication of waste generation and thus put control for the same to reduce the environmental impacts in due course.

The findings in the report shows that college perform fairly well in waste management issues and taken considerable efforts in a responsible manner. During audit and the conversations with the college team, we observed that Sree Narayana Guru College of Engineering and Technology done various approaches in the past few years to performing well to sustainable environment. Even though there is space for further improvement that mentioned in the executive summary, the college is a good example for the minimisation of environment issues in the existing conditions.

Dr. LEENA A V
PRINCIPAL
SREE NARAYANA GURU COLLEGE OF
ENGINEERING & TECHNOLOGY
PAYYANUR, KANNUR

ANNEXURE

- **BEE Accredited energy auditor certificate**

ENERGY IS LIFE
BEE
CONSERVE IT

BUREAU OF ENERGY EFFICIENCY

Examination Registration No.: EA-7597
Accreditation Registration No.: AEA-0275

Certificate of Accreditation

This is to certify that Mr./Ms. Santhosh. A having its trade/registered office at Kerala has been given accreditation as accredited energy auditor. The certificate shall be effective from 2nd day of November, 2017.

The certificate is subject to the provisions of the Bureau of Energy Efficiency (Qualifications for Accredited Energy Auditors and Maintenance of their List) Regulations, 2010.

This certificate shall be valid until it is cancelled under regulation 9 of the Bureau of Energy Efficiency (Qualifications for Accredited Energy Auditors and Maintenance of their List) Regulations, 2010.

On cancellation, the certificate of accreditation shall be surrendered to the Bureau within fifteen days from the date of receipt of order of cancellation.

Your name has been entered at AEA No. 0275 in the register of list of accredited energy auditors. Your name shall be liable to be struck out on the grounds specified in regulation 8 of the Bureau of Energy Efficiency (Qualifications for Accredited Energy Auditors and Maintenance of their List) Regulations, 2010.

Given under the seal of the Bureau of Energy Efficiency, Ministry of Power, this 12th day of February, 2018

Secretary,
Bureau of Energy Efficiency
New Delhi

Dr. LEENA A V
PRINCIPAL
SREE NARAYANA GURU COLLEGE OF
ENGINEERING & TECHNOLOGY
PAYYANUR, KANNUR

➢ **EnMs Certified Professional**

intertek
Total Quality. Assured.

Certificate of Attendance

G KRISHNAKUMAR

has attended the following live virtual classroom course:

Transition training for Environment Management System as per ISO 14001:2015

Course is designed to explain:

- Requirements of ISO 14001:2015 in context of audit.
- Key changes from ISO 14001: 2004 to 14001:2015

Session Duration: 16 Hours

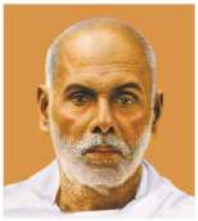
CERTIFICATE NUMBER
2020260507

TRAINING DATE:
25th & 26th May, 2020

Authorising Signature:

Intertek India Private Limited

Dr. LEENA A V
PRINCIPAL
SREE NARAYANA GURU COLLEGE OF
ENGINEERING & TECHNOLOGY
PAYYANUR, KANNUR

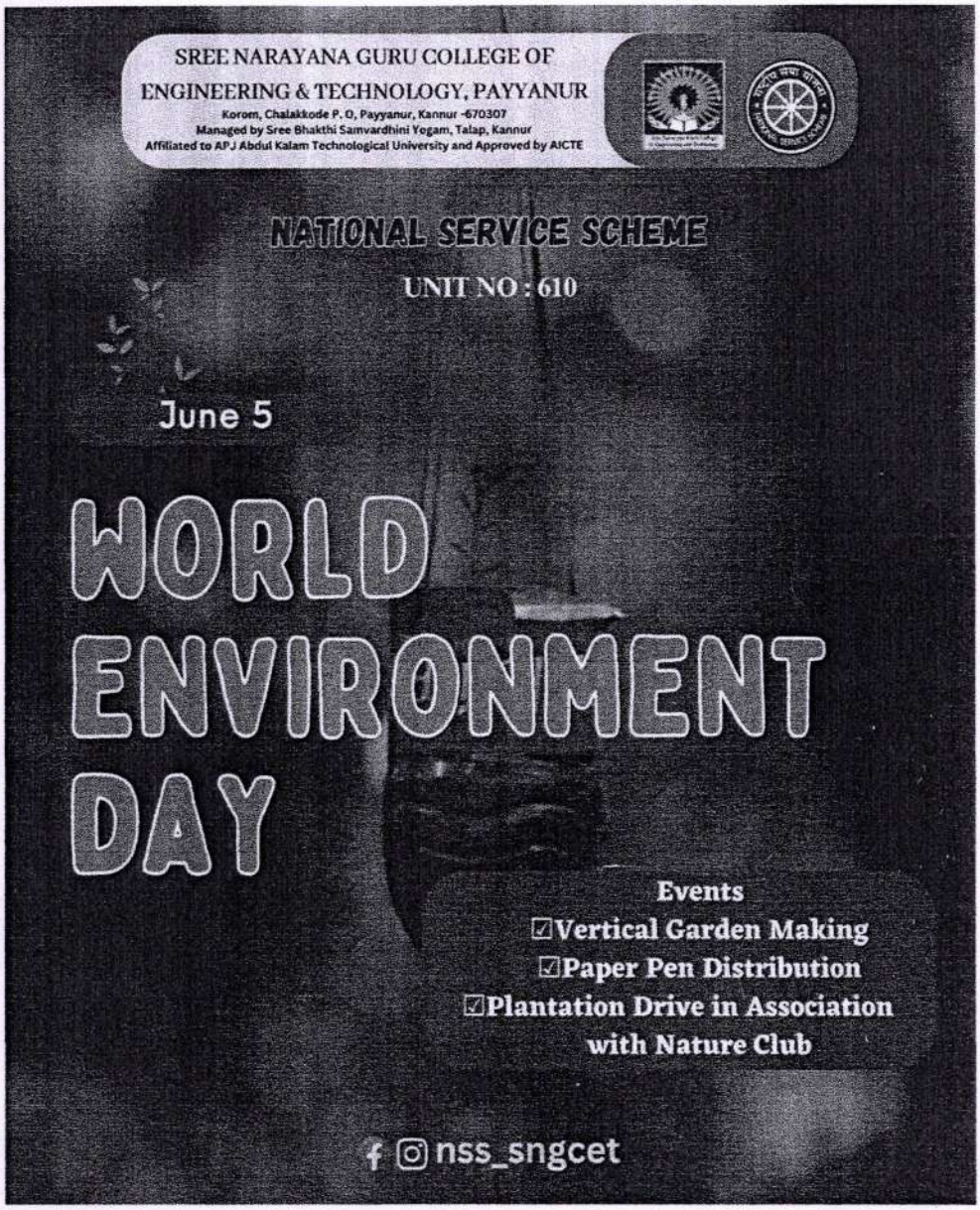


CLEAN AND GREEN CAMPUS INITIATIVES – NATURE CLUB & NSS

Sree Narayana Guru College of Engineering & Technology

KOROM, PAYYANUR, KANNUR-670 307

Est. 2003

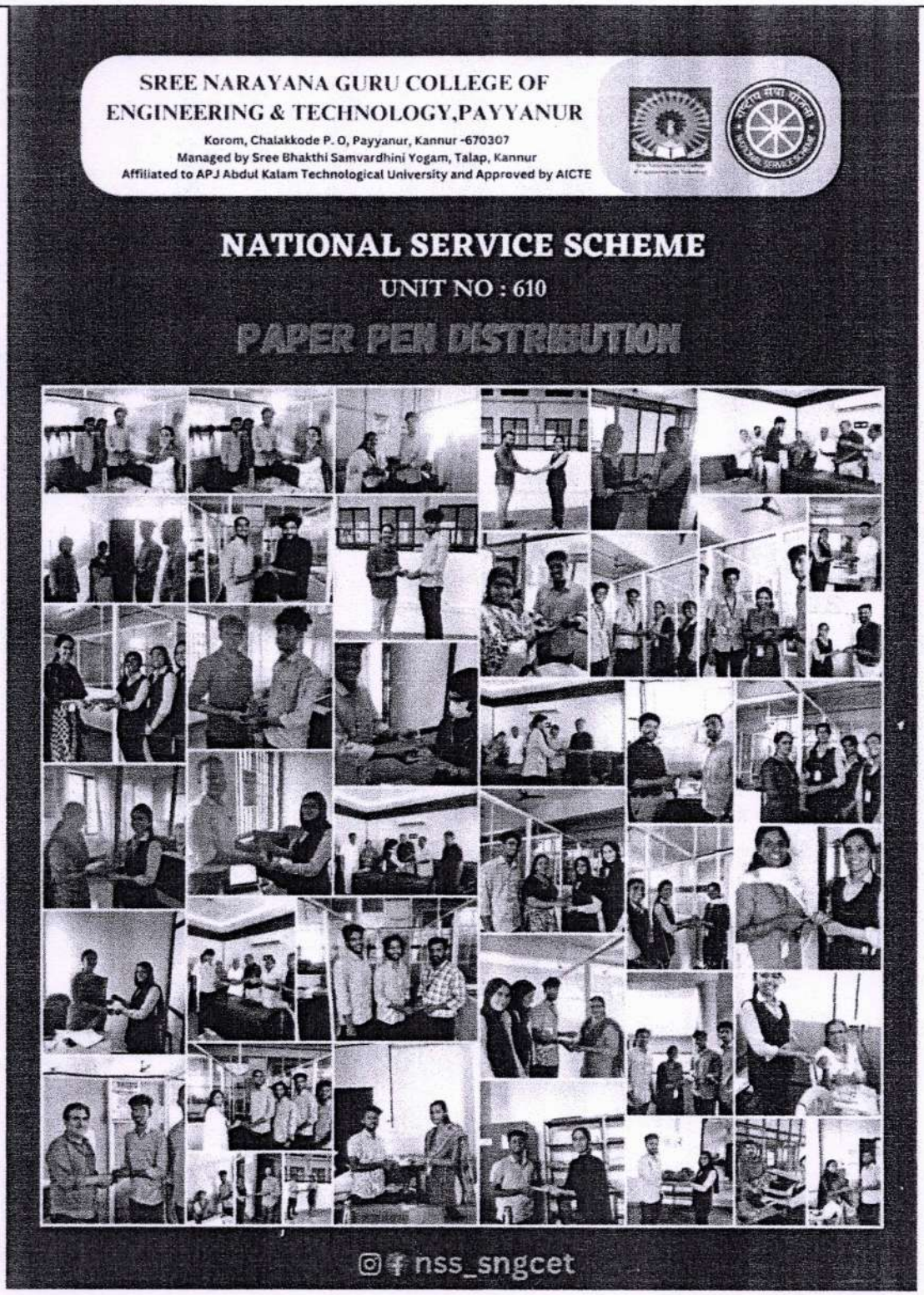


The NSS Unit of SNGCET, in collaboration with the Nature Club of SNGCET, organized a World Environment Day celebration at the college on June 5, 2023. The event was formally inaugurated by Sri. Rajeevan M, Assistant of Social Forestry in the Kannur division. Inside our campus, Sri T K Rajaendran, Vice President of SBSY Talap, inaugurated the paper pen distribution challenge, following which paper pens were distributed to all college staff. Additionally, Dr. Leena A V, the college principal, formally inaugurated the vertical garden

Dr. LEENA A. V.
PRINCIPAL
SREE NARAYANA GURU COLLEGE OF
ENGINEERING & TECHNOLOGY, PAYYANUR
KANNUR

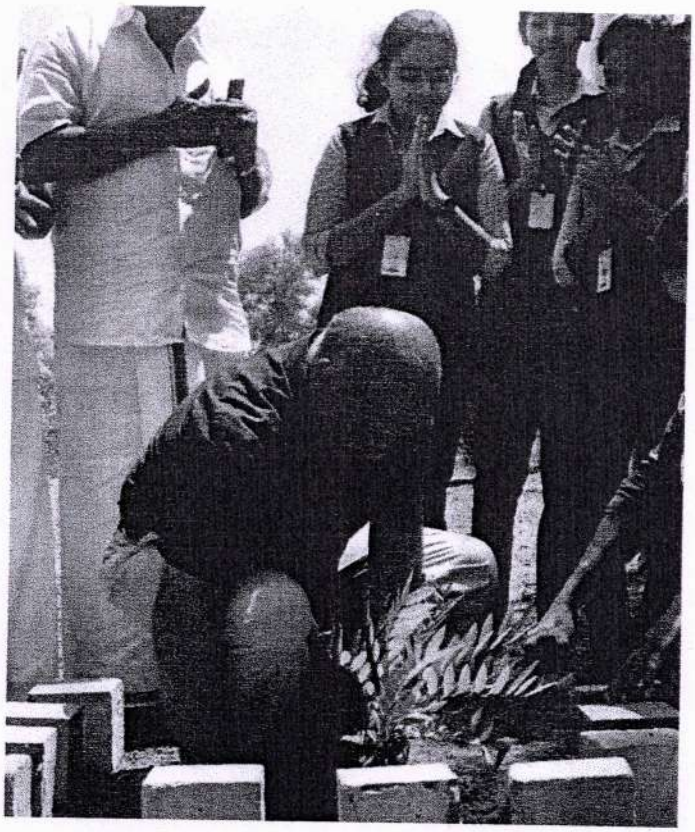
PROGRAMME OFFICER
NATIONAL SERVICE SCHEME
UNIT No. 610
SREE NARAYANA GURU COLLEGE
OF ENGINEERING & TECHNOLOGY,
PAYYANUR

created on our campus using recycled plastic bottles. As part of the collaboration with the Nature Club, NSS volunteers planted numerous saplings across our campus.



Dr. LEENA A. V.
PRINCIPAL
SREE NARAYANA GURU COLLEGE OF ENGINEERING & TECHNOLOGY, PAYYANUR
KANNUR

PROGRAMME OFFICER
NATIONAL SERVICE SCHEME
UNIT No. 610
SREE NARAYANA GURU COLLEGE OF ENGINEERING & TECHNOLOGY, PAYYANUR

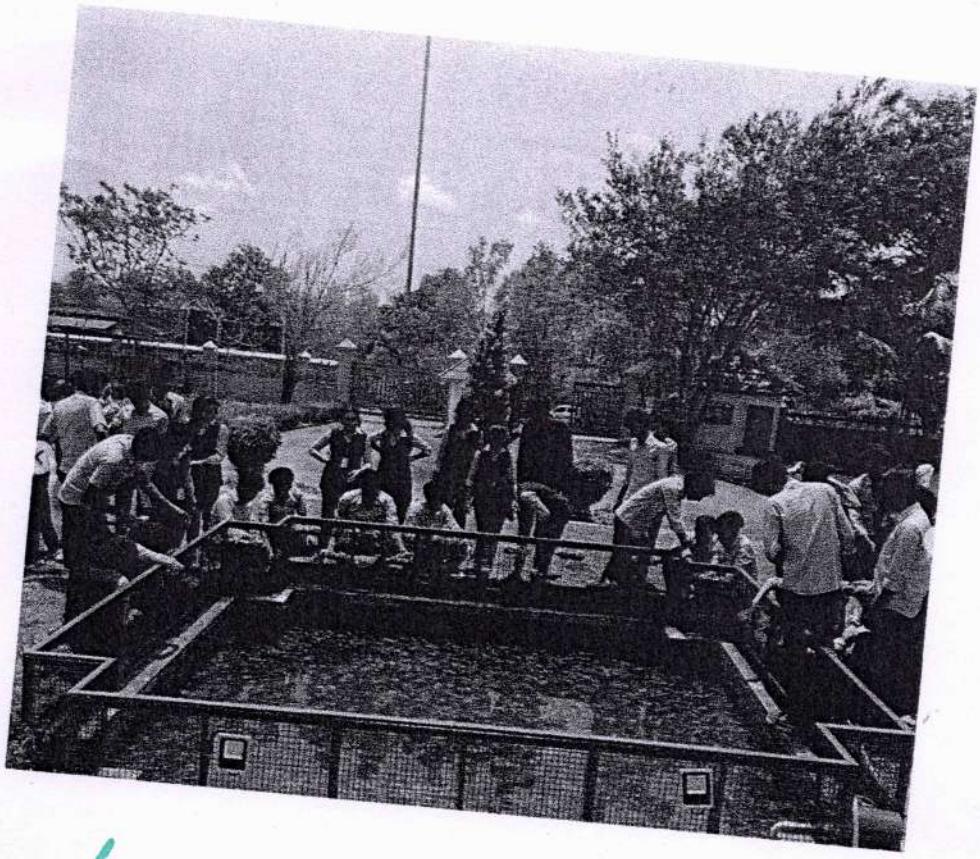


Dr. LEENA A. V.
PRINCIPAL
SREE NARAYANA GURU COLLEGE OF
ENGINEERING & TECHNOLOGY, PAYYANUR
KANNUR

PROGRAMME OFFICER
NATIONAL SERVICE SCHEME
UNIT No. 610
SREE NARAYANA GURU COLLEGE
OF ENGINEERING & TECHNOLOGY,
PAYYANUR

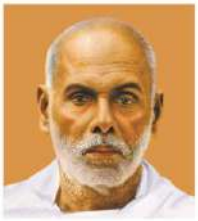
Dr. LEENA A. V.
PRINCIPAL
SREE NARAYANA GURU COLLEGE OF
ENGINEERING & TECHNOLOGY, PAYYANUR
KANNUR

PROGRAMME OFFICER
NATIONAL SERVICE SCHEME
UNIT No. 610
SREE NARAYANA GURU COLLEGE
OF ENGINEERING & TECHNOLOGY,
PAYYANUR



Dr. LEENA A. V.
PRINCIPAL
SREE NARAYANA GURU COLLEGE OF
ENGINEERING & TECHNOLOGY, PAYYANUR
KANNUR

PROGRAMME OFFICER
NATIONAL SERVICE SCHEME
UNIT No. 610
SREE NARAYANA GURU COLLEGE
OF ENGINEERING & TECHNOLOGY,
PAYYANUR



BEYOND THE CAMPUS ENVIRONMENTAL PROMOTION AND SUSTAINABILITY ACTIVITIES

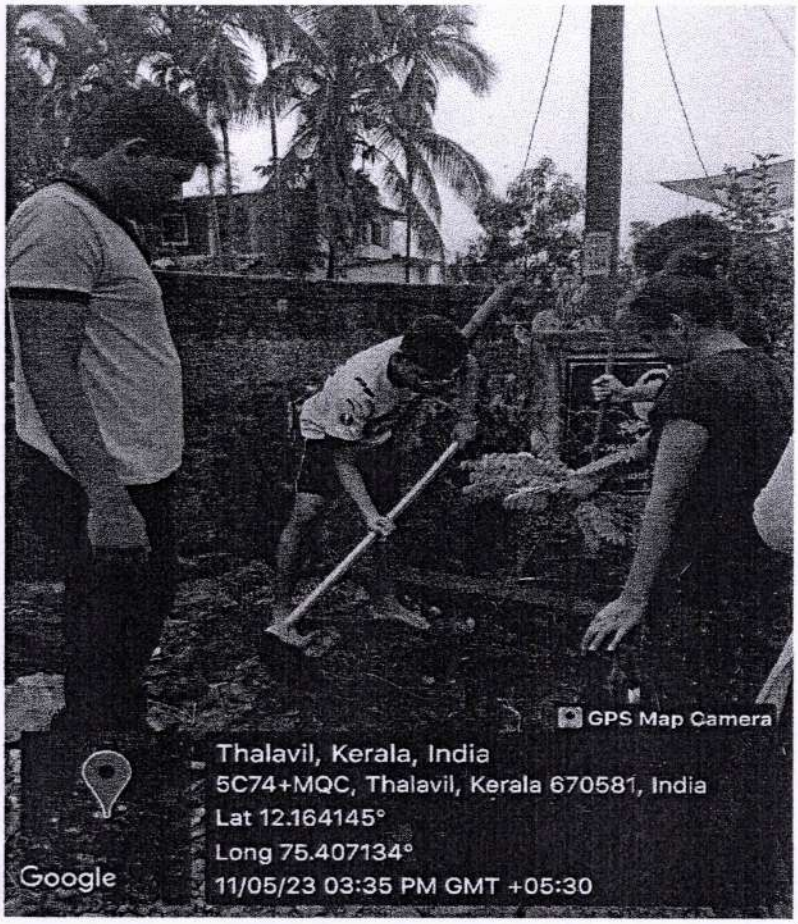
Sree Narayana Guru College of Engineering & Technology

KOROM, PAYYANUR, KANNUR-670 307

Est. 2003

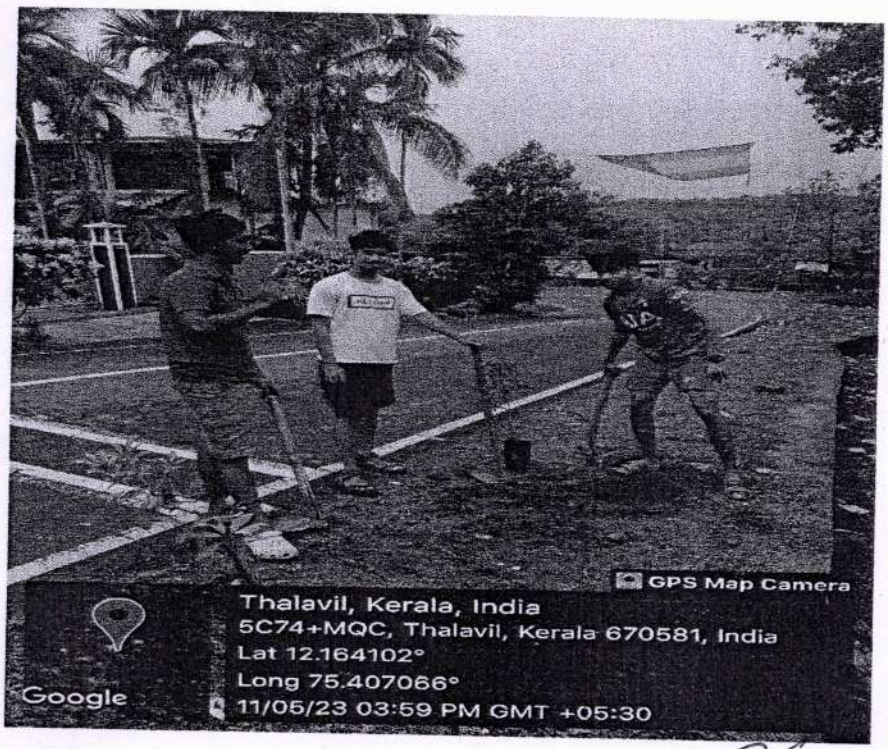
"THALAVINU ORU THANAL"
TREE PLANTATION DRIVE AT THALAVIL JUNCTION

During the 7-day NSS residential camp held at Thalavil, NSS volunteers organized a plantation drive titled "THALAVINU ORU THANAL" on May 11, 2023.



Dr. LEENA A. V.
PRINCIPAL
SREE NARAYANA GURU COLLEGE OF ENGINEERING & TECHNOLOGY, PAYYANUR
KANNUR

PROGRAMME OFFICER
NATIONAL SERVICE SCHEME
UNIT No. 610
SREE NARAYANA GURU COLLEGE OF ENGINEERING & TECHNOLOGY, PAYYANUR



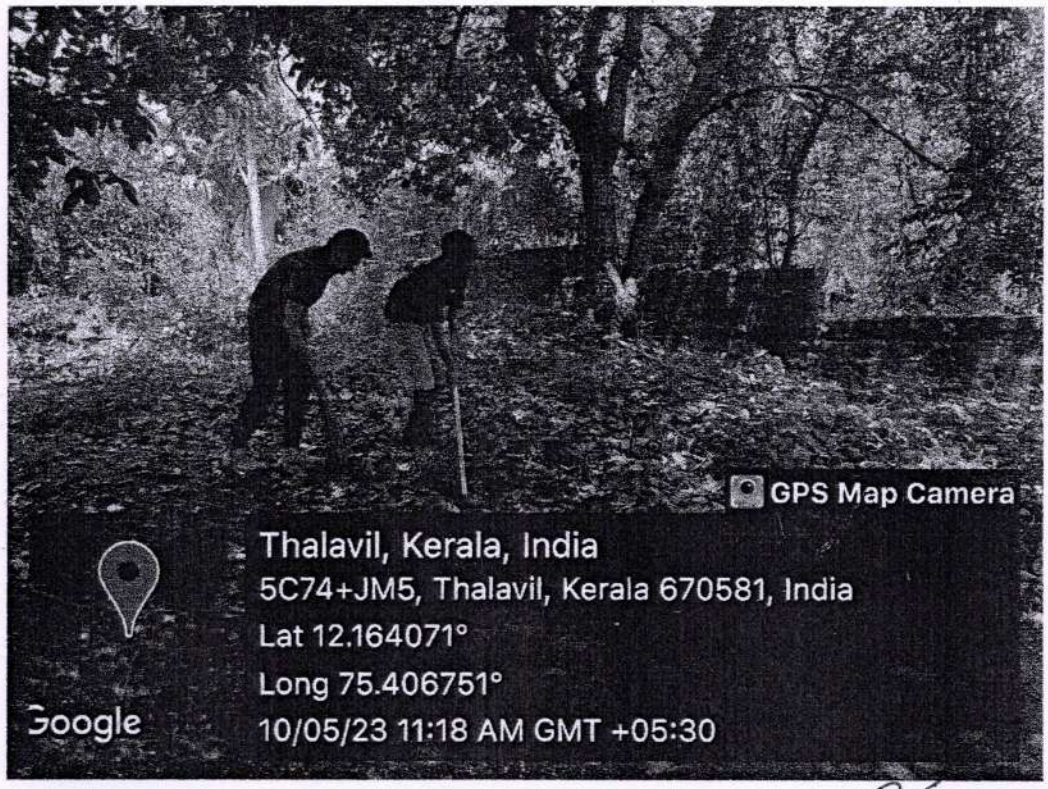
PROGRAMME OFFICER
NATIONAL SERVICE SCHEME
UNIT No. 610
SREE NARAYANA GURU COLLEGE
OF ENGINEERING & TECHNOLOGY,
PAYYANUR

Dr. LEENA A. V.
PRINCIPAL
SREE NARAYANA GURU COLLEGE OF
ENGINEERING & TECHNOLOGY, PAYYANUR
KANNUR

Sree Narayana Guru College of Engineering & Technology
KOROM, PAYYANUR, KANNUR-670 307
Est. 2003

CLEANING ACTIVITY HELD AT PRIMARY HEALTH CENTER THALAVIL

As part of 7 days NSS residential camp held at thalavil, NSS volunteers had conducted a cleaning activity at Primary health centre thalavil on 10th may 2023.



PROGRAMME OFFICER
NATIONAL SERVICE SCHEME
UNIT No. 610
SREE NARAYANA GURU COLLEGE
OF ENGINEERING & TECHNOLOGY,
PAYYANUR

Dr. LEENA A. V.
PRINCIPAL
SREE NARAYANA GURU COLLEGE OF
ENGINEERING & TECHNOLOGY, PAYYANUR
KANNUR

Dr. LEENA A. V.
PRINCIPAL
SREE NARAYANA GURU COLLEGE OF
ENGINEERING & TECHNOLOGY, PAYYANUR
KANNUR

PROGRAMME OFFICER
NATIONAL SERVICE SCHEME
UNIT No. 610
SREE NARAYANA GURU COLLEGE
OF ENGINEERING & TECHNOLOGY,
PAYYANUR

Sree Narayana Guru College of Engineering & Technology
KOROM, PAYYANUR, KANNUR-670 307
Est. 2003

"VEGETABLE GARDEN MAKING FOR ECONOMICALLYBACKWARD HOUSES OF THALAVIL "

During the 7-day NSS residential camp at Thalavil, the NSS unit of SNGCET established a vegetable garden for selected households (in the Economically Backward Category) of Thalavil on May 12, 2023.

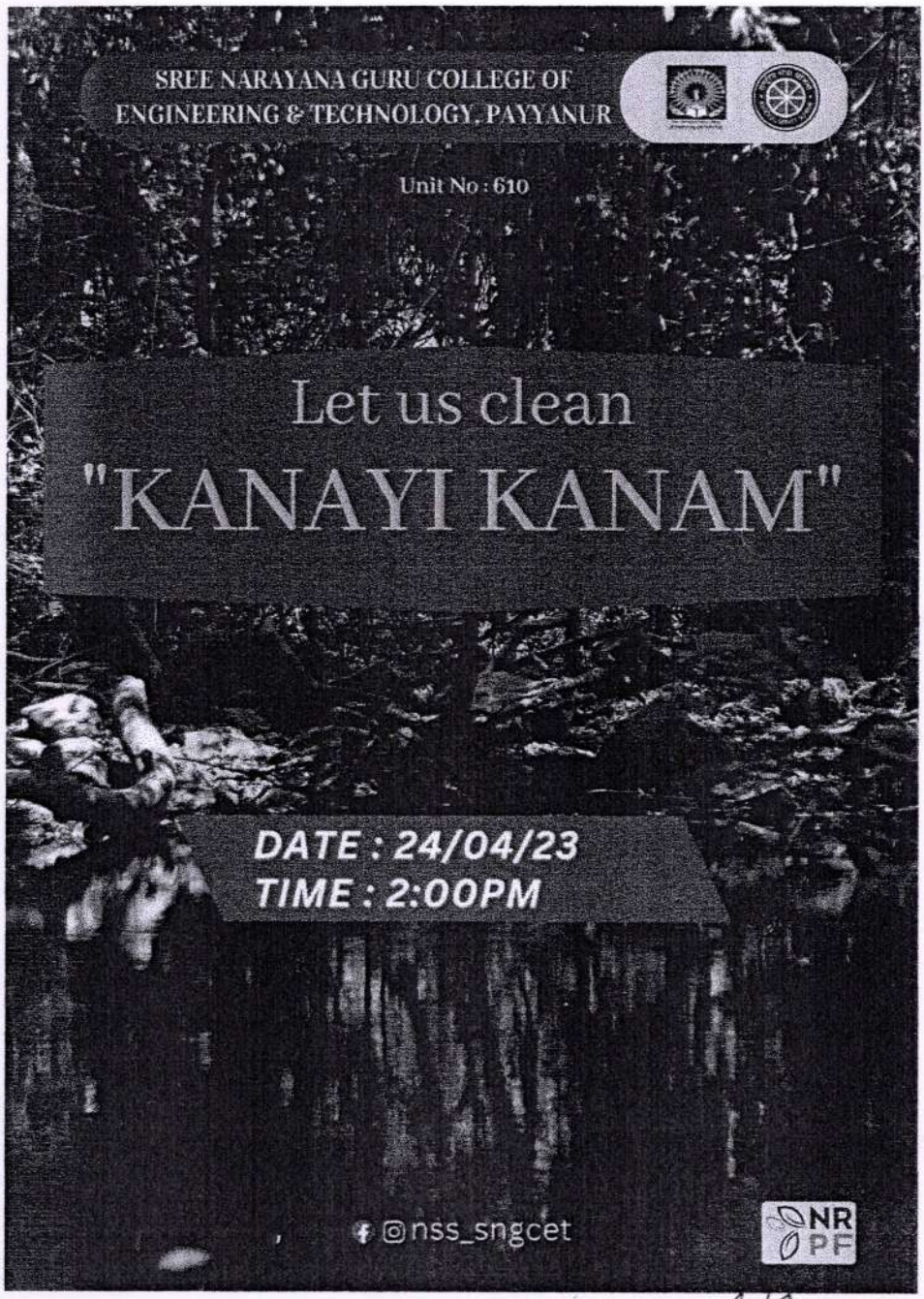
Dr. LEENA A. V.
PRINCIPAL
SREE NARAYANA GURU COLLEGE OF ENGINEERING & TECHNOLOGY, PAYYANUR
KANNUR

PROGRAMME OFFICER
NATIONAL SERVICE SCHEME
UNIT No. 610
SREE NARAYANA GURU COLLEGE
OF ENGINEERING & TECHNOLOGY,
PAYYANUR

Sree Narayana Guru College of Engineering & Technology

KOROM, PAYYANUR, KANNUR-670 307

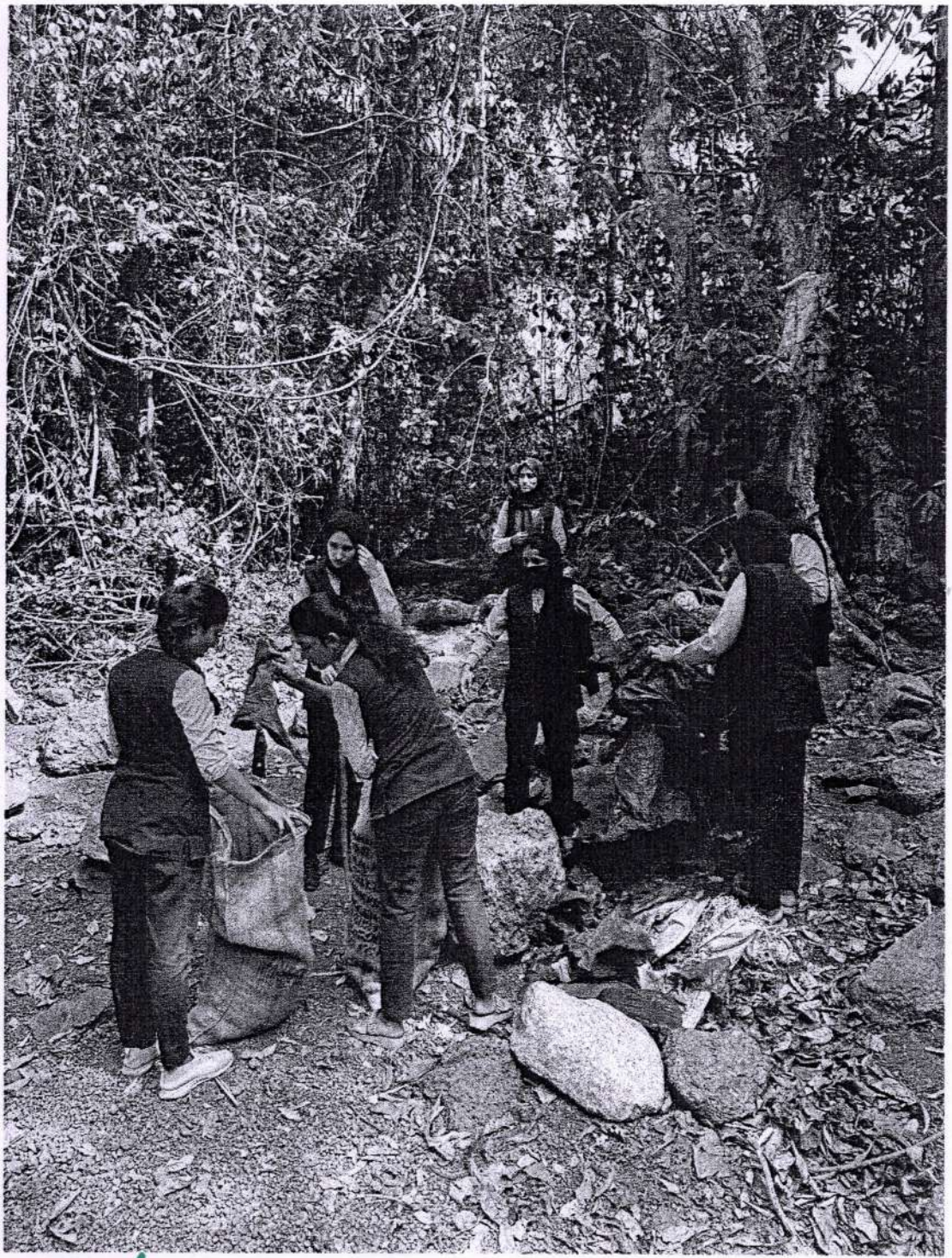
Est. 2003



DR. LEENA A. V.
PRINCIPAL
SREE NARAYANA GURU COLLEGE OF
ENGINEERING & TECHNOLOGY, PAYYANUR
KANNUR

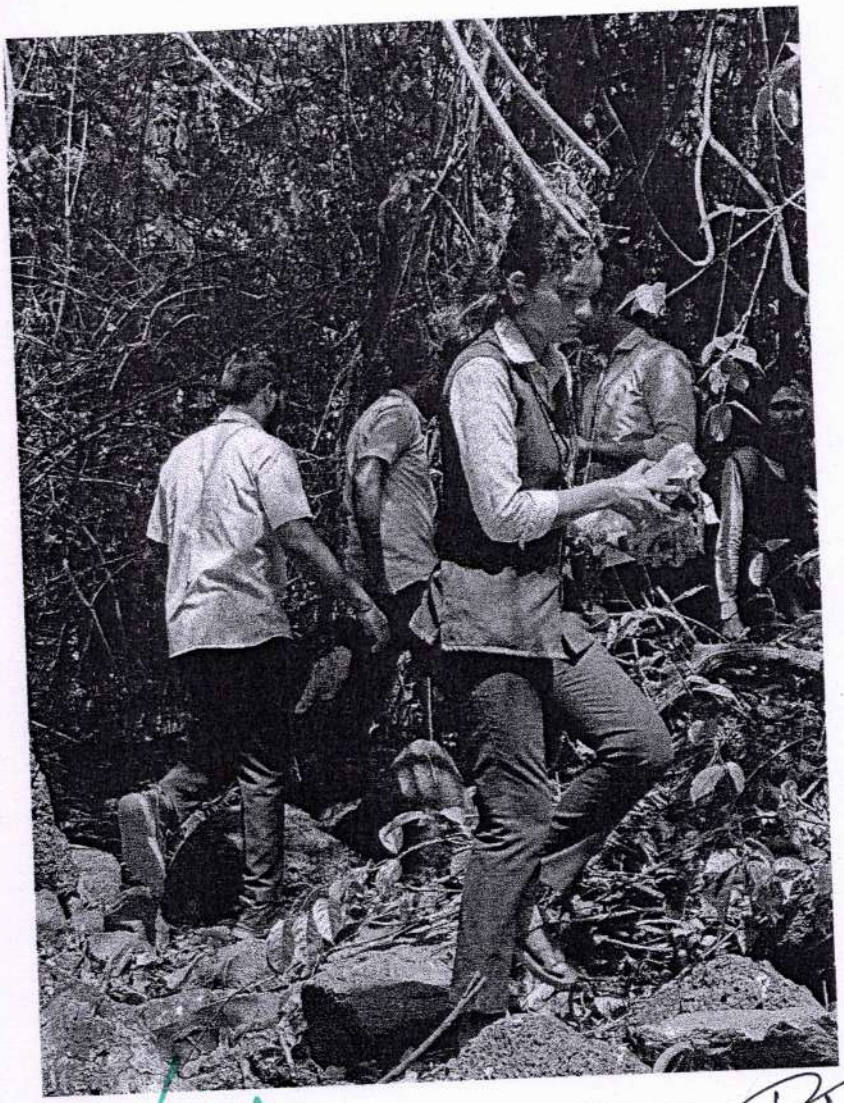
PROGRAMME OFFICER
NATIONAL SERVICE SCHEME
UNIT No. 610
SREE NARAYANA GURU COLLEGE
OF ENGINEERING & TECHNOLOGY,
PAYYANUR

Kanayi Kanam, situated near Payyanur, is a picturesque water body that attracts numerous travelers and photographers, especially during the rainy seasons. However, the natural ecosystem of this area has been adversely affected by the accumulation of plastic bottles and covers. To address this issue, the NSS unit of SNGCET organized a cleaning drive at Kanayi Kanam on April 21, 2023, to clear away all plastic waste before the onset of the rainy season. Several students, alongside NSS volunteers, actively participated in this program.



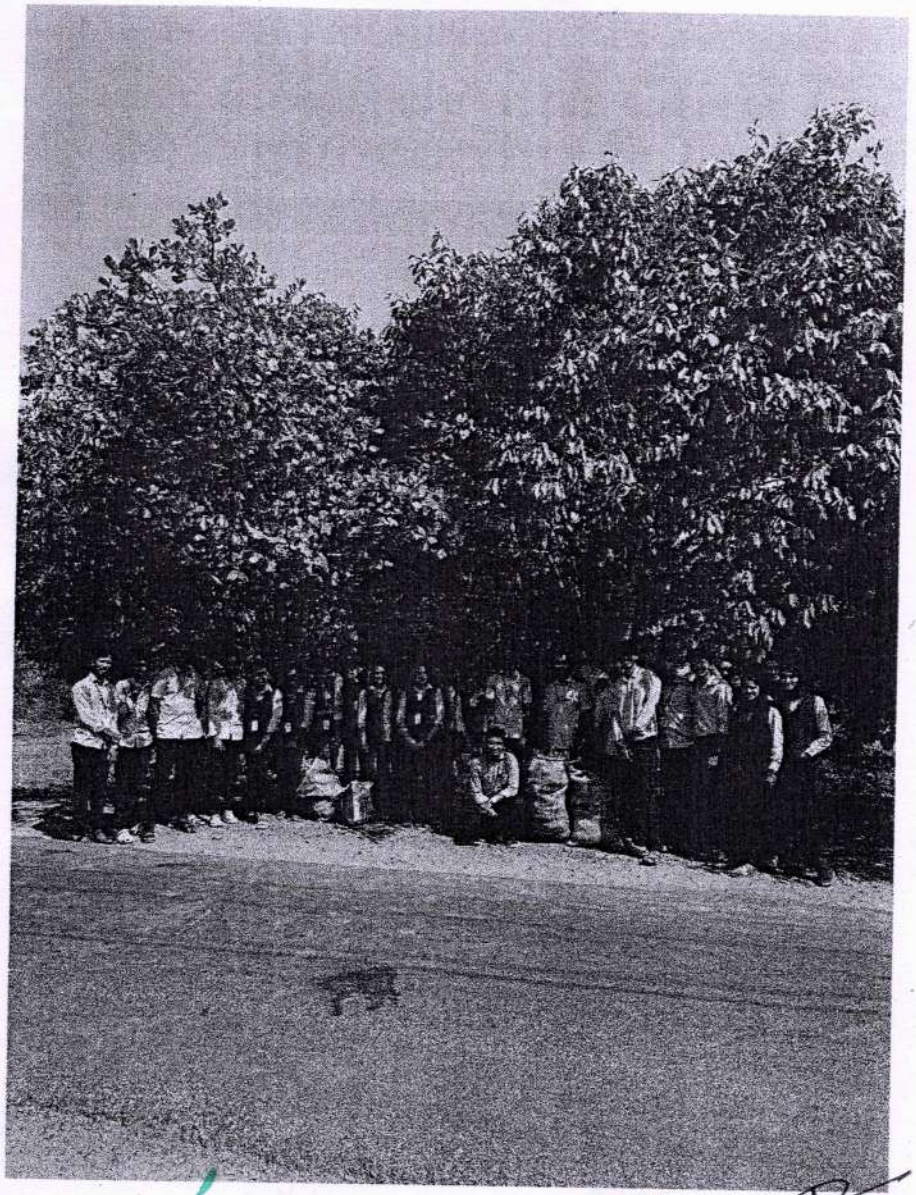
Dr. LEENA A. V.
PRINCIPAL
SREE NARAYANA GURU COLLEGE OF
ENGINEERING & TECHNOLOGY, PAYYANUR
KANNUR

PROGRAMME OFFICER
NATIONAL SERVICE SCHEME
UNIT No. 610
SREE NARAYANA GURU COLLEGE
OF ENGINEERING & TECHNOLOGY,
PAYYANUR



Dr. LEENA A. V.
PRINCIPAL
SREE NARAYANA GURU COLLEGE OF
ENGINEERING & TECHNOLOGY, PAYYANUR
KANNUR

PROGRAMME OFFICER
NATIONAL SERVICE SCHEME
UNIT No. 610
SREE NARAYANA GURU COLLEGE
OF ENGINEERING & TECHNOLOGY,
PAYYANUR



Dr. LEENA A. V.
PRINCIPAL
SREE NARAYANA GURU COLLEGE OF
ENGINEERING & TECHNOLOGY, PAYYANUR
KANNUR

PROGRAMME OFFICER
NATIONAL SERVICE SCHEME
UNIT No. 610
SREE NARAYANA GURU COLLEGE
OF ENGINEERING & TECHNOLOGY,
PAYYANUR

Sree Narayana Guru College of Engineering & Technology

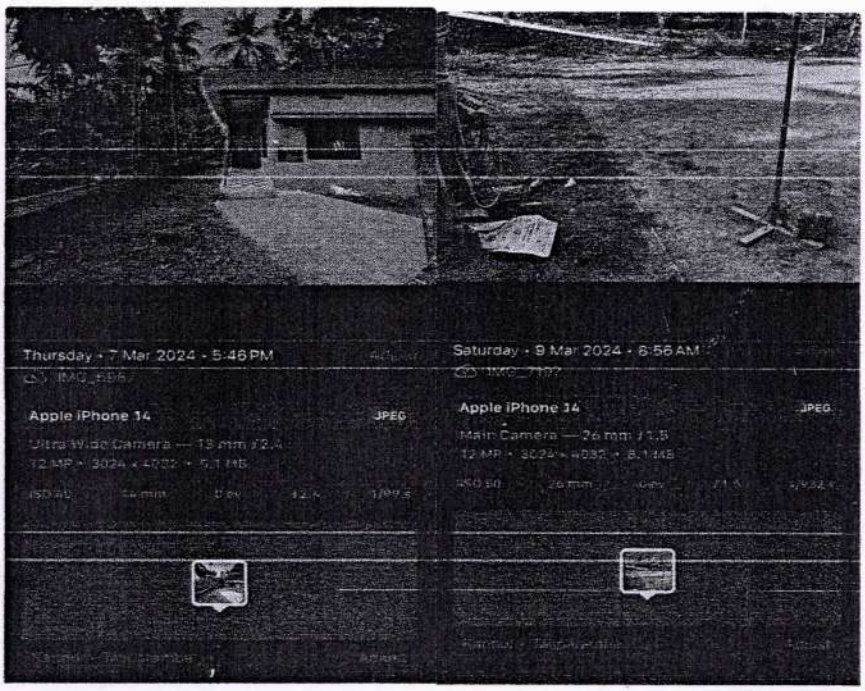
KOROM, PAYYANUR, KANNUR-670 307

Est. 2003

NATIONAL SERVICE SCHEME Unit No. 610

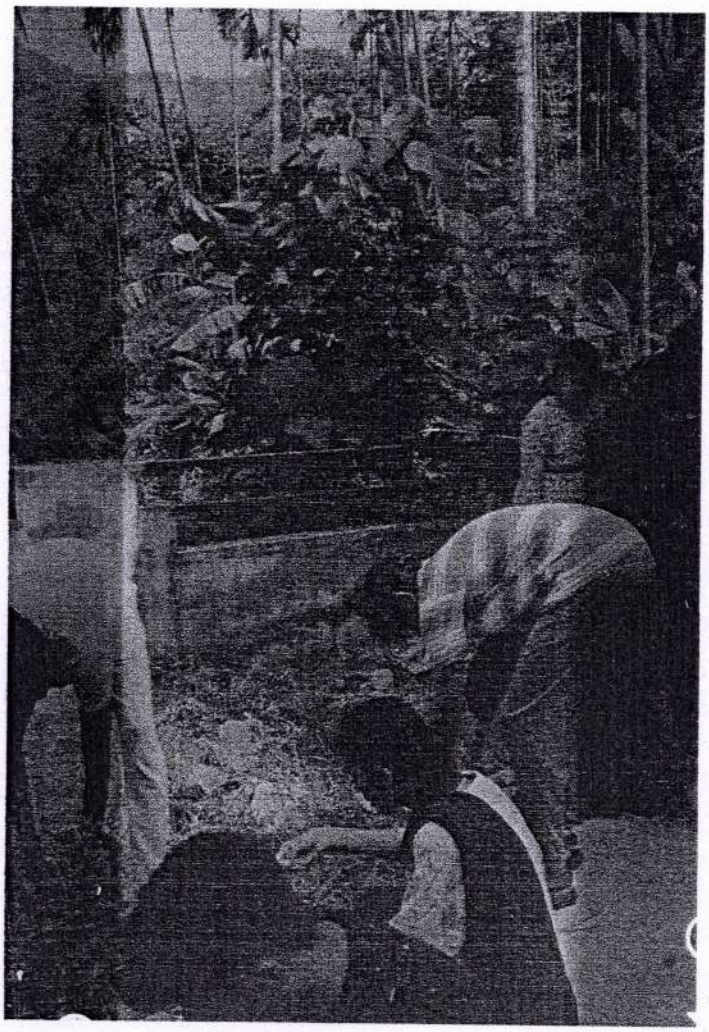
Primary Health Centre Cleaning Mampoil

During the Forenoon session of a residential camp on March 7th in Mampoil, On March 9th, volunteers conducted a cleaning drive at the primary health center in thalavil, which is the sole medical emergency facility available for the locals of Mampoil.



Dr. LEENA A. V.
PRINCIPAL
SREE NARAYANA GURU COLLEGE OF ENGINEERING & TECHNOLOGY, PAYYANUR
KANNUR

PROGRAMME OFFICER
NATIONAL SERVICE SCHEME
UNIT No. 610
SREE NARAYANA GURU COLLEGE OF ENGINEERING & TECHNOLOGY, PAYYANUR



Dr. LEENA A. V.
PRINCIPAL
SREE NARAYANA GURU COLLEGE OF
ENGINEERING & TECHNOLOGY, PAYYANUR
KANNUR

PROGRAMME OFFICER
NATIONAL SERVICE SCHEME
UNIT No. 610
SREE NARAYANA GURU COLLEGE
OF ENGINEERING & TECHNOLOGY,
PAYYANUR

Sree Narayana Guru College of Engineering & Technology

KOROM, PAYYANUR, KANNUR-670 307

Est. 2003

SREE NARAYANA GURU COLLEGE OF ENGINEERING & TECHNOLOGY, PAYYANUR

Korom, Chalakkode P. O, Payyanur, Kannur -670307

Managed by Sree Bhakthi Samvardhini Yogam, Talap, Kannur

Affiliated to APJ Abdul Kalam Technological University and Approved by AICTE

NATIONAL SERVICE SCHEME

UNIT NO : 610

"CLEAN HOME CHALLENGE"

DATE : 22/05/23

NR PF

nss_sngcet

Dr. LEENA A. V.
PRINCIPAL
SREE NARAYANA GURU COLLEGE OF
ENGINEERING & TECHNOLOGY, PAYYANUR
KANNUR

PROGRAMME OFFICER
NATIONAL SERVICE SCHEME
UNIT No. 610
SREE NARAYANA GURU COLLEGE
OF ENGINEERING & TECHNOLOGY,
PAYYANUR






On May 22, 2023, the NSS Unit of SNGCET orchestrated a challenge for all college students to tidy up their own residences and submit pictures to NSS coordinators. The objective behind this initiative was to prevent the widespread of diseases caused by unsanitary environments. Numerous students alongside nss volunteers were participated

Dr. LEENA A. V.
PRINCIPAL
SREE NARAYANA GURU COLLEGE OF
ENGINEERING & TECHNOLOGY, PAYYANUR
KANNUR

PROGRAMME OFFICER
NATIONAL SERVICE SCHEME
UNIT No. 610
SREE NARAYANA GURU COLLEGE
OF ENGINEERING & TECHNOLOGY,
PAYYANUR



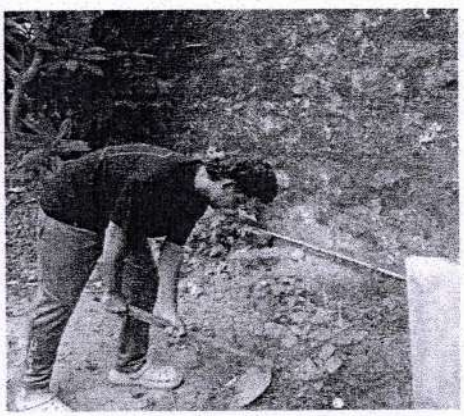



Dr. LEENA A. V.
PRINCIPAL
SREE NARAYANA GURU COLLEGE OF
ENGINEERING & TECHNOLOGY, PAYYANUR
KANNUR

PROGRAMME OFFICER
NATIONAL SERVICE SCHEME





Dr. LEENA A. V.
PRINCIPAL
SREE NARAYANA GURU COLLEGE OF
ENGINEERING & TECHNOLOGY, PAYYANUR
KANNUR

PROGRAMME OFFICER
NATIONAL SERVICE SCHEME
UNIT No. 610
SREE NARAYANA GURU COLLEGE
OF ENGINEERING & TECHNOLOGY,
PAYYANUR

Sree Narayana Guru College of Engineering & Technology
KOROM, PAYYANUR, KANNUR-670 307
Est. 2003

NATIONALSERVICE SCHEMEUnit No.610

Plastic Waste Collection and Disposal in Mampoil

&

Garden Making

On the 7th of March, 2024, a commendable environmental initiative took place at Mampoil Junction, led by a dedicated group of National Service Scheme (NSS) volunteers. The event focused on the critical issues of plastic waste management and urban greening, showcasing the volunteers' commitment to environmental sustainability and community welfare.

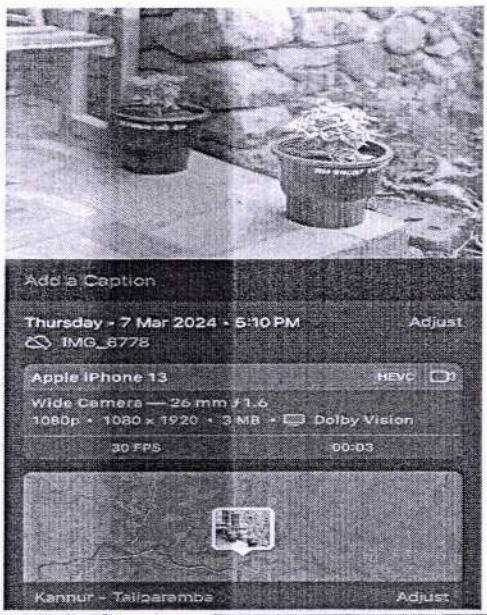
The day commenced with a plastic waste collection drive, where NSS volunteers meticulously scoured the area, gathering discarded plastic items that littered the junction. This activity was not only about cleaning the environment but also served as a strong message to the local community about the detrimental effects of plastic waste on our planet. By disposing of the collected waste in an eco-friendly manner, the volunteers ensured that their efforts contributed positively to reducing pollution and promoting recycling practices.

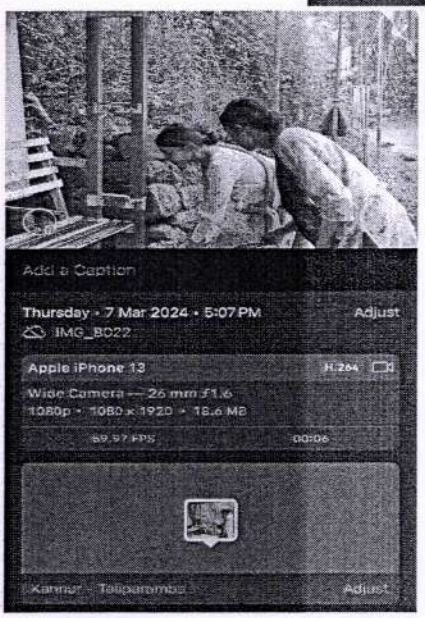
The garden creation was a testament to the volunteers' hard work and creativity, embodying the spirit of 'green activism'. Through their efforts, they demonstrated that small actions can lead to significant environmental improvements. The garden stands as a symbol of hope and a reminder to the community of the importance of nurturing and preserving our natural surroundings.

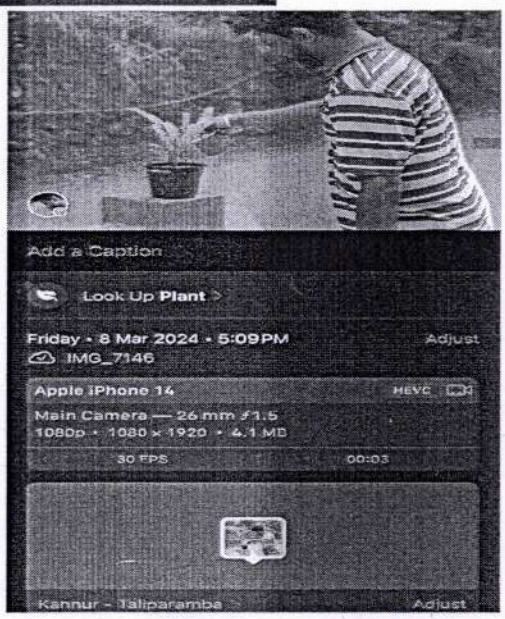
The NSS volunteers' initiative at Mampoil Junction is a shining example of how youth can lead the way in environmental conservation and community improvement. By addressing the twin issues of plastic waste and the lack of green spaces, they have made a tangible difference in their local community.

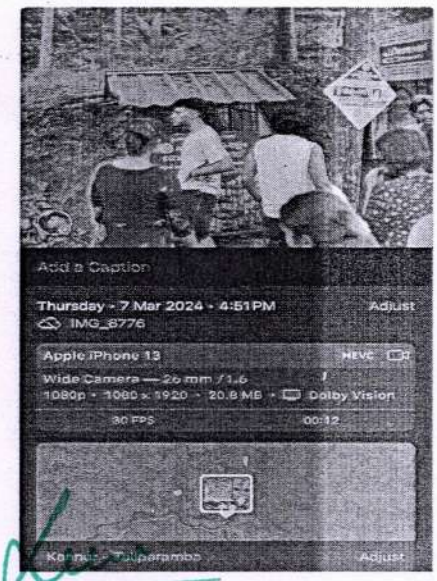
DR. LEENA A. V.
PRINCIPAL
SREE NARAYANA GURU COLLEGE OF ENGINEERING & TECHNOLOGY, PAYYANUR
KANNUR

PROGRAMME OFFICER
NATIONAL SERVICE SCHEME
UNIT No. 610
SREE NARAYANA GURU COLLEGE OF ENGINEERING & TECHNOLOGY, PAYYANUR









Dr. LEENA A. V.
PRINCIPAL
SREE NARAYANA GURU COLLEGE OF
ENGINEERING & TECHNOLOGY, PAYYANUR
KANNUR

PROGRAMME OFFICER
NATIONAL SERVICE SCHEME
UNIT No. 610
SREE NARAYANA GURU COLLEGE
OF ENGINEERING & TECHNOLOGY,
PAYYANUR

(24)

Sree Narayana Guru College of Engineering & Technology

KOROM, PAYYANUR, KANNUR-670 307

Est. 2003

NATIONALSERVICE SCHEMEUnit No.610

Vegetable Garden Making – Sacred Heart L P School Mampoil

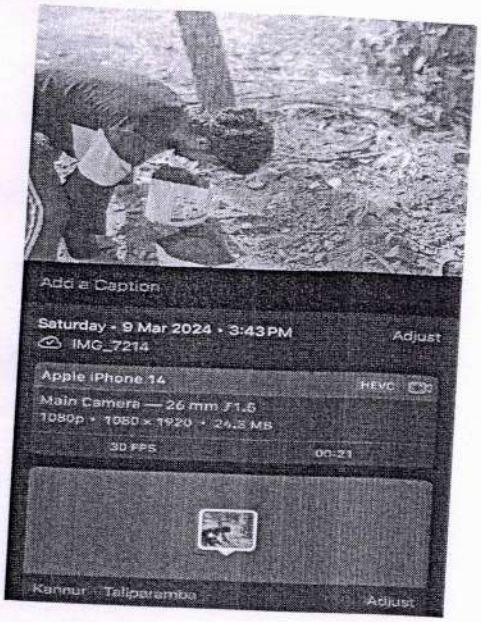
The initiative began early in the morning, with volunteers gathering at the designated area in the school grounds. The site was carefully chosen for its optimal sunlight exposure and accessibility to ensure the successful growth of the garden. The first step involved preparing the soil, a crucial process that involved clearing the land of weeds, tilling the earth, and enriching it with organic compost to create a fertile ground for the vegetables to thrive

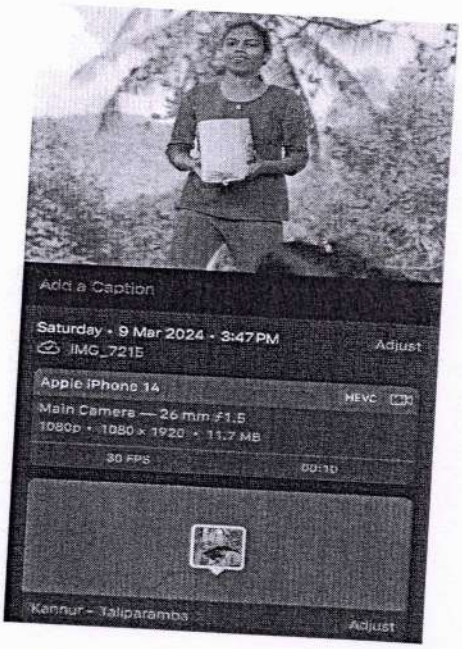
Once the soil was ready, the volunteers, alongside interested students and teachers, began the planting process. The selection of vegetables was strategic, focusing on varieties that were not only easy to grow but also beneficial for the school's lunch program. Tomatoes, carrots, spinach, and beans were among the chosen crops, planted with care and precision to ensure they would yield a bountiful harvest.

The vegetable garden at Sacred Heart LP School, Mampoil, stands as a testament to the power of community and the positive impact of youth-led initiatives. Through their hard work and dedication, the NSS volunteers have created more than just a garden; they have sown the seeds of change, inspiring a future generation to carry forward the torch of sustainability and care for our planet. This project marks a significant step towards a greener, healthier future, rooted in the principles of self-sufficiency and environmental respect.

Dr. LEENA A. V.
PRINCIPAL
SREE NARAYANA GURU COLLEGE OF ENGINEERING & TECHNOLOGY, PAYYANUR
KANNUR

PROGRAMME OFFICER
NATIONAL SERVICE SCHEME
UNIT No. 610
SREE NARAYANA GURU COLLEGE
OF ENGINEERING & TECHNOLOGY,
PAYYANUR





Dr. LEENA A. V.
PRINCIPAL
SREE NARAYANA GURU COLLEGE OF
ENGINEERING & TECHNOLOGY, PAYYANUR
KANNUR

PROGRAMME OFFICER
NATIONAL SERVICE SCHEME
UNIT No. 610
SREE NARAYANA GURU COLLEGE
OF ENGINEERING & TECHNOLOGY,
PAYYANUR