

7.1.6

Quality audits on Environment and Energy regularly undertaken by the Institution, and Awards received for such green campus initiatives




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7.1.6 Reports, Activity Photos and Certificate copies

1. Certificates: Green Audit, Energy Audit, Environment Audit
2. Reports: Green Audit, Energy Audit, Environment Audit
3. Work Order for Auditing
4. Plastic free campaign
5. Campus cleaning
6. Plastic free village papercutting
7. Flood Relief activities
8. Bharathapuzha cleaning
9. Award: LRA (honoring No Plastic initiatives for the society)
10. Award: Gramapanchayath (honoring Survey execution)
11. Certificates to students for from Collector/ Tahsildar
(honoring flood cleaning activity)
12. Screenshots of Submitting the certificates
to University for gracemarks




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No: AEC/GAC/13

12-02-2020

Audit Certificate

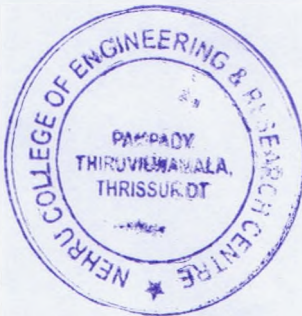
This is to certify that **Nehru College of Engineering and Research Centre**, Pampadi, Thrissur have successfully completed the **Energy Audit** of their buildings and campus conducted on 5th & 6th February 2020 for the Academic year 2019-2020. They have submitted all necessary data and credentials for scrutiny.

We, **Athul Energy Consultants Pvt Ltd**, Thrissur congratulate the Chairman, Advisor, Principal, CEO and staff members and students for the successful completion and participation in the audit report process.



Managing Director

Athul Energy Consultants Pvt Ltd



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GREEN AUDIT - 2020



NEHRU COLLEGE OF ENGINEERING & RESEARCH CENTRE (NCERC)

Pampadi, Thrissur

Kerala

EXECUTED BY



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February 2020



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TABLE OF CONTENTS

PREFACE	4
ACKNOWLEDGEMENTS	5
EXECUTIVE SUMMARY	6
BASIC DETAILS	7
INTRODUCTION	8
GREEN AUDIT	10
CAMPUS ENVIRONMENT	11
SUSTAINABLE CONSTRUCTION OF BUILDINGS	12
1. BUILDING DETAILS	17
2. VENTILATION AND CARBON DIOXIDE LEVELS	17
3. HERBAL GARDEN	19
4. FOREST COVERAGE AROUND NCERC CAMPUS	20
5. ZODIAC STAR FOREST (NAKSHTRA VANAM)	22
6. OXYGEN PARK AND NATURE THEATRE	24
7. SUGGESTIONS	25
WATER RESOURCES AND CONSERVATION	26
1. WATER CONSUMPTION	28
2. GROUND WATER RECHARGING	29
STUDENT ACTIVITIES FOR NATURE	32
CONCLUSION:	35
ANNEXURE-1	36

LIST OF TABLES

TABLE 1 BASIC DATA SHEET	7
TABLE 2: BUILT UP AREA	17
TABLE 3: CARBON DIOXIDE LEVELS	18
TABLE 4: STAR GARDEN	23
TABLE 5: WATER TAPS	28

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LIST OF FIGURES

FIGURE 1: CAMPUS VIEW	9
FIGURE 2: CAMPUS BUILDINGS	11
FIGURE 3: BHASKARA - REAR VIEW	12
FIGURE 4: ARYABHATTA BLOCK	13
FIGURE 5: KAPILA	13
FIGURE 6 BRAHMAGUPTA BLOCK	14
FIGURE 7: KAMALA, PRIYADARSHINI, KASTURBA HOSTELS	15
FIGURE 8: NALA	15
FIGURE 9 ADMINISTRATIVE BLOCK	16
FIGURE 10 INDOOR GARDEN	19
FIGURE 11: GREEN COVERAGE OF NCERC	20
FIGURE 12: ZODIAC STAR GARDEN ON THE WAY TO HOSTEL	23
FIGURE 13 OXYGEN PARK AND PARLOUR	24
FIGURE 14: NATURE AUDITORIUM	24
FIGURE 15 GREEN ZONE WITH WATER BODY	25
FIGURE 16 WATER SUPPLY FROM TANKER AND KWA	26
FIGURE 17: WATER DIAGRAM	27
FIGURE 18: QUARRY POND	30
FIGURE 19: CONTOUR FOR ROUTING WATER	30
FIGURE 20: WORLD ENVIRONMENT DAY CELEBRATIONS	32
FIGURE 21: NATURE VISIT	32
FIGURE 22: ORIENTATION ABOUT AGRICULTURE	33
FIGURE 23: WORLD WATER DAY	33
FIGURE 24: VISHARAHITHA VISHU PROGRAMME	34
FIGURE 25 NCC DAY CELEBRATIONS	34



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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.

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 preparing an initial skeleton for the report.



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ACKNOWLEDGEMENTS

We express our sincere gratitude to the **Nehru College of Engineering & Research Centre (NCERC)**, Pampadi, Thrissur, 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. Adv.Dr.Krishnadas | Chairman and Managing Trustee |
| 2. Dr.P. Krishnakumar | CEO and Secretary |
| 3. Dr. Radhakrishnan | Advisor |
| 4. Dr. Ambikadevi Amma | Principal |
| 5. Ms. Bindu | Campus Manager |
| 6. Adv. Suchithra Lal | Legal Advisor |
| 7. Dr. Sudheer Marar | HOD MCA |
| 8. Sri. Ambikadas | Academic Superintendent |

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

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Accredited Energy Auditor No - EA 7597
2. **Mr. Ashok K M P**
Registered Energy Manager of Bureau of Energy Efficiency (BEE - Govt. of India)
Accredited Energy Manager No - EA 25612, GRIHA Certified Professional
3. **Mr. Harikrishnan K**, Project Engineer
4. **Ms. Jijiraj KR**, Project Engineer



Yours faithfully

Managing Director
Athul Energy Consultants Pvt Ltd



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EXECUTIVE SUMMARY

- The entire campus having area of 25 acre and the NCERC buildings are located in a hill top covered with lush green nature
- NCERC developed an ecological design in the building construction to maintain minimum negative impact to ecology and surrounding nature
- Building have maximum ventilation and natural light in all areas.
- Herbal garden is created and maintained
- Star garden is developed on the way to Ladies Hostel
- Having an oxygen park and natural theatre to reduce the academic stress
- Water requirement for the NCERC is met by 4 means Borewell, Quarry pond, Water authority supply and tanker supply. Water authority and bore well is mainly used for hostels and other areas. The tanker supply mainly for canteen. The quarry pond -2 is for gardening and detailed water flow diagram is shown in Figure below
- There are 3 quarry ponds maintaining well in the college as for rain water collection and reuse of collected water to the college.
- Contours are made for recharging of ground water in the green forest trees in various areas.
- Lot of student initiates are in college through Nature club, various seminars, workshops are conducted by NSS & NCC wings of College

Suggestions for Improvement

- Install water meter in main supply and provide submetering in other usage areas.
- Display boards are to be made on trees and other areas such as vegetable garden, Herbal Garden, star garden etc. Oxygen park, biogas plant etc.
- Rain water harvesting (RWH) to be installed for collecting and use of rain water from buildings for catering water requirements toilets, wash basins in main buildings and hostels during rainy days.
- Construction percolation pits and contour trenches around campus after conducting detailed study on geographical topology of areas.
- Detailed piping diagram to be provided in the engineering office.



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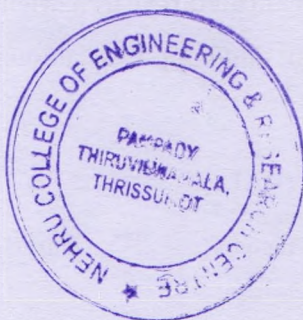


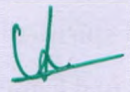
BASIC DETAILS

The general details of the NCERC college is given below in table based on the data availed from the college.

SL. NO	PARTICULARS	DETAILS
1	Name & Address of college	Nehru College of Engineering & Research Centre (NCERC) Nila Gardens, Pampadi Thiruvilwamala, Thrissur-680588
2	Contact person	Dr. Sudheer Marar Ph: 9656335444
3	Location: Latitude & Longitude	10.74356N, 76.43385E
4	No. of Teaching staff	149
5	No of technical staff	35
6	No. of Non-Teaching staff	54
7	No of students	993
8	Building area	26228 m ²
9	Land area	25 acres
10	Number of UG programs	06 nos
11	Number of PG programs	02 nos
12	Number of departments	08 nos
13	Hostel numbers	03 nos
14	Average annual working days	200 days
15	DG Set	125 & 200 kVA (1 each)
16	Transformer	400 kVA (1 No)

Table 1 Basic Data Sheet




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INTRODUCTION

Nehru College of Engineering and Research Centre (NCERC), situated on the Bank of the river Bharathapuzha, is one of the premier Engineering college in education, research and training in the private sector. Established in 2002 by the founder chairman Shri P.K. Das, NCERC had impart world class quality education in engineering and research. Dedicated to the service in the realm of technical education in Kerala, it is an ISO 9001:2015 certified institution, approved by All India Council for Technical Education (AICTE), affiliated to A P J Abdul Kalam Technological University (KTU) and is accredited by National Assessment and Accreditation Council (NAAC). The college contains 8 departments with almost 1500 students and more than 100 teaching staffs

OBJECTIVES

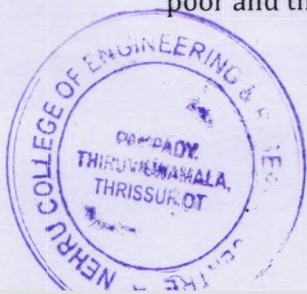
- To build a center of excellence in higher education and research and to train students in advanced technologies in Mechanical, Automobile, Electrical, Electronics, and Computer Engineering.
- To provide students with comprehensive knowledge of principles of engineering with a multidisciplinary approach that is challenging.
- To create an intellectually stimulating environment for research, scholarship, creativity, innovation and professional activity, besides exposing our students to the challenges of the industrial world.


VISION OF NCERC

To mould true citizens who are millennium leaders and catalysts of change through excellence in education

MISSION OF NCERC

NCERC is committed to transform itself into a center of excellence in Learning and Research in Engineering and Frontier Technology and to impart quality education to mould technically competent citizens with moral integrity, social commitment and ethical values. We intend to facilitate our students to assimilate the latest technological know-how and to imbibe discipline, culture and spiritually, and to mould them in to technological giants, dedicated research scientists and intellectual leaders of the country who can spread the beams of light and happiness among the poor and the underprivileged.




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GOALS OF NCERC

- To mould technically competent engineering professionals who can pioneer a social transformation for a brighter world.
- To facilitate research and learning by maintaining an ambience conducive to academic pursuits.
- To develop Industry - Institute Interaction to expose the students to the challenges of the industrial world and equip them with practical knowledge besides classroom and laboratory learning

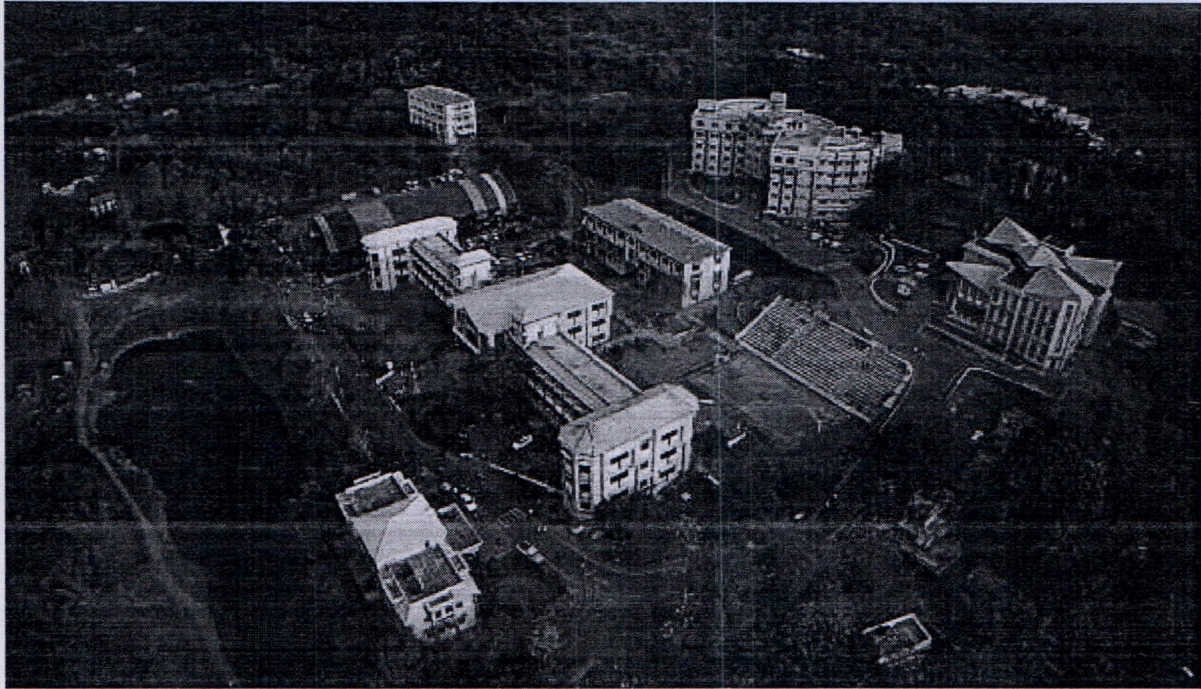


FIGURE 1: CAMPUS VIEW




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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. Engineers are increasingly expected to play leadership roles when it comes to sustainable development, working to solve global challenges such as the depletion of resources, pollution, ecosystem damage, and the effects of rapid population growth. 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 organization.
- 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

Demands for energy, drinking water, cleaner air, safe waste disposal and transportation issues are increasing day by day . This needs new infrastructure development for protecting the environment. Engineers have a critical role to play for this sustainable development. In this audit we aim to identify the areas of positive development done by the college and to point out the suggestions for improvement s.




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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 campus building is located in a center of lush greenery with ample free space. The building is located in a top of hill and its side with full of air circulating around the building.

Ultimately the campus is maintaining natural equilibrium with trees, birds and water bodies along with human interactions.

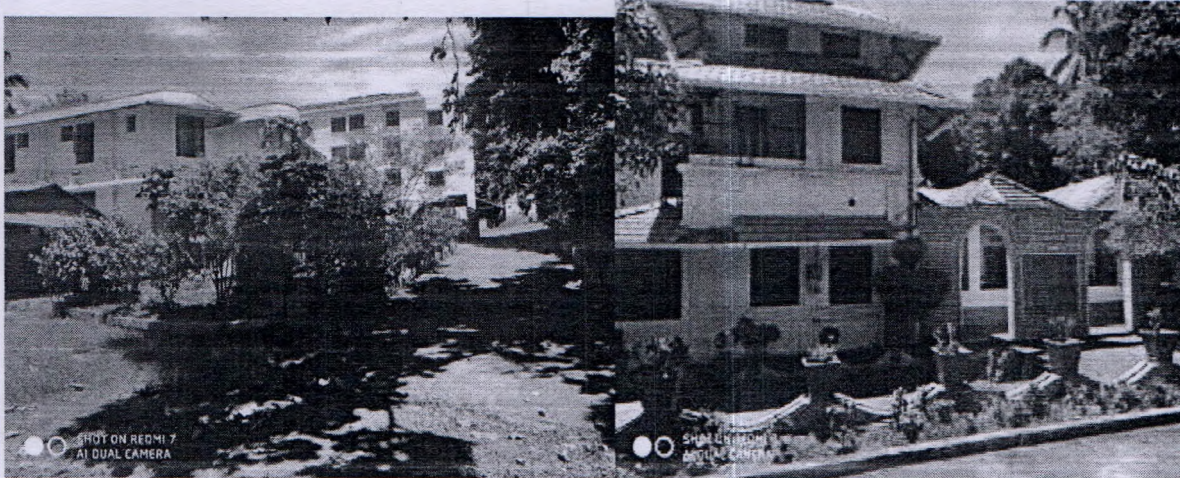


FIGURE 2: CAMPUS BUILDINGS

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).



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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.

NCERC 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.

NCERC management constructed the building to optimum utilisation of land and classrooms and with abundant light and natural ventilation. Maximum day light ingress 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 natural hill area design and thus avoiding the landslides.

BHASKARA

The first academic block with a built up area of 1 lakh sq. ft. is named after Bhaskaracharya, a genius in Algebra. This building houses the board room, conference room, faculty cabins, tutorial rooms, first year class rooms, electronics laboratories, computer science laboratories, language lab, drawing halls, gymnasium, billiards room and the store. The departments of Civil engineering and Applied Sciences and Humanities also operate from here.

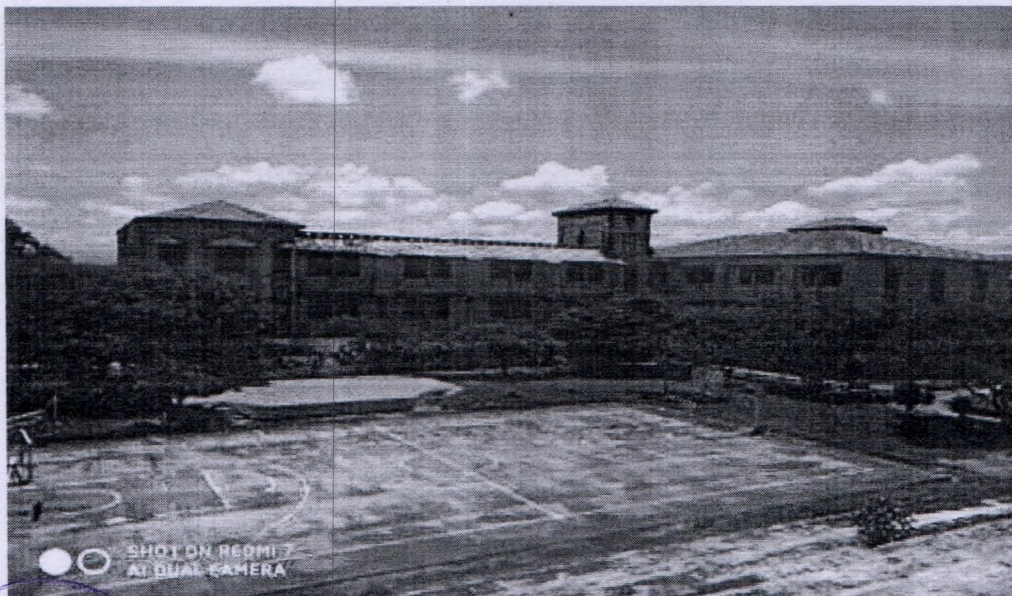
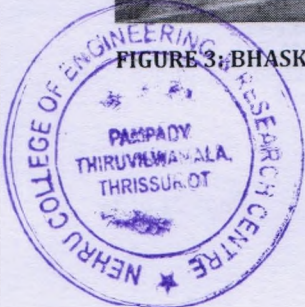



FIGURE 3: BHASKARA - REAR VIEW




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ARYABHATTA

Aryabhata' named after the famous astronomer 'Aryabhata', is a hexagonal six storied academic building, having a built up area of 1.25 lakhs sq. ft. It houses 5 U.G and P.G. departments, Principal's office, academic office, conference room, board room, cabins of faculty, seminar hall, Placement Office, computer laboratories and tutorial rooms

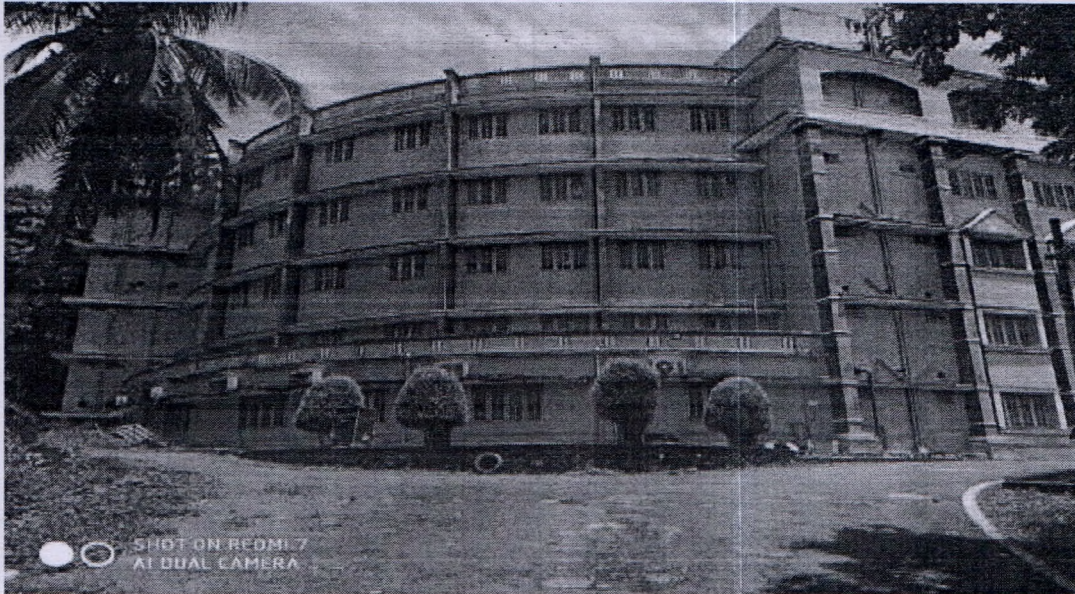


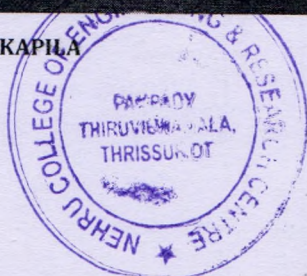
FIGURE 4: ARYABHATTA BLOCK

KAPILA

This block, named after Kapila, who is known as the Father of cosmology and the founder of Sankhya Philosophy has an area of 60.000 sq. ft. This block houses MBA & MCA Departments, board room, tutorial rooms, faculty cabins, class rooms, seminar halls, PG library, yoga hall and computer laboratories.



FIGURE 5: KAPILA



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BRAHMAGUPTA

This block, named after the ancient Indian astronomer Brahmagupta, has a total area of 30,000 sq. ft. and the block houses the main auditorium on the second floor with a seating capacity of 1000 people. The Library with a seating capacity of 400 students and a modern automobile workshop of 10000 sq. ft. and a new Electronics Laboratory. NCERC Central Library is located on the ground floor of the Brahmagupta block and is the real centres of learning. The library has got a rich collection of books on different domains of Science and Technology, Journals, Periodicals and other printed materials besides audio, visual and electronic information service, media workshops. The library also digitalized to meet most advanced information requirement with fully automated with software and equipped with 64MBPS internet connectivity for easy and fast access.

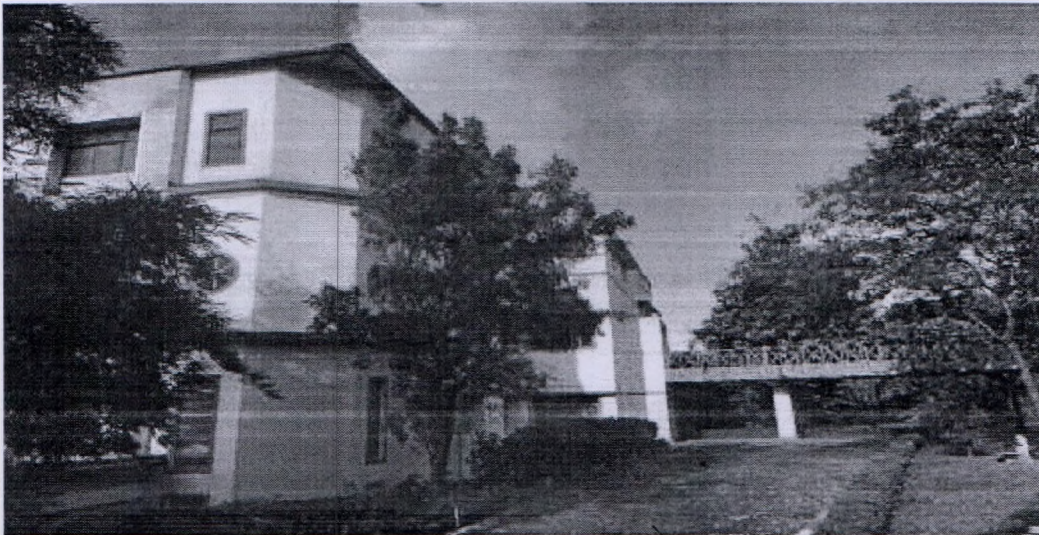


FIGURE 6: BRAHMAGUPTA BLOCK

KAMALA, PRIYADARSHINI AND KASTURBA HOSTELS

NCERC, located in a picturesque campus, proudly boast of a range of excellent accommodation facilities available to every budget. They provide good food and courteous catering to suit every wallet. The ladies hostel block 'A' is named after Kamala Kaul Nehru, wife of Pandit Jawaharlal Nehru. This block can house 300 students and the 'B' block of women's hostel is named after our illustrious former Prime Minister Smt. Indira Gandhi. This block can accommodate around 100 students. Air-conditioned rooms are available for students on first come first serve basis. The hostel block 'C' is named after Kasturba Gandhi, wife of Mohandas Karamchand Gandhi. This hostel can accommodate 500 students and various recreational facilities are made available for all the hostelers.





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FIGURE 7: KAMALA, PRIYADARSHINI , KASTURBA HOSTELS

CANTEEN (NALA)

A canteen is, of course, the most vibrant rendezvous where the students freely share views and feelings with their friends. It is, indeed, an integral part of student life in the campus. The canteen, named after the mythological King Nala, who had been renowned for his culinary expertise has a built up area of 18000 sq.ft. and is a three storied building with the most modern and hygienic kitchen facilities. The college has two canteens in the campus where high quality food is served at concessional rates. It is open from 8.00 A.M. to 5.00 P.M. on all working days including Saturday. There is also a Burger Shop where students get delicious food at affordable rates.



FIGURE 8: NALA




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ADMINISTRATIVE BUILDING

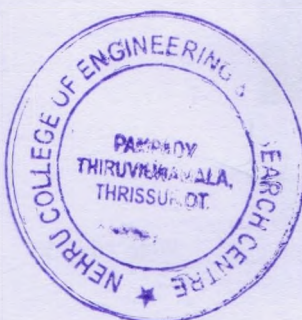
This building is located in a top of all buildings and it one of oldest buildings in the campus. The administration buildings is constructed in line with the nature and it is giving a bird eye view of the campus



FIGURE 9: ADMINISTRATIVE BLOCK

FACULTY QUARTERS AND MEN'S HOSTEL

Sivasree Apartments, the guest house of NCERC with all modern facilities has been used as residential quarters for faculty members. Men's hostel can accommodate around 300 students. Deluxe and semi deluxe rooms are available. Well-arranged and spacious mess halls and kitchen meet all the demands of inmates in time without any compromise on hygiene. Various recreational facilities are also made available here. These buildings are located outside of engineering campus.



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1. BUILDING DETAILS

There are major buildings in the campus. The purpose and the built-up area of the buildings are given below. All these buildings are placed in a lush green of trees and also constructed as of without affecting the ecological system of hilly terrain. The masterplan of the NCERC has been drawn to ensure and sustain harmonious blend of human and environmental well-being. Accordingly, spaces for academic, administrative and recreational areas are delineated in harmony with the topography to ensure an eco-friendly campus.

1	Particulars	Purpose	Built up Area in M2
1	Administration Building	Administration office,	447
2	Arya Bhatta	Class rooms	6434
3	Varahamihira	Work shop and Engineering class rooms	9869
4	Bhaskara	Class rooms, Examination hall	2204
5	Brahmagupta	Central Library and Auditorium	2250
6	Kapila	MBA & MCA Block	2748
7	Kasturba Hostel	106 Rooms	3140
8	Kamala Hostel	101 Rooms	4674
9	Priyadarshini Hostel	Mess hall + 8 Rooms attached	975

TABLE 2: BUILT UP AREA

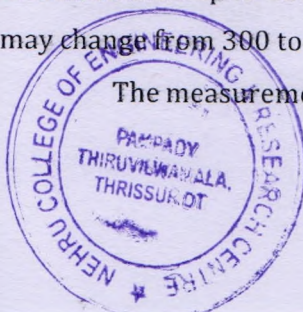
2. VENTILATION AND CARBON DIOXIDE LEVELS

Ventilation moves outdoor air into a building or a room, and distributes the air within the building or room. The general purpose of ventilation in buildings is to provide healthy air for breathing by both diluting the pollutants originating in the building and removing the pollutants from it. The nursing college is designed to provide maximum natural ventilation with abundant flow of light into class rooms. Due to this natural ventilation in lush green campus reducing the sick building syndrome and stress generated from the study by abundant supply of fresh air.

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.

Sl. No.	AREA	Measured CO2	Standard CO2 level (Range)	Remarks
1	Administration Block inside	600	300-500	Good
2	Kapila Block Class rooms	425	300-500	Good
3	Aryabhata Class room	600	300-500	Good
4	HOD room in Aryabhata	650	300-500	Good
5	Work shop in Varahamihira Block	340	300-500	Good
6	Brahmaguptha Block Auditorium	390	300-500	Good
7	Library in Brhmaguptha Block	350	300-500	Good
8	Hostel	390	300-500	Good
9	Canteen	550	300-500	Good
10	Mess hall in hostel	450	300-500	Good

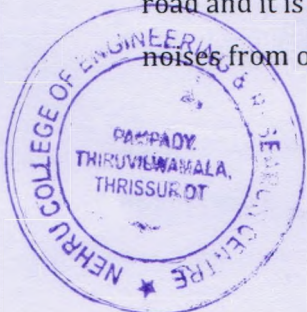
TABLE 3: CARBON DIOXIDE LEVELS

Acoustics in Buildings

Building acoustics is the science of controlling noise in buildings. This includes the minimisation of noise transmission from one space to another and the control of the characteristics of sound within spaces themselves. It is very hard for students to learn in noisy class rooms. Building Acoustics are an important consideration in the design, operation and construction of most building and it has significant impact on health, wellbeing, communication, productivity and learning capabilities. The building acoustics influenced by many factors such as geometry and volume of buildings, reflection and absorption of surface of materials used for buildings, air born noise etc. While designing class rooms the building should have low reverberation time and thus it will not produce echo or noise for sound. Indoor plants and open spaces inside the buildings increases the absorption of sound and it will not return as echo. The leaves of plants absorb the sound waves and kept the building as less noisy

Acoustics and indoor plants are playing vital role while designing buildings for office and educational institutions. In addition to aesthetics the indoor plants provide the calmness and stress-free atmosphere to the students. The comfort level is increased by proper ventilation, oxygen level, less noise and soothing atmosphere.

All the buildings including administration office, hostels and classrooms a, workshops are away from road and it is surrounded by lush green trees. The noise to the buildings by the transportation, other noises from other buildings are also heavily reduced and it is not affected to the inhabitants.





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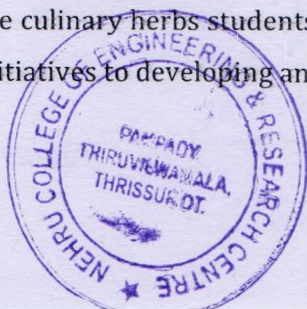
FIGURE 10: INDOOR GARDEN


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.

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.




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There is lot of trees in the NCERC having medicinal properties in the college which is protected by the college NSS club and the management. By preserving and nurturing the nature beauty of college, the management sends the message to society as its commitment to the environment. The students also get a practical experience in their academic life for the adaptation of green engineering in their future carrier life.

4. FOREST COVERAGE AROUND NCERC CAMPUS

NCERC is surrounded by lush green forest. The total area of 25 acres of land is covered with trees and it is well protected by management. 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 NCERC teaching sustainability and environment not in books but it is demonstrated in the campus. Due to green coverage the campus is cool and do not required fan for ventilation.

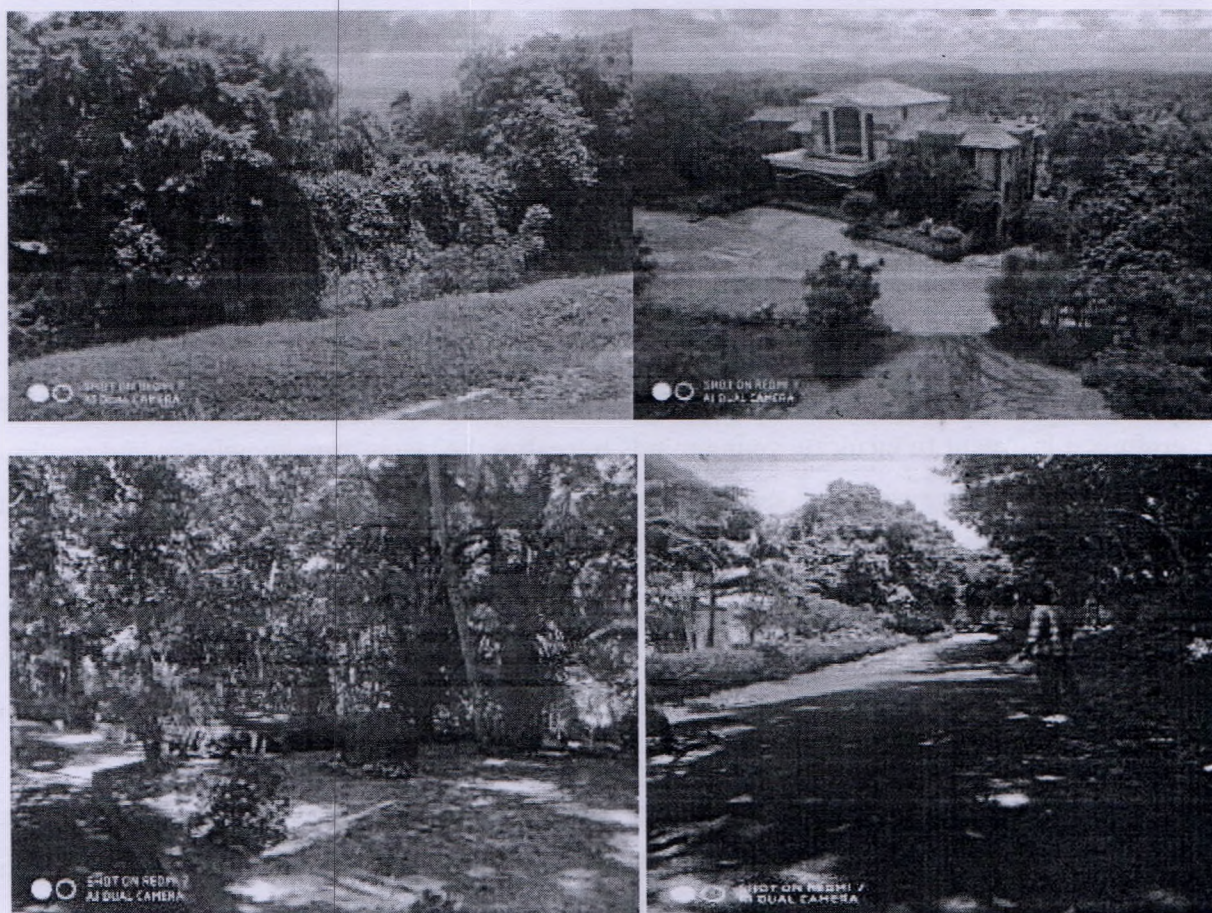


FIGURE 11: GREEN COVERAGE OF NCERC

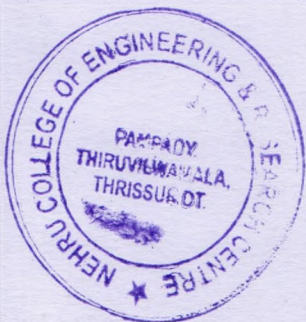


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Such a place can have following benefits to the ecosystem.

1. **Maintain the equilibrium of air and food:** Humans and animals need food and oxygen and excrete carbon dioxide and water. The plants, algae, etc, in the forest use carbon dioxide and water and release or produce oxygen and food.
2. **Filter and store water, and drastically reduce storm-water runoff:** Forests filter and regulate the flow of water. The litter over the forest floor acts as a sponge which filters, stores and gradually releases the water to natural channels and ground water.
3. **Conserve valuable topsoil and reduce soil erosion:** A forest is like a protective green cloth over Mother Earth's fragile body.
4. **Conserve biodiversity and balance ecology:** In a natural environment, the populations of species are balanced to an optimum minimum level
5. **Reduce pollution:** Plants can remove and/or Phyto remediate pollutants and contaminants from soil and water.
6. **Arrest or reverse global warming:** Global warming can cause extinction of species, tropical cyclones, extreme weather, tsunamis, abrupt climatic change, sea level rise, increased human stress resulting in violence, etc. These are just a few of its catastrophic effects. Plants can lock CO2 in their bodies to save our planet and the life on it.
7. **Acoustics of the college will gave comfort zone for academic purpose. :** Green coverage around the building reduces the sound by absorption by leaf's thus the echo and reverberation of sound will come down.



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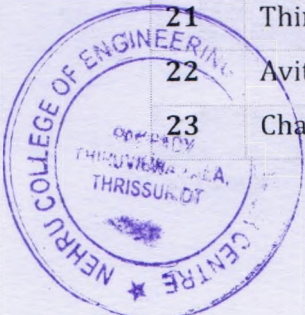


5. ZODIAC STAR FOREST (NAKSHTRA VANAM)

In Vedic astrology, the zodiac is divided into 27 *nakshatras* or stars. An individual is born under a particular star, known as his or her birth star. From ancient times, particular trees have been associated with birth stars. The concept of a Nakshatra Vanam involves the planting of these trees in a grove and nurturing them, to help develop a place of sanctity. Gardening can provide students with hands-on learning opportunities while increasing environmental awareness and vital experience in problem-solving.

NCERC developed a star garden on the way to ladies' hostel side. Most of the star related trees are in developing stage in the garden. The details are given below.

Sl No:	Star Name	Tree name	Botanical Name
1	Aswathy	Kanjiram	<i>Strychnos nux-vomica</i>
2	Bharani	Nelli	<i>Embllica officinalis</i>
3	Karthika	Aathi	<i>Ficus racemosa</i>
4	Rohini	Njaval	<i>Syzygium cumini</i>
5	Makayiram	Karngali	<i>Acacia catechu</i>
6	Thiruvathira	Karimaram	<i>Diospyros ebenum</i>
7	Punartham	Mula	<i>Bambusa bambos</i>
8	Pooyam	Arayal	<i>Ficus religiosa</i>
9	Ayilyam	Nangu	<i>Mesua ferrea</i>
10	Makam	Plassu	<i>Butea monosperma</i>
11	Uthram	Ithi	<i>Ficus tinctoria</i>
12	Atham	Ambazham	<i>Spondias pinnata</i>
13	Chithira	Koovalam	<i>Aegle marmelos</i>
14	Chothi	Nerr maruthu	<i>Terminalia arjuna</i>
15	Visakham	Vayam Kaitha	<i>Flacourtia jangomas</i>
16	Anizham	Elanji	<i>Mimusops elengi</i>
17	Triketta	Vetti	<i>Aporusa lindleyana</i>
18	Moolam	Vella Pine	<i>Vateria indica</i>
19	Pooradam	Vanchi	<i>Salix tetrasperma</i>
20	Uthradam	Plavu	<i>Artocarpus heterophyllus</i>
21	Thiruvonam	Erukku	<i>Calotropis gigantea</i>
22	Avittam	Vanni	<i>Prosopis juliflora</i>
23	Chathayam	Kadambu	<i>Anthocephalus cadamba</i>



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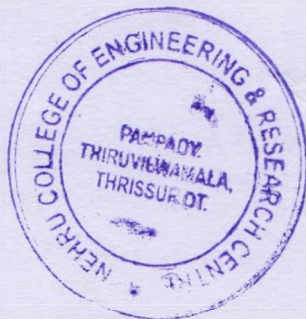
24	Pooruttathy	Mavu	Mangifera indica
25	Uthrattathy	Karimbana	Borassus flabellifer
26	Revathi	Elippa	Madhuca longifolia

TABLE 4: STAR GARDEN

Every students and staffs are having a birth star which is related to a tree, animal and bird in nature. 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 12: ZODIAC STAR GARDEN ON THE WAY TO HOSTEL



Handwritten signature in green ink

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6. OXYGEN PARK AND NATURE THEATRE

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. his park is anything but regular with its many sections for picnic lovers, 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.

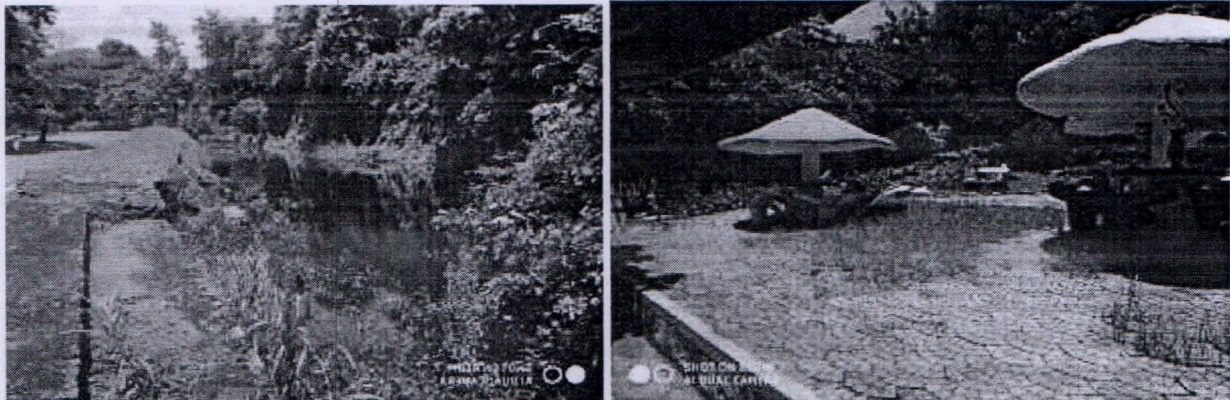


FIGURE 13: OXYGEN PARK AND PARLOUR

NATURE THEATRE (OPEN STAGE)

Open stage behind the Bhaskara building can accommodate more than 4000 persons. The stage is located in the center in down side in scenic view from all the sides. Nature playing a vital role in the is stage because it will create only sound not echo or noise during the show. Due to the leaves of the plants will absorb all the echo reverberated from the buildings.

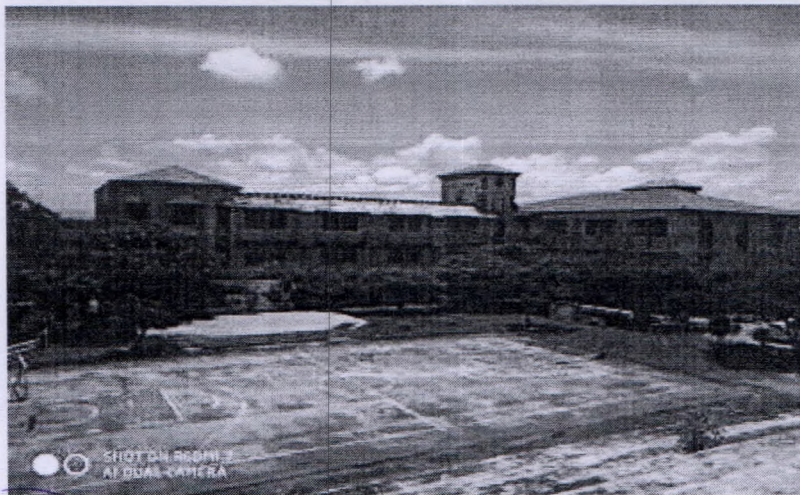


FIGURE 14: NATURE AUDITORIUM



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GREEN ZONE

This Relaxation Area is designed to help students improve their emotional, mental and physical health. Spending time in green spaces with friends has indeed great psychological and physical impacts on the psyche of the students. Simply taking a walk in a natural area has been shown to decrease negative thinking and the risk of depression.

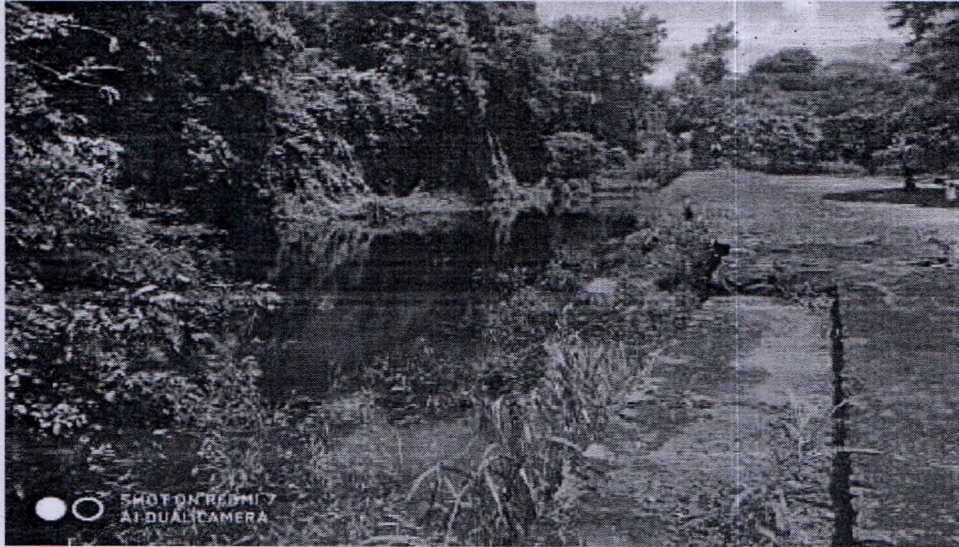
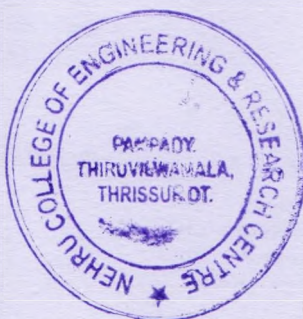


FIGURE 15: GREEN ZONE WITH WATER BODY

7. SUGGESTIONS

- ❖ Mark the trees around the campus, Display boards such as Oxygen park, Nature open stage herbal garden, vegetable garden, zodiac star garden etc has to provided.
- ❖ Documentation to be done as list of trees, carbon sequestration by measuring its diameter, height, botanical name, medicinal importance etc. This list has to be updated in every 6 months.
- ❖ Boundary to be made for zodiac star garden and marking to be done in the trees as its star, local name of tree, botanical name.



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WATER RESOURCES AND CONSERVATION

NCERC uses water mainly for latrines and drinking purpose in all buildings, cooking in hostels and main canteen and for gardening. There are mainly three sources of water supply to the college.

I. Borewells

The borewells in and around the campus counts to 03 nos, situates in the ladies hostel and compound area which supplies water to the overhead or underground tanks and redistributed to various buildings.

II. Quarry

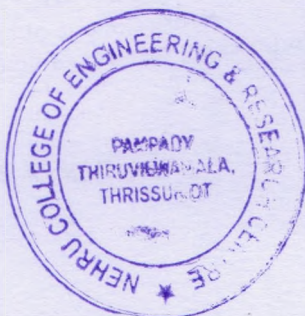
The water that stored in the three quarries in which two are using for latrines in various buildings and gardening the college campus.

III. Water authority/tanker

Water authority/tanker water are mainly used in the canteen and drinking purposes in all the buildings. The payment against the consumption is in per month basis and the average water consumption through this source is 9680KL per annum. The consumption details of water through tanker and Kerala water authority is given in the table below.

Months In 2019	Water supply by Tanker (No)	Water consumption per month (KL)	Water Authority (KL)
January	128	512	
February	262	1048	1155
March	307	1228	
April	314	1256	747
May	325	1300	
June	265	1060	886
July	228	912	
August	134	536	318
September	64	256	
October	126	504	344
November	89	356	
December	178	712	291
Total	2420	9680	3741

FIGURE 16: WATER SUPPLY FROM TANKER AND KWA



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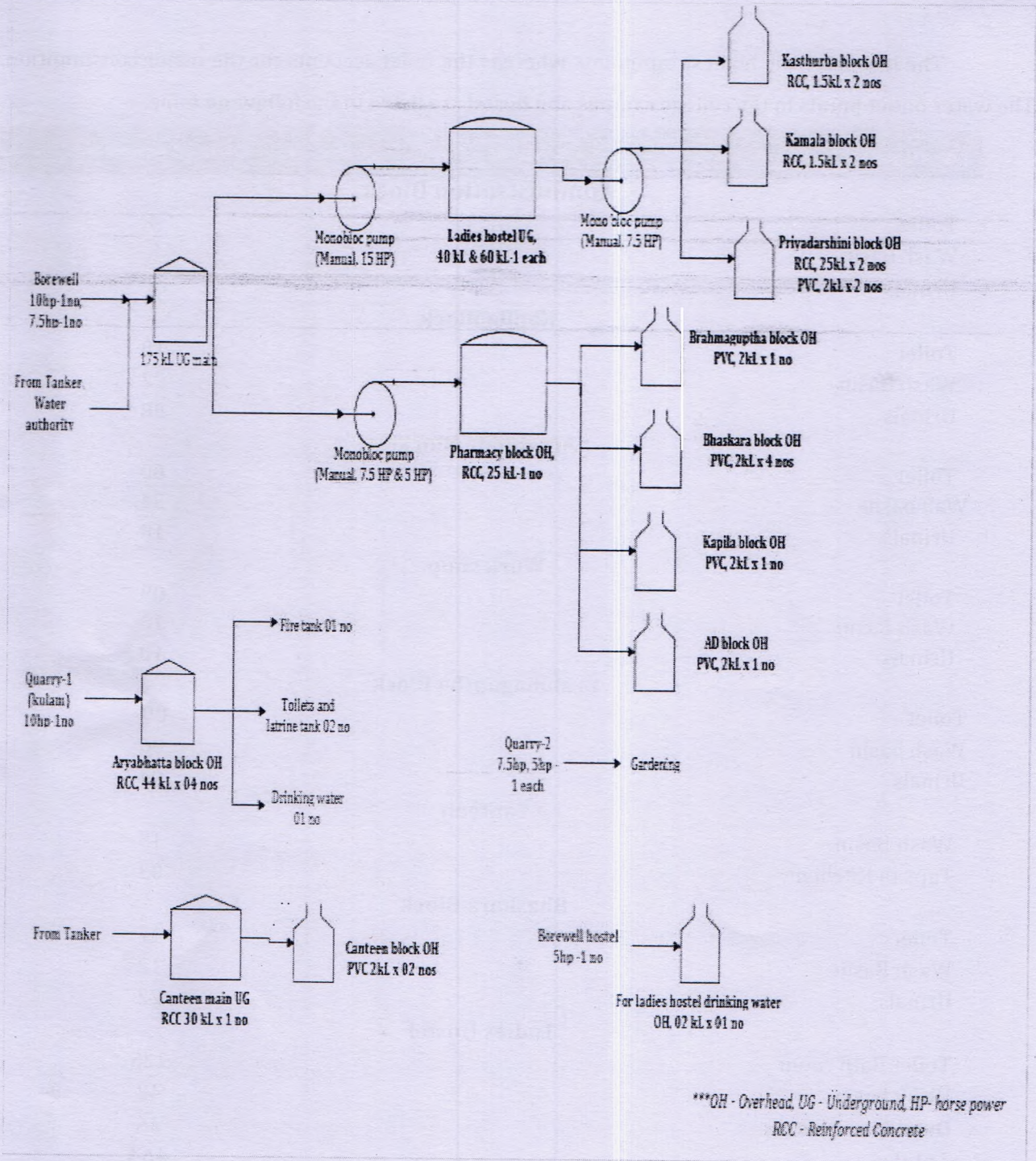


FIGURE 17: WATER DIAGRAM



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1. WATER CONSUMPTION

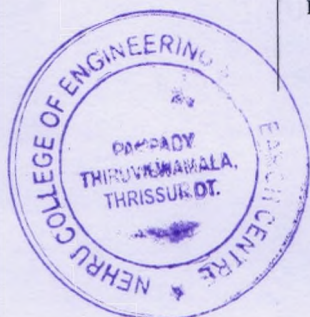
The labs have the highest tap points whereas the toilet accounts for the major consumption. The water outlet points in the college campus and hostel are listed in the following table.

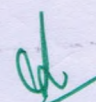
Location	Area	No: of taps
Administration Block		
Toilet		4
Wash basin		5
Urinals		2
Kapila Block		
Toilet		10
Wash Basin		22
Urinals		08
Aryabhata Block		
Toilet		60
Wah basin		34
Urinals		18
Work shop		
Toilet		09
Wash Basin		18
Urinals		10
Brahmaguptha Block		
Toilet		09
Wash basin		06
Urinals		04
Canteen		
Wash Basin		15
Taps in Kitchen		03
Bhaskara Block		
Toilet		17
Wash Basin		12
Urinals		22
Ladies Hostel		
Toilet Bath room		125
Wash basin		42
Outside garden pipes		46
Total		464

TABLE 5: WATER TAPS

Inference

- i. The average approximate water consumption in the NCERC is 1500 kilo litres/month.
- ii. The majority of the consumption is for lavatories and gardening purpose.
- iii. Actual consumption couldn't monitor due to the non-availability of water meters in the campus.




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Suggestion

- i. Install water meter separately at the pipelines that supplies water to each locations such as Brahmagupta, Kapila, Bhaskara and ladies hostels, admin building, library, canteen and gardening.
- ii. Record this measurement once in a week so that the college can understand the usage pattern vs the functioning of the building and can initiate the reduction in consumption, such as, automatic urinal flusher using sensors and automatic water taps using motion sensors in toilets of main buildings and other higher consumption areas.

2. GROUND WATER RECHARGING

Depletion of vegetation cover, pollution of water, from different sources, soil erosion and recession of water table are impacting nature and environment. The nature has been generous in bestowing this region in the form of rain fall but with the absence of scientific management it is becomes waste. But proper collection, routing recharging and recycling of this water will increase the vegetation and increase ground water table level.

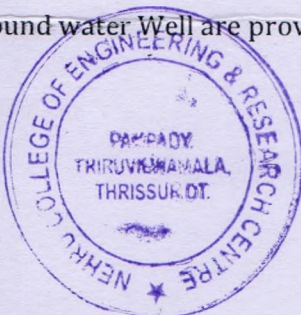
Rainwater harvesting (RWH) is a technique of collection and storage of rainwater into natural reservoirs or tanks, or the infiltration of surface water into subsurface aquifers (before it is lost as surface runoff). There are different methods for artificial rain water harvesting. Ground water recharging 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 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

NCERC done lot of initiatives for collecting rain water by routing it into old quarry ponds in 3 locations. All these water is percolating to the ground. Contours are developed in many areas to recharge the ground water Well are provided as 3 areas for collecting water which they are recycled back to use.



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Collection of water in natural pond

Infiltration ponds (also called infiltration basins or percolation ponds) are large open water ponds that are either excavated or in an area of land surrounded by a bank, and normally will not exceed 15,000 m³. They store rainwater but with the main aim of infiltrating the water to aquifers where it can be extracted using boreholes, hand-dug wells, or nearby springs. They are constructed in areas where the base of the pond is permeable and where the aquifer to be recharged is at or near the surface.

Facilitate recharge into surrounding ground which in turn improves soil moisture, improves agricultural productivity and mitigates against drought

- Can assist recharge of shallow wells, boreholes and springs
- Can reduce salinity in groundwater

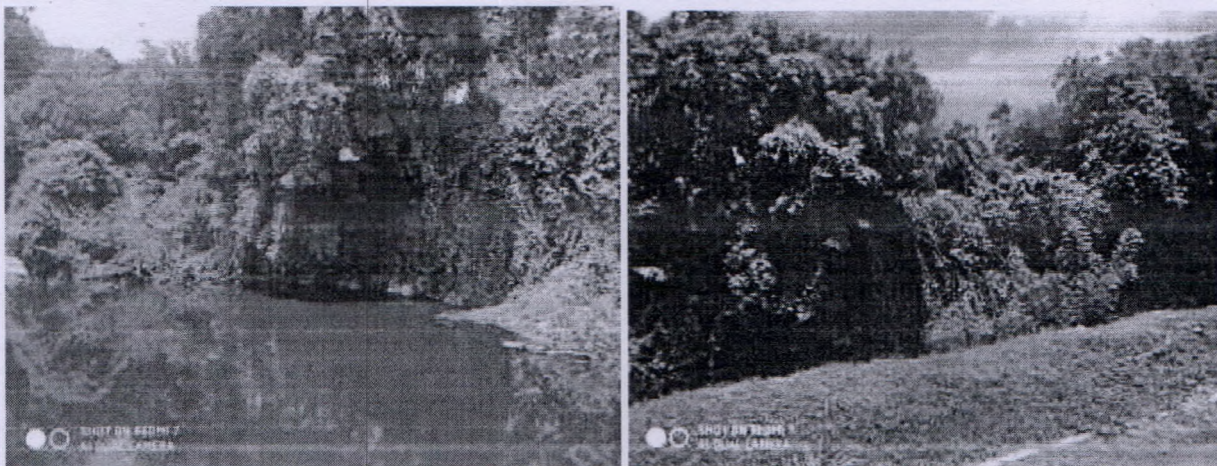


FIGURE 18: QUARRY POND

Contours

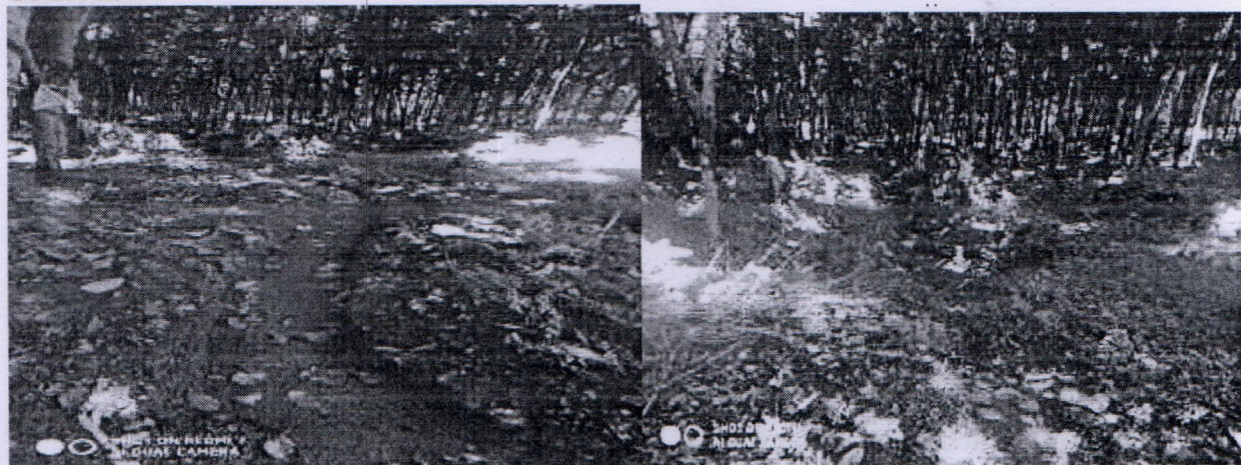
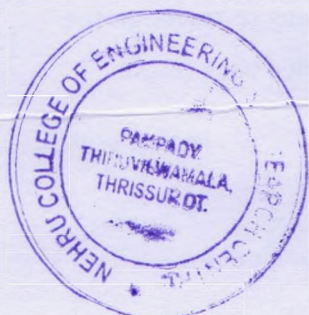
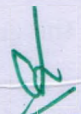


FIGURE 19: CONTOUR FOR ROUTING WATER




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SUGGESTIONS FOR WATER CONSERVATION AND GROUND WATER RECHARGING.

- The use of biomass in the form coconut shells can be used to cover the foot of the trees which can behave as recharging soak pits.
- Construction of percolation pits (Mazha kuzhi) around the campus area for collecting the rainwater flush through ground surface. This will reduce the velocity of flow of water, soil erosion, maintain the surface moisture level for longer time after rainy season etc which will help to maintain the green forest coverage for longer time and useful for ground water recharging.
- Suggested to conduct a detailed study on geological and hydrogeological mapping of the area to find out proper sizing of percolation pits, contour trenches, deep well recharging, collection of water passing through road, gutter etc



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STUDENT ACTIVITIES FOR NATURE

Trees are the major source of the oxygen we breath 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.

NSS take care about all the environmental activities of college and maintain the campus greenery successfully. It has the representation from students from each class, teachers and representatives from management. The major activities are as follows.

I. World Environment day celebrations “

The volunteers of the NSS units of NCERC enthusiastically celebrated the World Environment Day of this year by organizing several programmes. By planting saplings in and around the College. Dr. Ambika Devi Amma T, Principal of our College, inaugurated the program by planting a sapling of the neem tree.

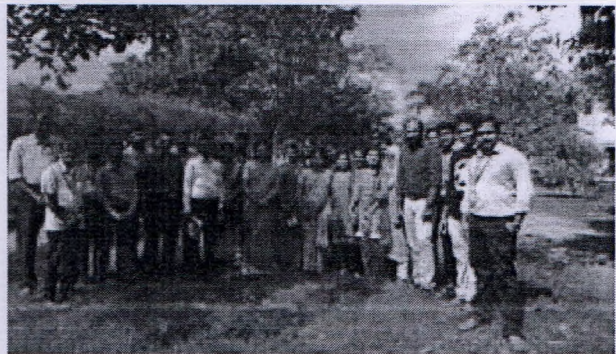


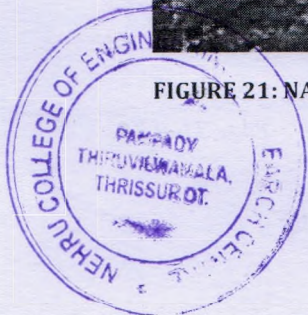
FIGURE 20: WORLD ENVIRONMENT DAY CELEBRATIONS

II. Nature Visit

The NSS volunteers of unit 209 &596 attended a nature camp on 16th March 2019 at Pudur near Palakkad. A farmer named N V JOHN has turned his property to a small forest with hundreds of fruit bearing trees grow thick rubbing shoulder to shoulder. A 10 acre campus of Athira Villa in Pudur near Palakkad.



FIGURE 21: NATURE VISIT




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III. ORIENTATION ABOUT AGRICULTURE

The NSS volunteers of unit 209 & 596 attended a nature camp on 16th March 2019 at Pudur near Palakkad. There we got a class about organic farming and natural source of organic products by N V JOHN



FIGURE 22: ORIENTATION ABOUT AGRICULTURE

IV. WORLD WATER DAY

The NSS volunteers of unit 209,596 of NCERC as a part of water day celebration ,oath taking and thereafter procession was held from Bhaskara block on 22nd March 2019.The volunteers carried pluck cards to make the people aware of the importance of water in life as scarcity is in its peak stage. Our programme officer Mr Rakesh, Mr Gopinath also accompanied the volunteers for the programme.

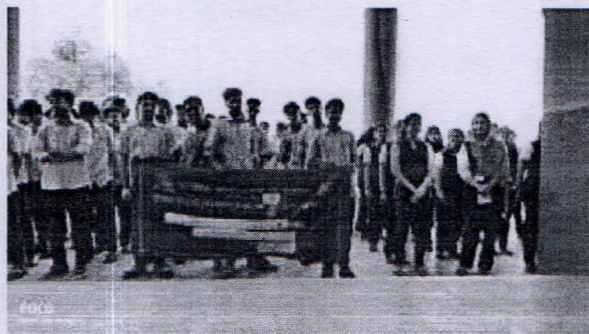
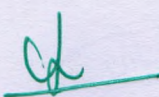


FIGURE 23: WORLD WATER DAY




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VISHARAHITHA VISHU

NSS Volunteers created a vegetable garden and nurtured organic vegetables in the campus as Visharahitha Vishu. This programme will be a grand success due to the co-operation of students, teachers and management.



FIGURE 24: VISHARAHITHA VISHU PROGRAMME


NCC DAY celebrations

NCC of the college celebrated their day with planting tree samples the campus. They initiated to protect the mother nature in the campus programme.



FIGURE 25: NCC DAY CELEBRATIONS




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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 everyone 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 NCERC 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. There is still opportunity to attain the perfection some of the identified suggestions are listed in the executive summary.




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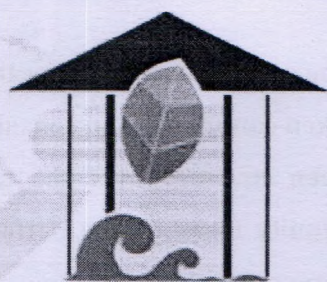
ANNEXURE-1

GRIHA CP CERTIFICATE


CERTIFICATE



Ministry of New and Renewable Energy
Government of India



GRIHA Council



The Energy and Resources Institute

This is to certify that

Ashok K M P

of

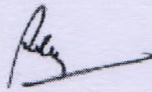
Athul Energy Consultants Pvt Ltd, Thrissur

has qualified as

GRIHA Certified Professional


on

01st August 2018



Sanjay Seth
Chief Executive Officer
GRIHA Council

Note: This certification is valid for a period of 2 years from the date of qualification (exam)




GRIHA

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ENERGY AUDIT - 2020



NEHRU COLLEGE OF ENGINEERING & RESEARCH CENTRE (NCERC)

Pampadi, Thrissur

Kerala

EXECUTED BY



ATHUL ENERGY CONSULTANTS PVT LTD

4th FLOOR, CAPITAL LEGEND BUILDING,

KORAPPATH LANE, ROUND NORTH, THRISSUR-680020

Ph: +91 7356111990-6 Web: www.athulenergy.com E-Mail: info@athulenergy.com



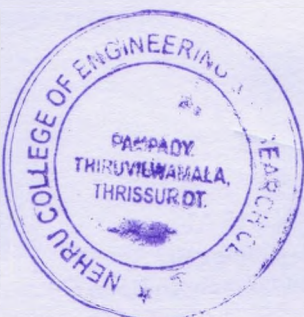
February 2020

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BRIEF CONTENTS

PREFACE	6
ACKNOWLEDGEMENTS	7
EXECUTIVE SUMMARY	8
ENERGY AUDIT	12
ABOUT NCERC	13
SINGLE LINE DIAGRAM	15
PHOTOS OF ELECTRICAL SYSTEM	16
BASIC DETAILS	17
ENERGY ANALYSIS	18
ENERGY CONSUMPTION ANALYSIS	18
ELECTRICITY CONSUMPTION ANALYSIS	27
MAJOR ELECTRICAL LOADS	35
ANNEXURE 1	37
ANNEXURE-2	43



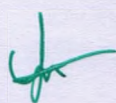
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TABLE OF CONTENTS

PREFACE	6
ACKNOWLEDGEMENTS	7
EXECUTIVE SUMMARY	8
I. LOAD SUMMARY	8
II. SUMMARY OF THE REPORT	9
III. ENERGY SUMMARY:	10
IV. ENERGY PERFORMANCE INDEX (EPI)	11
ENERGY AUDIT	12
ABOUT NCERC	13
SINGLE LINE DIAGRAM	15
PHOTOS OF ELECTRICAL SYSTEM	16
BASIC DETAILS	17
ENERGY ANALYSIS	18
ENERGY CONSUMPTION ANALYSIS	18
I. DESCRIPTION OF ELECTRICITY BILL	18
II. DEMAND ANALYSIS	19
III. ELECTRICITY DEMAND IN VARIOUS TIME ZONES	20
IV. POWER FACTOR ANALYSIS IN KSEB BILL	21
V. TARIFF RATES ANALYSIS	22
VI. SPECIFIC ELECTRICITY CONSUMPTION (KWH/M2)	23
VII. DIESEL CONSUMPTION ANALYSIS	24
VIII. WATER CONSUMPTION ANALYSIS	25
ELECTRICITY CONSUMPTION ANALYSIS	27
I. TRANSFORMER SECONDARY LOGGING	27
II. ANALYSIS: VOLTAGE VARIATION	28
III. ANALYSIS: CURRENT VARIATIONS	29
IV. LOAD FACTOR	30
V. ANALYSIS: POWER FACTOR	31
VI. HARMONIC STUDY	32
MAJOR ELECTRICAL LOADS	35
I. LIGHT & FAN LOADS	35
II. AIR CONDITIONER LOADS	36
ANNEXURE 1	37
ENERGY CONSERVATION MEASURES	37



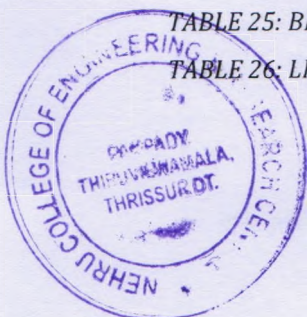

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Pin - 680 597 Kerala



ANNEXURE-2	43
I. LED SPECIFICATION	43
II. BLDC SPECIFICATION	44
III. LIST OF INSTRUMENTS USED	44
IV. ABBREVIATIONS	45
V. REFERENCES:	45
VI. CERTIFICATES	46

LIST OF TABLES

TABLE 1: LOAD SUMMARY.....	8
TABLE 2: EXECUTIVE SUMMARY - ENERGY.....	10
TABLE 3: ENERGY PERFORMANCE INDEX.....	11
TABLE 4: BASIC DETAILS.....	17
TABLE 5: KSEB BILL ANALYSIS.....	18
TABLE 6: SPECIFIC ELECTRICITY CONSUMPTION (SEC).....	23
TABLE 7: DIESEL CONSUMPTION.....	24
TABLE 8: TRANSFORMER LOGGING.....	27
TABLE 9: LOAD FACTOR - TRANSFORMER.....	30
TABLE 10: LOAD FACTOR IN LAST 12 MONTHS.....	30
TABLE 11: HARMONICS CLASSIFICATION.....	32
TABLE 12: EFFECTS OF HARMONICS (IEEE 519).....	32
TABLE 13: CURRENT HARMONICS LIMIT (IEEE 519-2014).....	33
TABLE 14: VOLTAGE HARMONICS LIMIT (IEEE 519-2014).....	33
TABLE 15: HARMONICS ANALYSIS.....	33
TABLE 16: LIGHT AND FAN LOADS.....	35
TABLE 17: AIR CONDITIONER DETAILS.....	36
TABLE 18: ENERGY CONSERVATION MEASURE-1.....	37
TABLE 19: ENERGY CONSERVATION MEASURE - 2.....	38
TABLE 20: ENERGY CONSERVATION MEASURE-3.....	39
TABLE 21: LIFECYCLE DATA OF LIGHT TYPES.....	40
TABLE 22: ENERGY CONSERVATION MEASURES-3.....	41
TABLE 23: FAN POWER VARIATIONS AS PER SPEED.....	42
TABLE 24: LED SPECIFICATION.....	43
TABLE 25: BLDC SPECIFICATION.....	44
TABLE 26: LIST OF INSTRUMENTS.....	44



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LIST OF FIGURES

FIGURE 1: LOAD SUMMARY 8

FIGURE 2: COLLEGE CAMPUS..... 14

FIGURE 3: SINGLE LINE DIAGRAM 15

FIGURE 4: DIESEL GENERATOR..... 16

FIGURE 5: MSB..... 16

FIGURE 6: TRANSFORMER YARD 16

FIGURE 7: DEMAND ANALYSIS..... 19

FIGURE 8: DEMAND IN VARIOUS TIME ZONE 20

FIGURE 9: POWER FACTOR ANALYSIS..... 21

FIGURE 10: TARIFF RATE ANALYSIS 22

FIGURE 11: SEC..... 23

FIGURE 12: WATER DISTRIBUTION DIAGRAM 26

FIGURE 13: VOLTAGE PROFILE..... 28

FIGURE 14: CURRENT VARIATIONS..... 29

FIGURE 15: KW, & PF VARIATIONS 31

FIGURE 16: HARMONICS ANALYSIS 34



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PREFACE

Every institution should be imparting knowledge about the campus environment and its surroundings through activities that follows the principles of sustainability. An energy audit is essential first step to reduce energy cost and greenhouse emissions. Audit is defined as a systematic and implement examination of data statements, records, operations and performance of an enterprise for a purpose. Energy audits is a systematic study or survey to identify how energy being used in its own facility. And identifying the energy savings opportunities in the building Behavioural Change through the student education can provide greatest benefit at least cost. Even small savings in each house holds make dramatic change in the society and for nation. The idea of energy conservation and sustainability will be percolated to society through students will have long standing effect and successful too

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 preparing an initial skeleton for the report.



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ACKNOWLEDGEMENTS

We express our sincere gratitude to the **Nehru College of Engineering & Research Centre (NCERC)**, Pampadi, Thrissur district, for giving us an opportunity to carry out the project of Energy 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 Energy audit. The energy audit conducted in the period of 05th & 06th February 2020.

- | | |
|------------------------|-------------------------------|
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| 2. Dr.P. Krishnakumar | CEO and Secretary |
| 3. Dr. Radhakrishnan | Advisor |
| 4. Dr. Ambikadevi Amma | Principal |
| 5. Ms. Bindu | Campus Manager |
| 6. Adv. Suchithra Lal | Legal Advisor |
| 7. Dr. Sudheer Marar | HOD MCA |
| 8. Sri. Ambikadas | Academic Superintendent |

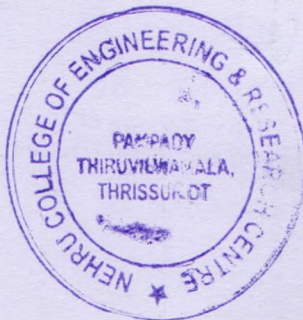
Also congratulating our Energy audit team members for successfully completing the assignment in time and making their best efforts to add value.

ENERGY 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 K M P**
Registered Energy Manager of Bureau of Energy Efficiency (BEE – Govt. of India)
Accredited Energy Manager No – EA 25612
3. **Mr. Harikrishnan K**, Project Engineer.
4. **Ms. Jijiraj K R**, Project Engineer



Yours faithfully



Managing Director
Athul Energy Consultants Pvt Ltd

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EXECUTIVE SUMMARY

I. LOAD SUMMARY

The net connected load summary is given in the pie chart which clearly shows that the light and fan loads are the major contributor to the electricity consumption in the college.

Particulars	Units	Values
Light loads	kW	11.842
Fan loads	kW	17.55
Computer and accessories	kW	7.65
Other loads	kW	5
Total	kW	42.05

Table 1: Load summary

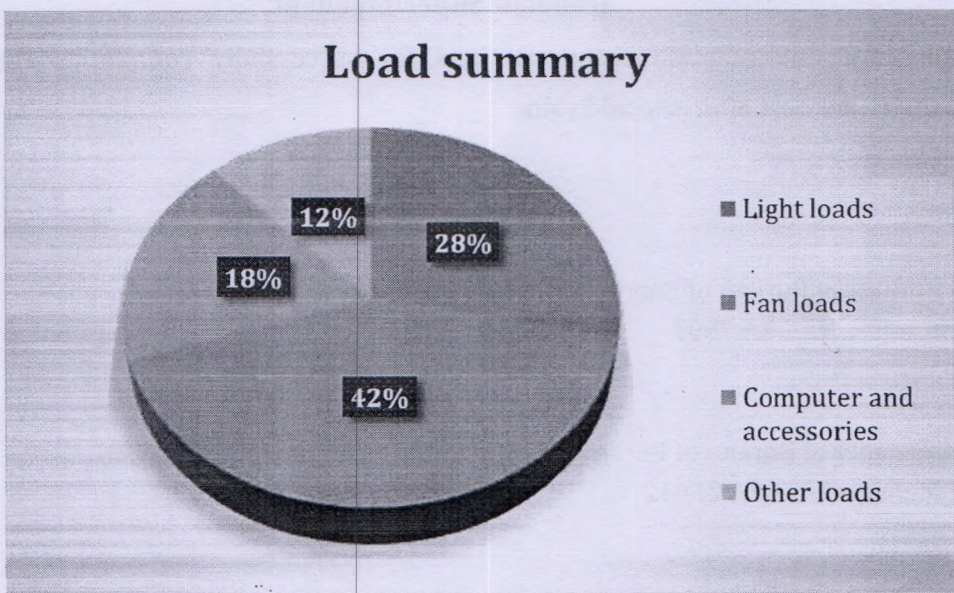
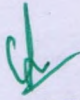


Figure 1: Load summary




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II. SUMMARY OF THE REPORT

I. Energy consumption analysis

- **Demand analysis:** The demand analysis gives an output that recorded maximum demand in the last 12 months was below the minimum value which is 75% in 9 months. The recorded maximum demand was 206 kVA which is 88% of the contract value of 235 kVA. Thus the unwanted charges paid through the non-used demand is Rs 1.05 lakhs in last 12 months (Feb 2019 to Jan 2020) which is 2.78% of the total electricity charges. By reducing the contract demand to near 200 kVA will reduce this charge which needs to be done after the optimization of the PF.
- **Power factor analysis:** The average power factor registered in last 12 months was 0.98 leading. For last few months, the college was not receiving PF incentive due to this leading effect. By optimising the PF to near unity, the college will have annual financial savings of Rs 1.70 lakhs. The following suggestions needs to be implemented for the PF incentives.
 - I. Rectify the APFC control panel and the capacitor panel should run in the auto mode.
 - II. Install a 3 kVAr capacitor in line with the transformer for reactive power compensation.

II. Water consumption analysis

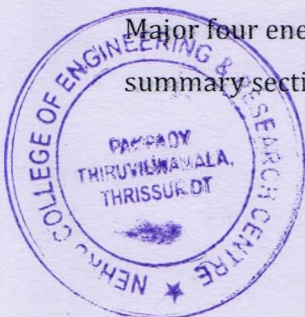
The present water consumption couldn't analyse due to the non-availability of water meter in the college. Install water meter separately at the pipelines that supplies water to each location such as hostels, admin building, library and canteen. Record this measurement once in a week so that the college can understand the usage pattern and can initiate the reduction in consumption, such as, automatic urinal flusher using sensors and automatic water taps using motion sensors in toilets of main buildings and other higher consumption areas.

III. Diesel consumption analysis

The present annual diesel consumption in the NCERC is 19370 litres by the Diesel generators and bus combined. The power failure is more often in the location due to the forest or tree touching to the 11 kV incoming supply from the KSEBL substation. The net annual cost for diesel was Rs 14.5 lakhs in combined bus and generator, in which 84% consumption by bus.

IV. Energy saving proposals

Major four energy saving proposals are suggested in this report. They are listed in the energy summary section follows below and detailed analysis given in the Annexure-1.



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Page 9 of 47

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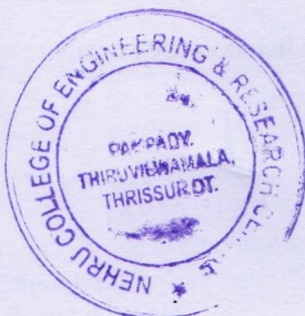


III. ENERGY SUMMARY:

Sl no	Particulars	Annual Energy Savings	Annual cost Savings	Investment cost	Payback period	Carbon dioxide emission - Reduced
		kWh	Rs	Rs	Months or (Years)	Tons/ year
1	Power factor optimization		1,70,805.96	50,000.00	08	
2	Optimization of the contract demand to 200 kVA		1,05,600.00	1,20,000.00	14	
3	Replacement of existing fluorescent lights with LED lights	2520	16,909.00	25,000.00	18	1.31
4	Replacement ceiling fans with BLDC/star rated fans	10,700	71,797.00	4,50,000	75	5.56
	Total	13,220.00	3,65,111.96	6,45,000.00	24	6.87

Table 2: EXECUTIVE SUMMARY -ENERGY

- ❖ NCERC initiated to install the LED s their energy conservation measures. .



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IV. ENERGY PERFORMANCE INDEX (EPI)

EPI was based on the energy consumption in Feb 2019 to Jan 2020.

Parameters	Values
Present Annual electricity consumption(kWh/year)	3,79,560
Present annual electricity cost (Rs)	37,67,220
Present annual specific electricity consumption (kWh/m ²)	14.47
After energy saving implementation	
Expecting annual electricity consumption (kWh/year)	3,66,340
Expecting annual specific electricity consumption (kWh/m ²)	13.62
Electricity savings %	3.48
Cost savings %	9.69

Table 3: Energy Performance Index



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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 NCERC as per the request from the institution, we have assessed the energy consumption and saving opportunities at present scenario.

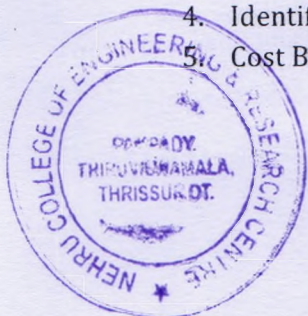
Methodology for the study


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. Electrical, Mechanical and Thermal energy analysis.
3. Power Quality Analysis.
4. Identification of Energy saving opportunities.
5. Cost Benefit Analysis.




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ABOUT NCERC

Nehru College of Engineering and Research Centre (NCERC), situated on the Bank of the river Bharathapuzha, is one of the premier Engineering college in education, research and training in the private sector. Established in 2002 by the founder chairman Shri P.K. Das, NCERC had impart world class quality education in engineering and research. Dedicated to the service in the realm of technical education in Kerala, it is an ISO 9001:2015 certified institution, approved by All India Council for Technical Education (AICTE), affiliated to A P J Abdul Kalam Technological University (KTU) and is accredited by National Assessment and Accreditation Council (NAAC). The college contains 8 departments with almost 1500 students and more than 100 teaching staffs.

VISION OF NCERC

To mould true citizens who are millennium leaders and catalysts of change through excellence in education.

MISSION OF NCERC

NCERC is committed to transform itself into a center of excellence in Learning and Research in Engineering and Frontier Technology and to impart quality education to mould technically competent citizens with moral integrity, social commitment and ethical values. We intend to facilitate our students to assimilate the latest technological know-how and to imbibe discipline, culture and spiritually, and to mould them in to technological giants, dedicated research scientists and intellectual leaders of the country who can spread the beams of light and happiness among the poor and the underprivileged.

GOALS OF NCERC

- To mould technically competent engineering professionals who can pioneer a social transformation for a brighter world.
- To facilitate research and learning by maintaining an ambience conducive to academic pursuits.
- To develop Industry - Institute Interaction to expose the students to the challenges of the industrial world and equip them with practical knowledge besides classroom and laboratory learning



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FIGURE 2: COLLEGE CAMPUS



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SINGLE LINE DIAGRAM

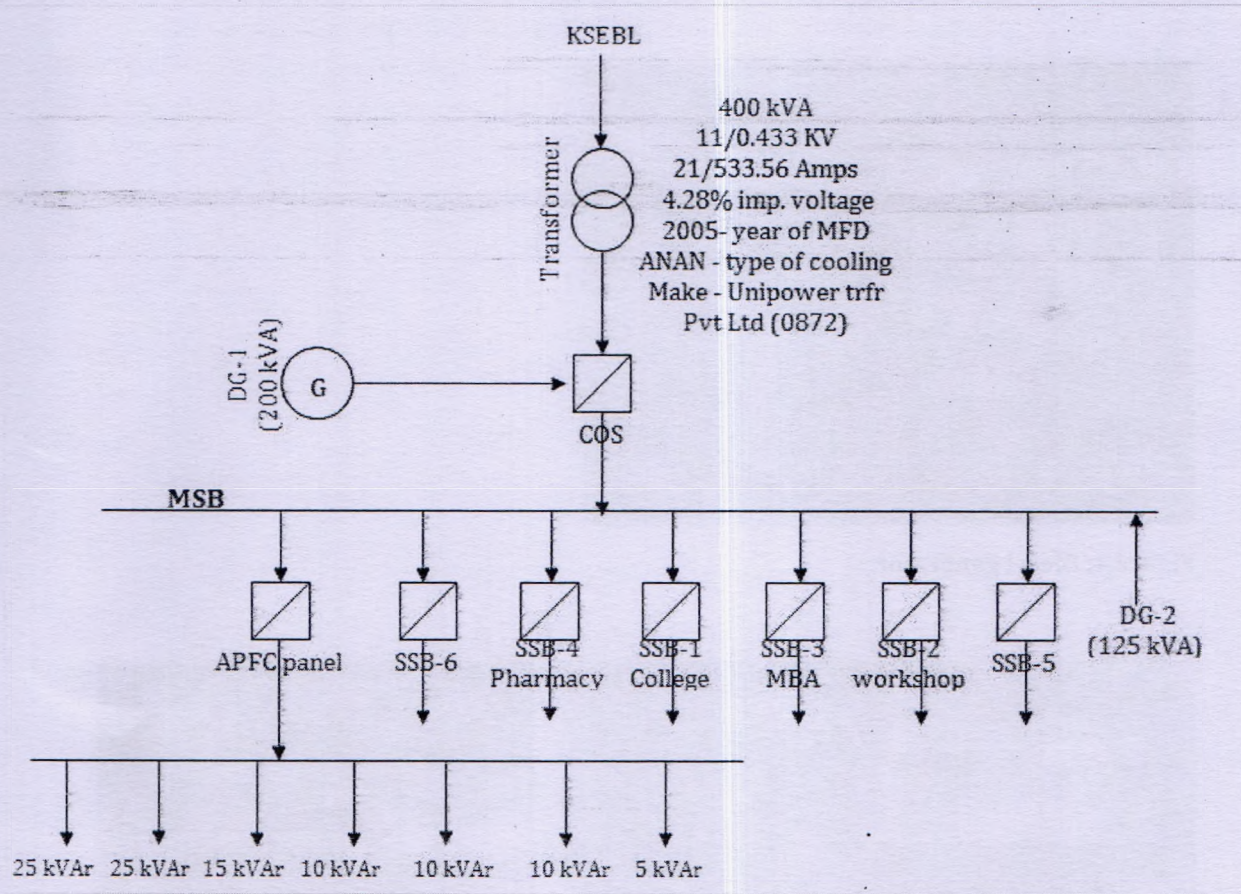
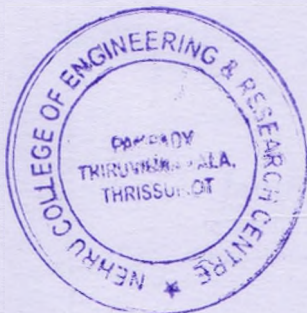


Figure 3: Single line diagram



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PHOTOS OF ELECTRICAL SYSTEM

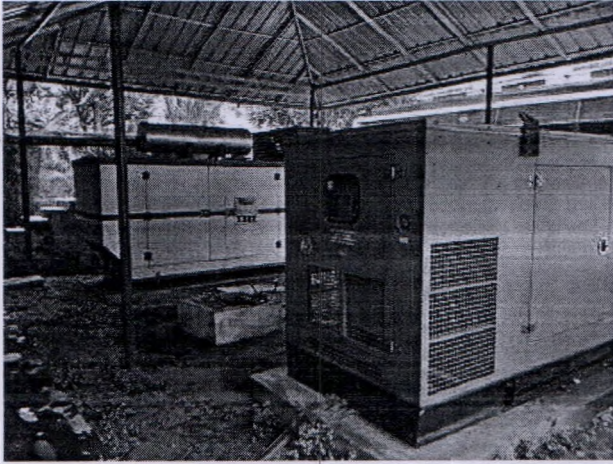


Figure 4: Diesel generator



Figure 5: MSB

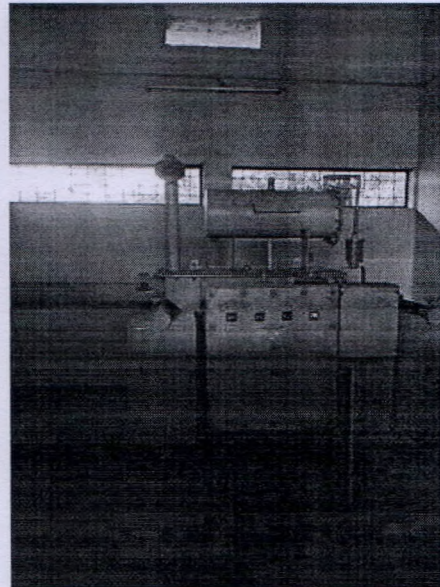


Figure 6: Transformer yard



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
BASIC DETAILS

The general details of the NCERC college is given below in table based on the data availed from the college.

SL. NO	PARTICULARS	DETAILS
1	Name & Address of college	Nehru College of Engineering & Research Centre (NCERC) Nila Gardens, Pampadi Thiruvilwamala, Thrissur-680588
2	Contact person	Dr. Sudheer Marar Ph: 9656335444
3	Location: Latitude & Longitude	10.74356N, 76.43385E
4	No. of Teaching staff	149
5	No of technical staff	35
6	No. of Non-Teaching staff	54
7	No of students	993
8	Building area	26228 m ²
9	Land area	25 acres
10	Number of UG programs	06 nos
11	Number of PG programs	02 nos
12	Number of departments	08 nos
13	Hostel numbers	03 nos
14	Average annual working days	200 days
15	DG Set	125 & 200 kVA (1 each)
16	Transformer	400 kVA (1 No)
17	Audit dates	05 th & 6 th February 2020

Table 4: Basic details




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ENERGY ANALYSIS

The different type's energy usage is given in this section. The major source of energy to the college is electricity. Other energy come in the form of water, LPG, petrol and diesel.

ENERGY CONSUMPTION ANALYSIS

The major source of electricity to the college and hostel is the electrical connection from the KSEBL. All the buildings and hostels are came under the single HT consumer. Two diesel generators are provided in the college which are manually operated, mainly used during the power failures in critical days like examinations or college events.

I. DESCRIPTION OF ELECTRICITY BILL

Base line data given below is based on the Electricity bill provided by the supplier of electricity to the College. Details obtained from the KSEB bill for the month of Feb 2019 to Jan 2020 is as follows in the Table.

Particulars	Details
Consumer No	LCN:24/4312
Contract Demand	235 kVA
Connected Load	437.4 kW
Tariff	HT-2(B) General
Recorded maximum demand (kVA)	206 kVA
Average monthly consumption (kWh)	31,630 kWh
Average Demand charges (Rs)	Rs 75,640.00
Average Energy charge (Rs)	Rs 2,18,982.00
Average PF	0.98
Average net charge (Rs)	Rs 3,13,934.00
Average cost per kWh (Rs/kWh)	Rs 6.71
Average cost per demand (Rs/kVA)	Rs 440

TABLE 5: KSEB BILL ANALYSIS



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II. DEMAND ANALYSIS

This section analyses the trend for the maximum demand versus the Contract Demand (CD) over a 12-month period (Feb 2019 to Jan 2020).

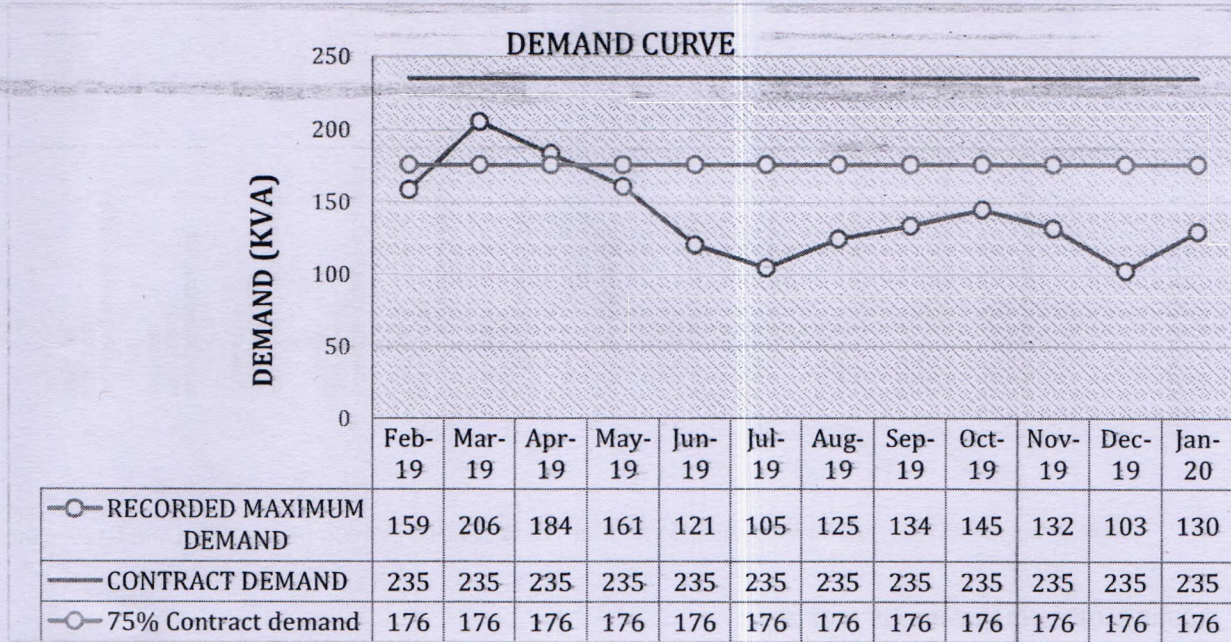


FIGURE 7: DEMAND ANALYSIS


Inference

- Average annual demand charges came as **Rs. 69,834** and which is 24% of the total electricity charge.
- The recorded maximum demand came in the range of 43.82% to 87.6 % of the contract demand with an average of 60.4%.

Suggestion

- The present contract demand is excess that makes the college pay unwanted amount of minimum 6% to 31% in varying months.
- After optimising the Power factor to near unity, monitor whether the present demand is required or not and can take further action based on that such as to reduce the CD.
- The college can reduce the contract demand to 200 kVA which will reduce the demand charges to around Rs 14,000 per month.




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III. ELECTRICITY DEMAND IN VARIOUS TIME ZONES

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

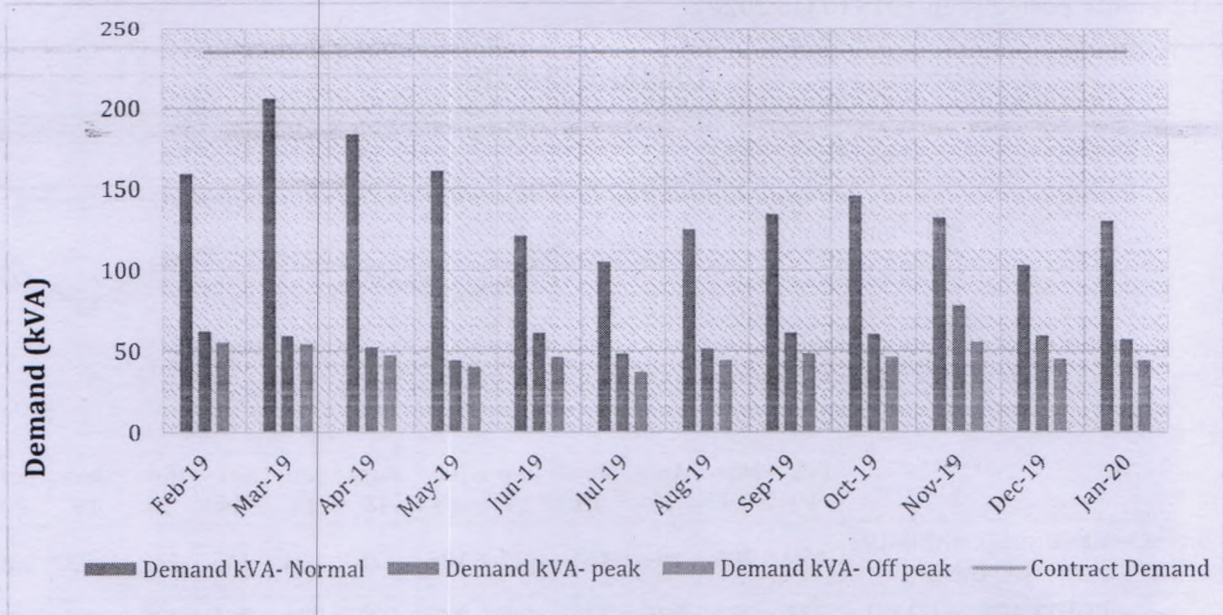
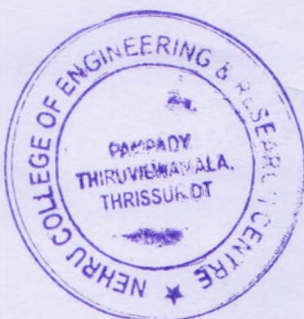
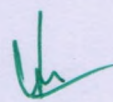


FIGURE 8: DEMAND IN VARIOUS TIME ZONE

Inference

- i. The average maximum demand in the normal, Peak and off-peak period registered at NCERC with respect to the contract demand is 88, 24, and 19% respectively.




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IV. POWER FACTOR ANALYSIS IN KSEB BILL

The Power factor is the ratio of Active power (kW) and apparent power (kVA).

$$PF = \frac{\text{Active energy kWh}}{\text{Apparent energy (kVAh)}}$$

The power factor variations in past one year is given below in figure.

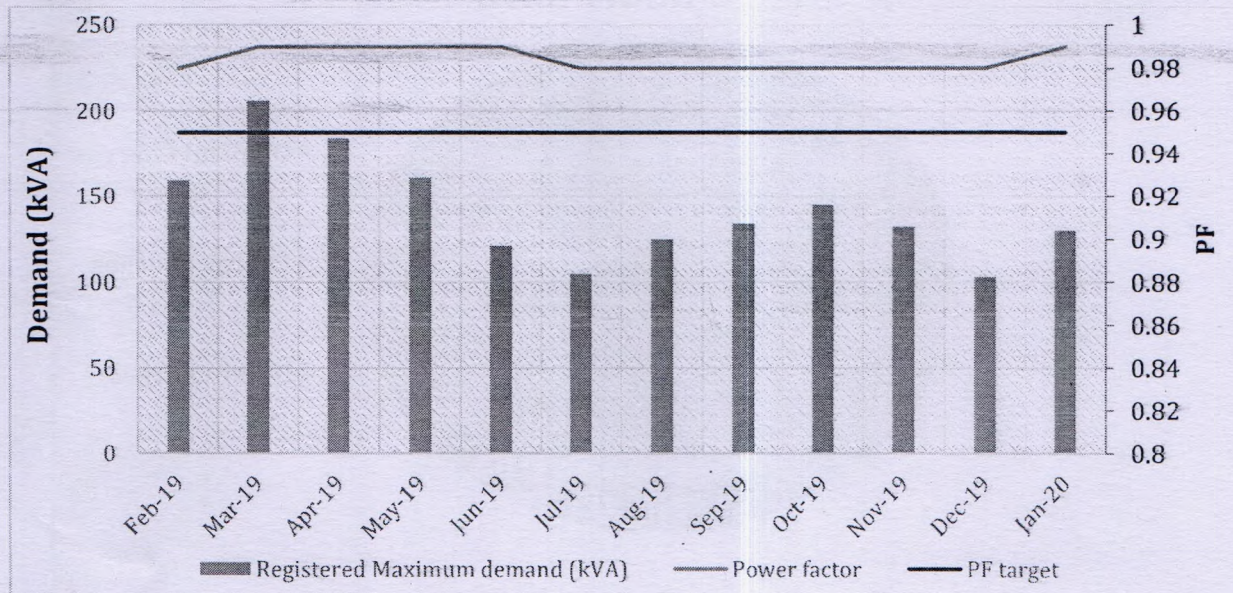


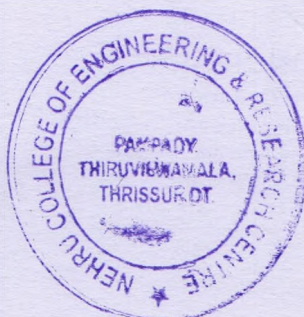
FIGURE 9: POWER FACTOR ANALYSIS

Inference

- i. Average power factor during the past one year is found to be 0.98.
- ii. The PF was leading in all those time periods.
- iii. For last few months, the college was not receiving PF incentive due to the leading effect at the secondary of the transformer.
- iv. The net incentive amount received in last 12 months was Rs 53,668.

Inference

- i. By optimising the PF to near unity the college will have annual financial savings of Rs 1.70 lakhs.
- ii. The calculations regarding the power factor optimisation is given in the Annexure-1.



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V. TARIFF RATES ANALYSIS

The average monthly energy and demand charges for the period Feb 2019 to Jan 2020 is represented in Fig.

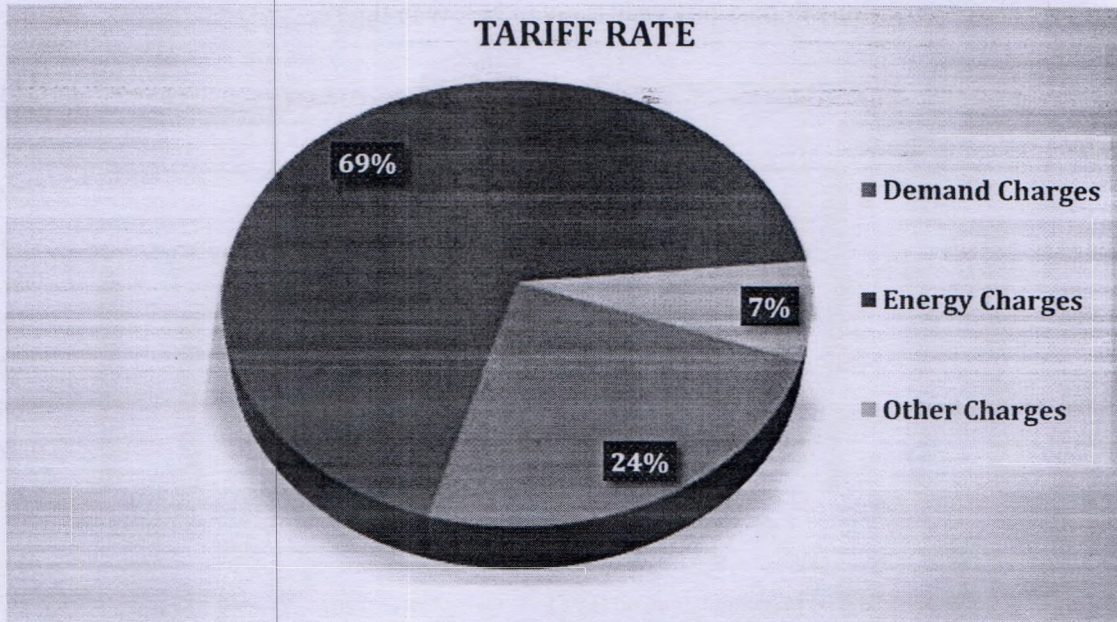
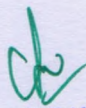


FIGURE 10: TARIFF RATE ANALYSIS

Inference

- i. Average demand charges for the past one year was **Rs 75,640/ per month** and energy charges was **Rs 2.18 lakhs/ per month**.
- ii. The energy charges come about **69%** of the total bill.
- iii. The demand charges normally ranges in between 10 to 20% of the total electricity amount for the colleges and universities whereas in NCERC, it was excess and reached at 24%.
- iv. This is mainly due to the big difference in contract demand and actual maximum demand in last 12 months which mentioned in the demand analysis.




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VI. SPECIFIC ELECTRICITY CONSUMPTION (KWH/M2)

The electricity consumption from the Feb 2019 to Jan 2020 has been taken for the benchmarking. Here the comparison is done with electricity consumption and the Building area which is the average of each month. The below table shows the specific electricity consumption of NCERC.

Month	Electricity Consumption kWh	Building Area SQ. metre	SEC kWh/SQ. metre
Feb-19	33612	26228	1.28
Mar-19	39588	26228	1.51
Apr-19	34161	26228	1.30
May-19	32571	26228	1.24
Jun-19	29289	26228	1.12
Jul-19	26790	26228	1.02
Aug-19	26967	26228	1.03
Sep-19	26874	26228	1.02
Oct-19	36351	26228	1.39
Nov-19	34323	26228	1.31
Dec-19	25179	26228	0.96
Jan-20	33855	26228	1.29
Average	31630	26228	1.21
Annual SEC	379560	26228	14.47

TABLE 6: SPECIFIC ELECTRICITY CONSUMPTION (SEC)

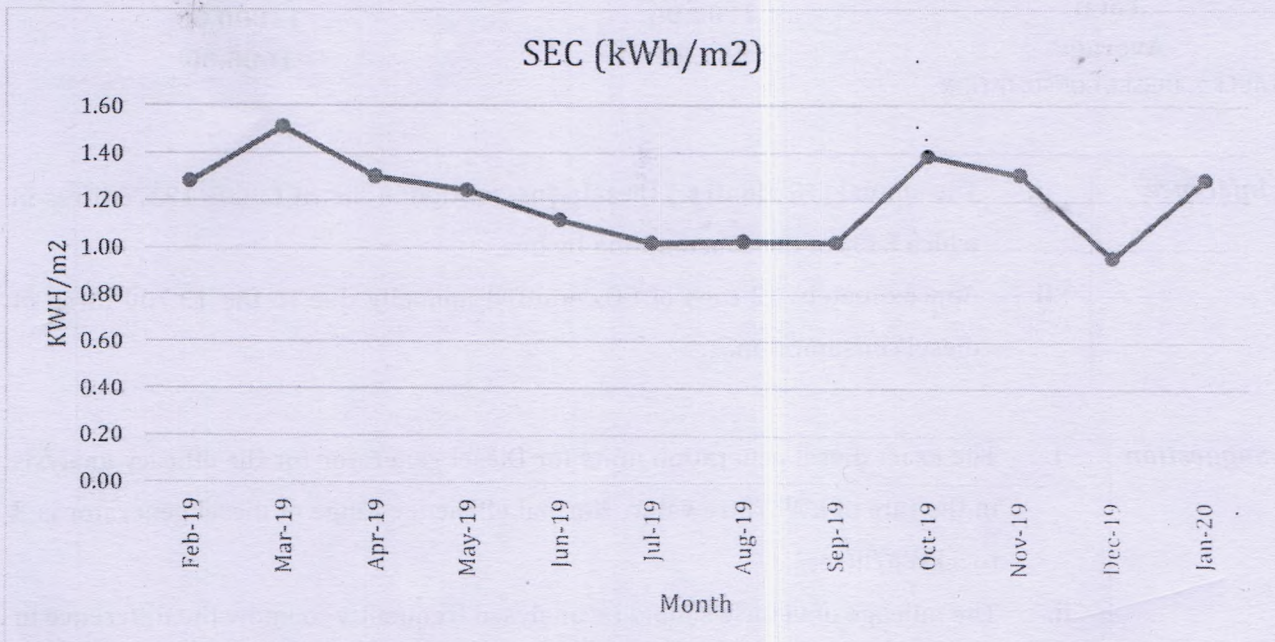


FIGURE 11: SEC



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**Inference**

- i. The annual SEC of the NCERC is 14.47 kWh/m². Comparing to normal standard for colleges, 15 to 20 kWh/m², the SEC is lower and good.
- ii. By implementing the suggestions in the Annexure-1 the SEC would get reduced.

VII. DIESEL CONSUMPTION ANALYSIS

The Diesel is the fuel which is used for the Diesel generator and vehicles such as buses and jeep. Separate consumption pattern is not availed from the NCERC to know the exact analysis of the diesel consumption for diesel generator. The Diesel consumption in the last 08 months is given in the Table below.

Month	Generator	Bus (average per month)
Jul-19	200	1600
Aug-19	500	1600
Sep-19	200	1600
Oct-19	200	1600
Nov-19	800	1600
Dec-19	200	1600
Jan-20	200	1600
Feb-20	400	1600
Total	2700.00	12800.00
Average	337.50	1600.00

TABLE 7: DIESEL CONSUMPTION


Inference

- i. The annual (10 Months) Diesel consumption in the NCERC is 19370 litres in which 84% of the consumption by bus.
- ii. Approximately 52 tons of CO₂ emitted annually due to the 13,700 litres of diesel consumption.

Suggestion

- i. The exact diesel generation units for Diesel generator for the efficacy analysis in the rate of kWh/litre value. Normal efficiency range of diesel generator is 3 to 5 kWh/litres.
- ii. The mileage of vehicle should be analysed frequently to know the difference in consumption and also to understand any maintenance issue for the same.




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VIII. WATER CONSUMPTION ANALYSIS

NCERC uses water mainly for latrines and drinking purpose in all buildings, cooking in hostels and main canteen and for gardening. There are mainly three sources of water supply to the college.

I. Borewells

The borewells in and around the campus counts to 03 nos, situated in the ladies hostel and compound area which supplies water to the overhead or underground tanks and redistributed to various buildings.

II. Quarry

The water that stored in the three quarry in which two are using for latrines in various buildings and gardening the college campus.

III. Kerala Water authority/tanker

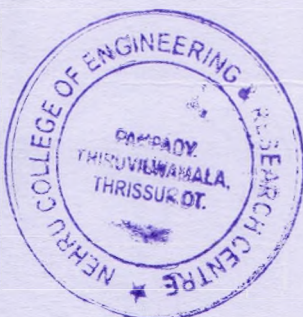
Kerala Water authority/tanker water are mainly used in the canteen and drinking purposes in all the buildings. The payment against the consumption is in per month basis and the average water consumption through this source is 50 kL/day.

Inference

- i. The average approximate water consumption in the NCERC is 1500 KL/month.
- ii. The majority of the consumption is for lavatories and gardening purpose.
- iii. Actual consumption couldn't monitor due to the non-availability of water meters in the campus.

Suggestion

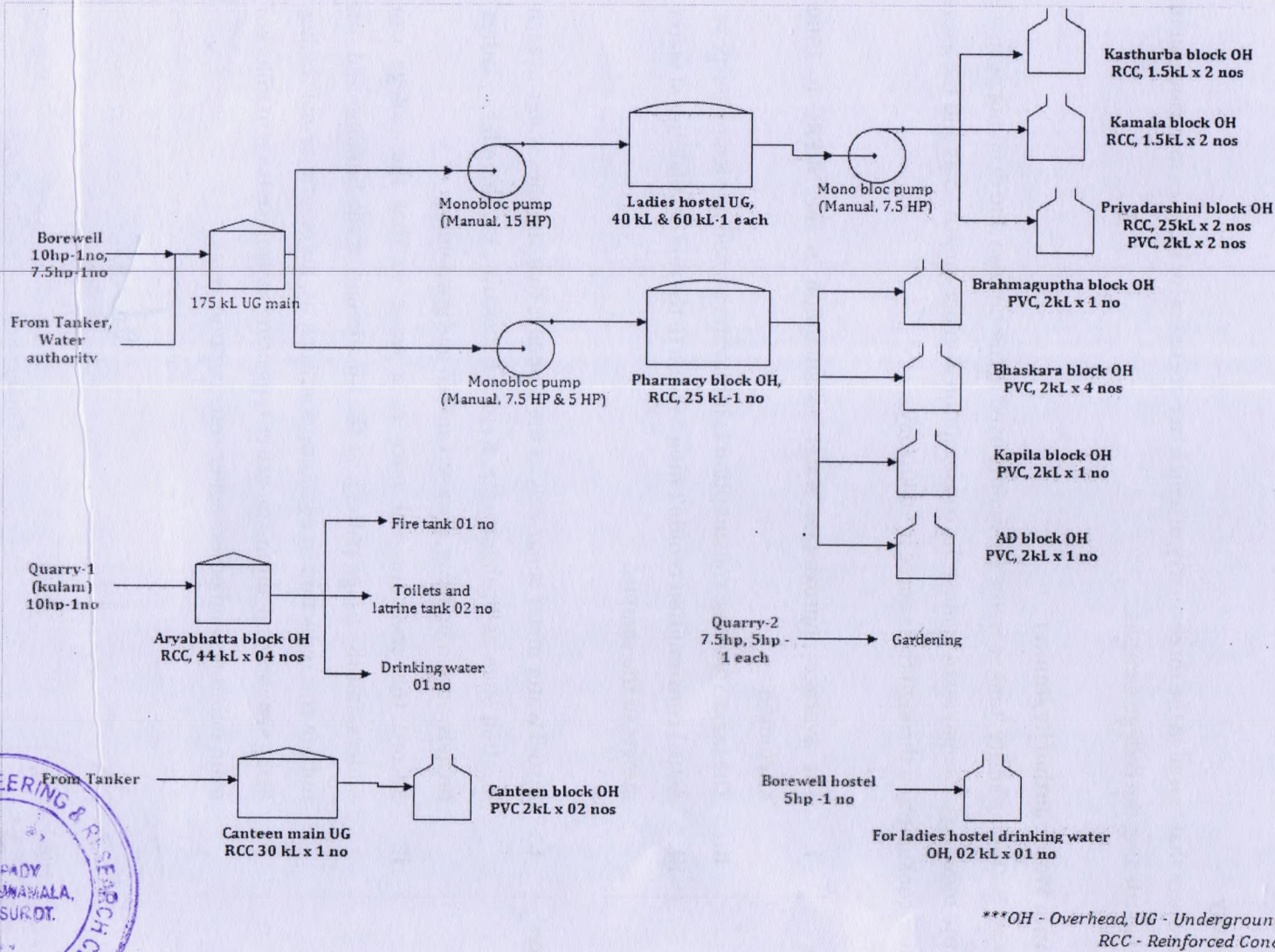
- i. Install water meter separately at the pipelines that supplies water to each location such as Brahmagupta, Kapila, Bhaskara , Varahamihira , ladies' hostels, admin building, library, canteen and gardening.
- ii. Record this measurement once in a week so that the college can understand the usage pattern vs the functioning of the building and can initiate the reduction in consumption, such as, automatic urinal flusher using sensors and automatic water taps using motion sensors in toilets of main buildings and other higher consumption areas.



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A brief water distribution diagram of the NCERC campus is given in the figure below.



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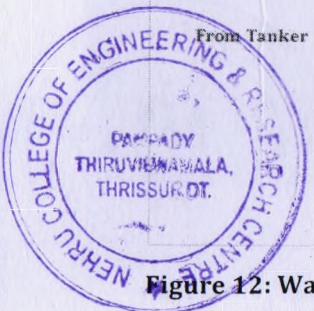


Figure 12: Water distribution diagram



ELECTRICITY PERFORMANCE ANALYSIS

I. TRANSFORMER SECONDARY LOGGING

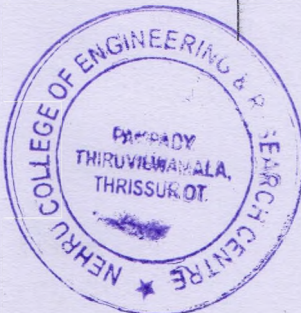
The LT side of the transformer was logged using power quality analyser Krykard ALM 35 for 10 minutes and given in following table. The Measurement details are given below:

Make		Unipower transformers		
Voltage level	kV	11/0.433		
Current level	A	21/533.5		
Voltage impedance	%	4.28		
Cooling method		ANAN		
Date of Mfd		2005		
Serial no		0872		
Measurement values - LT side				
Actual Energy for 10 min	kWh	3.548		
Apparent Energy for 10 min	kVAh	5.527		
Power Factor		0.64 (leading)		
Particulars	Units	Minimum	Maximum	Average
Active Power	kW	20.92	21.61	21.28
Apparent Power	kVA	30.6	42.38	33.16
Reactive Power	kVAr	-28.70	-13.04	-16.44
Voltage phase	Volts	234.1	240.7	237.3
Current	Amps	39.1	60.8	46.4
THD V	%	2.9	3.8	3.2
THD A	%	13.3	18.7	15.07
Voltage Imbalance	%	1.1	1.2	1.1
Current Imbalance	%	2.2	12	8.51

TABLE 8: TRANSFORMER LOGGING

Inference

- i. The maximum demand registered during the period of measurement is 42.38 kVA, in 10 minutes' interval, and the corresponding PF was 0.64 leading that shows the importance of PF optimisation.
- ii. The percentage variation of voltages at the time of audit ranges at 97.5% to 100%.
- iii. The average loading of transformer is only about 11% during the period of measurement mainly due to the non-working day.



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II. ANALYSIS: VOLTAGE VARIATION

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

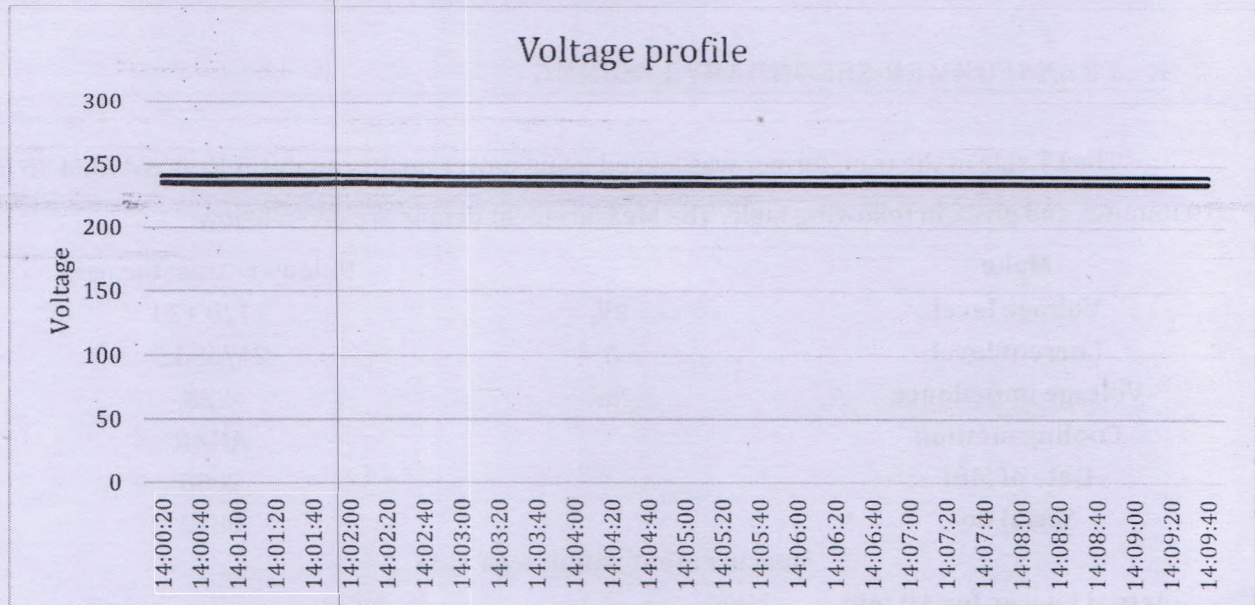


FIGURE 13: VOLTAGE PROFILE

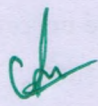
Inference

- i. The figure shows the minimum voltage imbalance and supply voltage variation.
- ii. The high voltage will increase the power consumption and increases the capacitance value in the system.

Inference

- i. Optimise the voltage level in the range of 230V by the installation of On load tap changers as the future installation of solar power plant will increase the voltage level in the system.
- ii. The high voltage will decrease the life of equipment along with the increase in the power consumption and the maintenance in the college.




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III. ANALYSIS: CURRENT VARIATIONS

This section carries the current variations during the 24-hour measurement period with the power analyser.

The figure below gives the current profile of the phases at the LT side.



FIGURE 14: CURRENT VARIATIONS

Inference

- i. Above figure denotes current variations at the LT side.
- ii. The maximum and minimum current occurred during the measurement was 60.8 and 39.1A respectively.
- iii. The current varies between 7.32 to 11.3% of the rated current of the transformer at the secondary side.



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IV. LOAD FACTOR

The load factor is the ratio of the energy consumed during a given period (in the audit period or in last 12 months) to the energy, which would have been consumed if maximum demand had been maintained throughout the period.

$$\text{Load factor (\%)} = \frac{\text{Energy used during the period (kWh)} \times 100}{\text{Maximum demand (kW)} \times \text{Time under consideration (hr)}}$$

Load factor calculated from the measurement logging at the LT side during the period of audit is given in table below:

Total kWh	Max kW	Time (min)	Load factor (%)
3.548	21.61	10	98.5

TABLE 9: LOAD FACTOR - TRANSFORMER

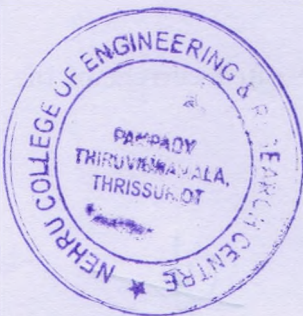
Load factor for last 12 months

Total annual kWh	Max kW in last 12 months	Time (hrs)	Load factor (%)
3,79,560	204	8640	21.54

Table 10: Load factor in last 12 months

Inference

- i. The higher the load factor means higher utilisation efficiency of the electrical system.



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V. ANALYSIS: POWER FACTOR

The section provides an overview of the power factor variations at the LT side. The Power factor variation with respect to the active and reactive power are given in figure below.

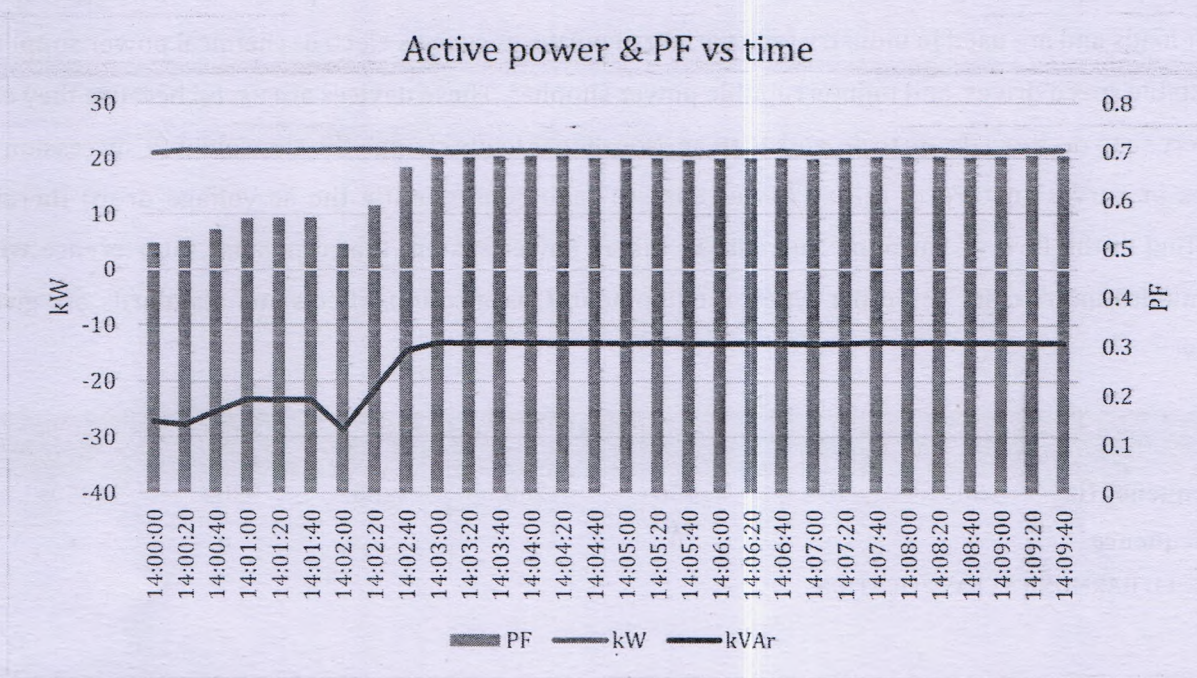


FIGURE 15: KW, & PF VARIATIONS

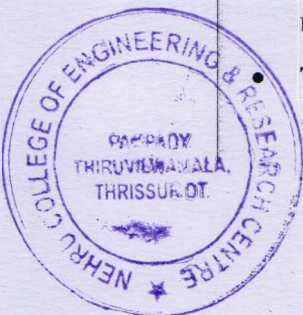
Inference

- The power factor was leading during the period of measurement due to the manual functioning of Automatic PF controller panel installed across the MSB.
- The total net capacitors placed in the APFC panel is 100 kVAr, where the sub divisions starts from 5 kVAr up to 25 kVAr.
- The Capacitors are placed in the manual mode due to the non-functioning of automatic system.
- With the present leading PF, incentives are not availed to the college.

Suggestions

- The Capacitors are placed in the manual mode due to the non-functioning of automatic controller which needs to be rectified immediately.
- This would help the college to reduce the excess voltage in the system and also will stabilize the PF within the limits (Good PF = 0.95 lag to unity PF) which makes them available for incentives.

The net annual incentives by maintaining the good PF is given in the Annexure-



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**MAJOR ELECTRICAL LOADS****I. LIGHT & FAN LOADS**

The light and fan loads in the various buildings of the NCERC campus is given in the table below

Sl no	Buildings	LED	LED	Tube light	Ceiling fan
		5	20	36	60
1	Bhaskara				
	Classrooms			65	113
	Varanda		15	23	
	Conference room		18		
	Innovators room		04		
	Computer lab			32	
2	Aryabhata				
	Directors room				
	Principals Room				
	Board room	4	6	1	2
	Classrooms			130	185
	Corridor		75	100	
	Dining hall			8	12
	Seminar hall			12	16
	Various labs		12	42	
3	Brahmaguptha				
	Auditorium			33	44
4	Kapila				
	NCC room			3	3
	MBA		7	63	88
	MCA			15	43
5	Admin block		25		15
6	Ladies hostel	80		349	425
	Total nos	84	150	873	946
	Total load in kW	0.42	2.7	31.43	56.76
	Net total kW		91.31 kW		

Table 16: Light and fan loads

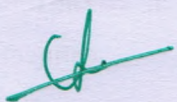
Inference

- The ceiling fan consumes the most of the power in this section.
- The ceiling fans in the admin block and staff rooms works continuously for 8 to 10 hours in the normal working days.
- Whereas in the class rooms and ladies hostel the ceiling fans used to run for 6 to 8 hours in the working days.

Suggestions

- Replacing the ceiling fans with BLDC or star rated will reduce the consumption to half to three quarter of the total consumption.




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- ii. Best suitable method is, when any damages occur to existing ceiling fan, do not rewind and change it with either BLDC or star rated fans, which consumes in the range of 25 to 45 Watts instead of 60W or more in the present fans.

II. AIR CONDITIONER LOADS

The NCERC installed split AC in important rooms throughout the campus. The details of air conditioners in the campus is given in the table below

Sl no	Block	Location	Tonnage	Nos	Make	
1	New & Old Block	Pharmaceutic Lab	2	1	Blue Star	
2		computer lab	3	1	Blue Star	
3		computer lab	2	1	Blue Star	
4		Board room	3	2	Blue Star	
5		instrument room	2	1	Blue Star	
6		Principle room 2nd	1.5	1	Blue Star	
7		Board room 1st	3	1	Blue Star	
8		Seminar hall	3	2	Blue Star	
9		Guest rooms	1.5	4	Voltas	
10	Kapila Block	Director room	1.5	1	MS Cold	
11		ML Level tutorial class	3	2	Blue Star	
12		Lecture hall	3	3	Blue Star	
13		MCA computer lab	3	2	Blue Star	
14	Baskara Block	Board room Principal	3	1	Blue Star	
15		Conference room	2	1	Blue Star	
16		Conference room	3	1	Blue Star	
17		Innovation centre	2.5	2	Blue Star	
18		Old Principal room	2	1	V star	
19		Old computer lab 1st	0.5	1	Transcold	
20		Old computer lab 1st	1.5	2	Transcold	
21		Old computer lab 2nd	1.5	2	Transcold	
22		Computer lab 3rd	1.5	7	Transcold	
23		Aryabhata Block	Internet lab	3	3	Blue Star
24			Digital lab	3	3	Blue Star
25	Advanced computing lab		3	3	Blue Star	
26	Cyber security lab		3	3	Blue Star	
27	Casit lab		3	1	Blue Star	
28	Casit lab old		3	2	Blue Star	
29	Seminar hall		3	5	Blue Star	
30	Research lab		3	3	Blue Star	
31	Advanced software Engineering lab		3	1	Blue Star	
32	CAD lab		2.5	2	Blue Star	
33	Front Office	Advanced software Engineering lab	3	2	Blue Star	
34		Chairman room	1.5	1	Voltas	
35		Board room	1.5	1	Blue Star	

Table 17: Air conditioner details

- i. The total air conditioner tonnage in the NCERC is 172 which amounts to a connected load 223 kW.



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**ANNEXURE 1****ENERGY CONSERVATION MEASURES****I. POWER FACTOR OPTIMISATION****Background**

At present the power factor were found to be 0.98 to 0.99 leading in last 12 months, incentives received for first 6 months. At present tariff rate, the leading PF does not give incentives and PF should maintain in the range of 0.95 lagging to unity. APFC panels are installed in the MSB for maintaining the power factor, but it works in manual model.

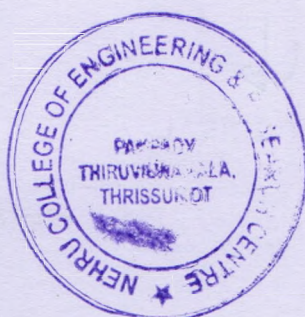
Proposal

A revamping in the APFC panel will generate sufficient savings to the college by receiving the incentives through PF optimising in the range of 0.95 lagging to unity. The APFC panel of 100 kVAr, should work in auto mode by rectifying the controls and the segregation of capacitors should be done starting from 5 kVAr upto 25 kVAr.

The calculation for the saving is given in the table below.

Particulars	Units	Values
Present PF		0.98 leading
Proposed PF		0.99 lagging
Present average energy consumption/month	kWh	31,630.00
Present average energy charge/month	Rs	2,18,982.00
Incentives for improving the PF/month	Rs	14,233.83
Annual incentive	Rs	1,70,805.96
Investment for replacement of control panel/capacitors (max)	Rs	50,000.00
Payback period	Months	08

TABLE 18: ENERGY CONSERVATION MEASURE-1

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II. OPTIMISATION OF THE CONTRACT DEMAND TO 200 KVA

Background

The institution have a contract demand of 235 kVA. Only thrice in last 12 months the maximum demand were above the minimum billing demand that is 176 kVA. The unwanted charges paid in the last 12 months for higher setting of contract demand was Rs. 1.05 lakhs.

Proposal

Reduce the contract demand to 200 kVA and install demand controller at the secondary side of the transformer sensing any one of the DB's in the substation such as hostels or workshop that doesn't have much importance on the system.

Calculation

MONT H	Present contract demand	RMD in last 12 months	Billing demand - Present	Demand charges	Proposed contract demand	RMD in last 12 months	Billing demand - NEW	Demand charges	Difference in Demand charges
Feb-19	235	159	176	77440	200	159	159	69960	7480
Mar-19	235	206	206	90640	200	206	206	90640	0
Apr-19	235	184	184	80960	200	184	184	80960	0
May-19	235	161	176	77440	200	161	161	70840	6600
Jun-19	235	121	176	77440	200	121	150	66000	11440
Jul-19	235	105	176	77440	200	105	150	66000	11440
Aug-19	235	125	176	77440	200	125	150	66000	11440
Sep-19	235	134	176	77440	200	134	150	66000	11440
Oct-19	235	145	176	77440	200	145	150	66000	11440
Nov-19	235	132	176	77440	200	132	150	66000	11440
Dec-19	235	103	176	77440	200	103	150	66000	11440
Jan-20	235	130	176	77440	200	130	150	66000	11440

Summary

Annual demand savings	Rs	1,05,600.00
Investment cost	Rs	1,20,000.00
Payback period	Months	14

Table 19: Energy conservation measure - 2




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**III. REPLACEMENT OF FLUORESCENT TUBES WITH LED LIGHTS.****Background**

The majority of the light fittings in the college is fluorescent tube lights. This consumes around 36W with electronic choke.

Proposal

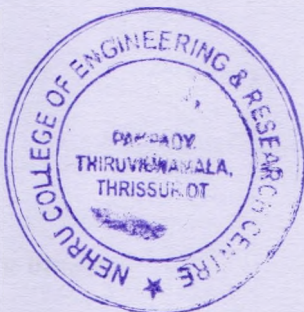
Replace the continuous working tube lights with LED of 18W which reduces the power consumption to 50%. We are suggesting to replace the continuous working lights with immediate effect.

The continuous working areas are office, staff rooms, and seminar halls and directors/principals offices. The net total number of such lights will be around 20 nos in the main building. The other major fluorescent tube consumption occurs in the hostels where the working hour of light fittings in the range of 6 to 8 hours per day. The net total number of lights that works in that duration per day would be 80 nos.

Calculations:

Particulars	Units	Tube lights with LED
Power of Fluorescent lights	Watts	36
Power of proposed LED tube	Watts	18
Difference in Wattage	Watts	18
Avg No: of working hours/day	Hrs	7
No: of working days per year (Average)	Nos	200
No: of working hours per annum	Hrs	1600
Number of Lights operating	Nos	100
kWh Saving per Annum	Rs	2520
Cost per kWh (Average)	Rs	6.71
Annual Financial Savings	Rs	16,909.20
Cost of LED tube	Rs	250
Investment for LED lights	Rs	25,000.00
Simple Payback period	Months	18

Table 20: Energy Conservation Measure-3



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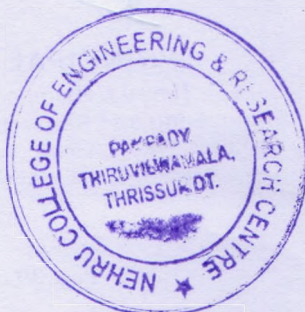



Reason for change in the lighting system

- Lighting quality can have a dramatic influence on the attitude and performance of working persons, if they have an environment that with proper uniform lighting.
- In addition to the lumens per watt which is a lighting quantity calculation lighting quality and life of lighting system is also to be considered.
- Lighting quality can be divided into Uniformity, Glare, Colour rendering Index, coordinated colour temperature.
- In case of consistency and in uniformity, the life time of LED is far better than CFL s and FTLs.
- Deterioration of lumens or lux level in FTLs and CFL are more as compared with LED which is consistent during in its life time.
- Considering VCP (Visual Comfort Probability) LED is better option than FTLs and CFL because the glare value is lesser.
- The LED are whitish in colour than FTLs which is giving a better feeling of brightness to the persons occupied or working
- CCT of LED is 5000k which is white as compared with lesser CCT for FTLs of 4500 k
- There is no mercury content in the LED as compared with CFL and FTL s hence it is environmentally supportive.
- The life cycle data of tube lights with LED is given in the table below.

Type of lamp	Typical life in Hours	Cost per lamp	No: of lamps required during LED lifetime (led 60,000 Hours)	Replacement cost per lamp	Approximate maintenance expense for replacement	Total cost per lamp
T12	5000	45	12	540	500	1040
T8	5000	45	12	540	500	1040
T5	5000	100	12	1200	500	1700
LED	60000	250	1	250	0	250

Table 21: Lifecycle data of light types




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IV. REPLACEMENT OF CEILING FANS WITH BLDC FANS/STAR RATED 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. A commutation is basically the technique of changing the direction of current in the motor for the rotational movement. In a BLDC motor, as there are no brushes, so the commutation is done by the driving algorithm in the Electronics. The main advantage is that over a period, due to mechanical contact in a brushed motor the commutators can undergo wear and tear, this thing is eliminated in BLDC Motor making the motor more rugged for long-term use. To explain, BLDC technology in simpler terms, BLDC uses a combination of Permanent Magnets and Electronics to achieve the kind of efficiency and performance, it delivers.

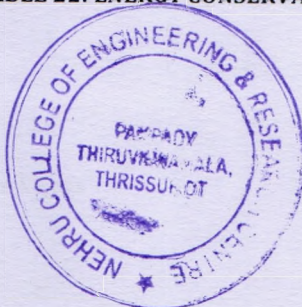
Proposal

Replace the ceiling fans with BLDC in the office and library areas where the working hours are higher. The approximate number of continuous working fan in the main building and library would be 50 nos for 10 hours/day.

Star rated fans are best suitable for hostels where the continuous working of minimum 10 hours. The approximate number of ceiling fans that run in such duration would be 150 nos considering the half of the total count. The calculation for the savings is given in the table below.

Particulars	Unit	With BLDC in Office areas	With BEE star rated in Hostels
Power of existing ceiling fans at full speed	Watts	60	60
Power of replacing fan	Watts	25	40
Difference in Wattage	Watts	35	20
Avg No: of working hours/day	Hrs	10	12
No: of working days per year (Average)	Nos	200	200
No: of working hours per annum	Hrs	2000	2400
Number of Ceiling Fans operating	Nos	50	150
kWh Saving per Annum	kWh	3500	7200
Cost per kWh (Average)	Rs	6.71	6.71
Annual Financial Savings	Rs	23,485.00	48,312.00
Cost per fan	Rs	3,000.00	2,000.00
Investment for replacing Fan	Rs	1,50,000.00	3,00,000.00
Simple Payback period	Months	77	75

TABLE 22: ENERGY CONSERVATION MEASURES-3




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**Summary**

Annual unit savings	kWh	10700
Annual financial savings	Rs	71,797.00
Net investment cost	Rs	4,50,000.00
Payback period	Months	75

Actual savings and comparison table with normal, star rated and BLDC fans is given in the table below.

Type	Power at Various Speeds					Max flow (M3/Min)
	1	2	3	4	5	
Regular Ceiling Fan	14	25	39	48	76	230
BEE Five Star rated Fan	13	24	30	40	55	210-220
BLDC Fan	3.8	7.7	13.8	22.7	35.8	230
% Variation of BLDC fan with Ceiling fan in power	72.8	69.2	64.6	52.7	52.8	
% Variation of BLDC fan with 5 Star rated fan in power	70.77	67.92	54	43.25	34.91	
Saving in power for Ceiling fan and BLDC	10.2	17.3	25.2	25.3	40.2	
Saving in power for 5 Star rated Ceiling fan and BLDC	9.2	16.3	16.2	17.3	19.2	

Table 23: Fan power variations as per speed



↓

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ANNEXURE - 2

I. LED SPECIFICATION

The Department of Electronics and information technology issued "Electronics and information Technology goods order 2012" on 3rd October 2012 the following standards for LED lamps are covered.

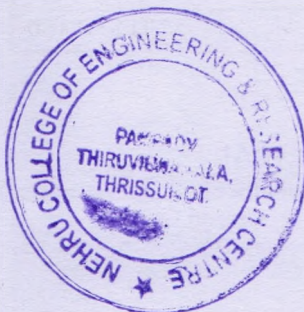
1. IS 15885 (Part -2/section 13)
2. IS 16102 (Part-1): 2012

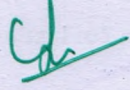
As per this order LED manufactures to get their product tested from BIS recognised labs.

Thus the following electrical parameters and standards should ensure while purchasing LED in future based on the BIS standards. These are the minimum technical requirements for the acceptance of LED. Also the LED test certificates as per the various standards mentioned below should be examined while purchasing.

Sl no	Parameters	Requirements	Applicable IS
1	Light source	SMD LED chip	LM 80/IS 16106
2	System Efficacy	>= 110 lumen /watt	IS 16106:2012
3	LED Driver Efficiency	Minimum 85%	
4	Harmonics	Maximum 10%	IS 16102-2-2012
5	Power factor	Minimum 0.95	IS 16102-2
6	Frequency	50 Hz ±3%	LM-79 report
7	Operating voltage	110V - 320V	LM 79 report
8	Surge voltage	>4 kV	LM 79 report
9	Ambient temp	-10 to 50 deg C	LM 79 report
10	Degree of protection	IP 66	IS 10322
11	CRI	Minimum 70	IS 16102 - 2

Table 24: LED specification




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II. BLDC SPECIFICATION

Normal trend of one ceiling fan working hours with present cost while replacing with BLDC fan and the payback period is given in below table.

Number of working hours/day for a single ceiling fan	Hours	9	10	11	12	13	14	15	16	17	18	19	More than 20
Simple payback period after replacement with BLDC	Years	5	5	4	4	4	3	3	3	3	3	3	2

The BLDC fan test certificates as per the various standards mentioned below should be examined while purchasing.

Sl no	Parameters	Requirements	Applicable IS
1	Air delivery	215 CMM	IS 374 - 2019
2	Harmonics	Maximum 10%	IS 374 - 2019
3	Power factor	Minimum 0.95	IS 374 - 2019
4	Frequency	50 Hz \pm 3%	IS 374 - 2019
5	Insulation resistance	>2 M Ω	IS 374 - 2019
6	Speed	350 rpm	IS 374 - 2019
7	Maximum temperature rise	70 deg C	IS 374 - 2019
8	Degree of protection	IP 65	IS 10322


Table 25: BLDC specification

III. LIST OF INSTRUMENTS USED

SL.NO	EQUIPMENT DESCRIPTION	MAKE & MODEL
1	POWER ENERGY & HARMONIC ANALYSER	KRYKARD ALM 30
2	POWER ENERGY & HARMONIC ANALYSER	KRYKARD ALM 35
3	AIR QUALITY METER	TESTO 480

Table 26: List of instruments




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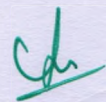
IV. ABBREVIATIONS

APFC	:	Automatic power factor controller
AVG	:	Average
BEE	:	Bureau of energy efficiency
BLDC	:	Brushless DC fan
CD	:	Contract demand
CFL	:	Compact fluorescent lamp
CO2	:	Carbon dioxide
DB	:	Distribution Board
EC	:	Energy Conservation
FTL	:	Fluorescent tube light
HT	:	High tension
IEEE	:	The Institute of electrical and electronics engineers
IS	:	Indian Standard
kL	:	kilo Litre
KSEB	:	Kerala State Electricity Board.
KVA	:	kilo Volt Ampere
kVAh	:	kilo volt Ampere Hour
kVAr	:	kilo volt ampere
kW	:	kilo Watts
kWh	:	kilo watt hour
LED	:	Light emitting diode
LT	:	Low tension
MAX	:	Maximum
PF	:	Power factor
SLD	:	Single Line Diagram
SPV	:	Solar photo voltaic
TOE	:	Ton of Oil equivalent

V. REFERENCES:

- Handbook on energy audit and environment management by TERI.
- Bureau of Energy Efficiency (BEE) books for certification of Energy Auditors & Managers.

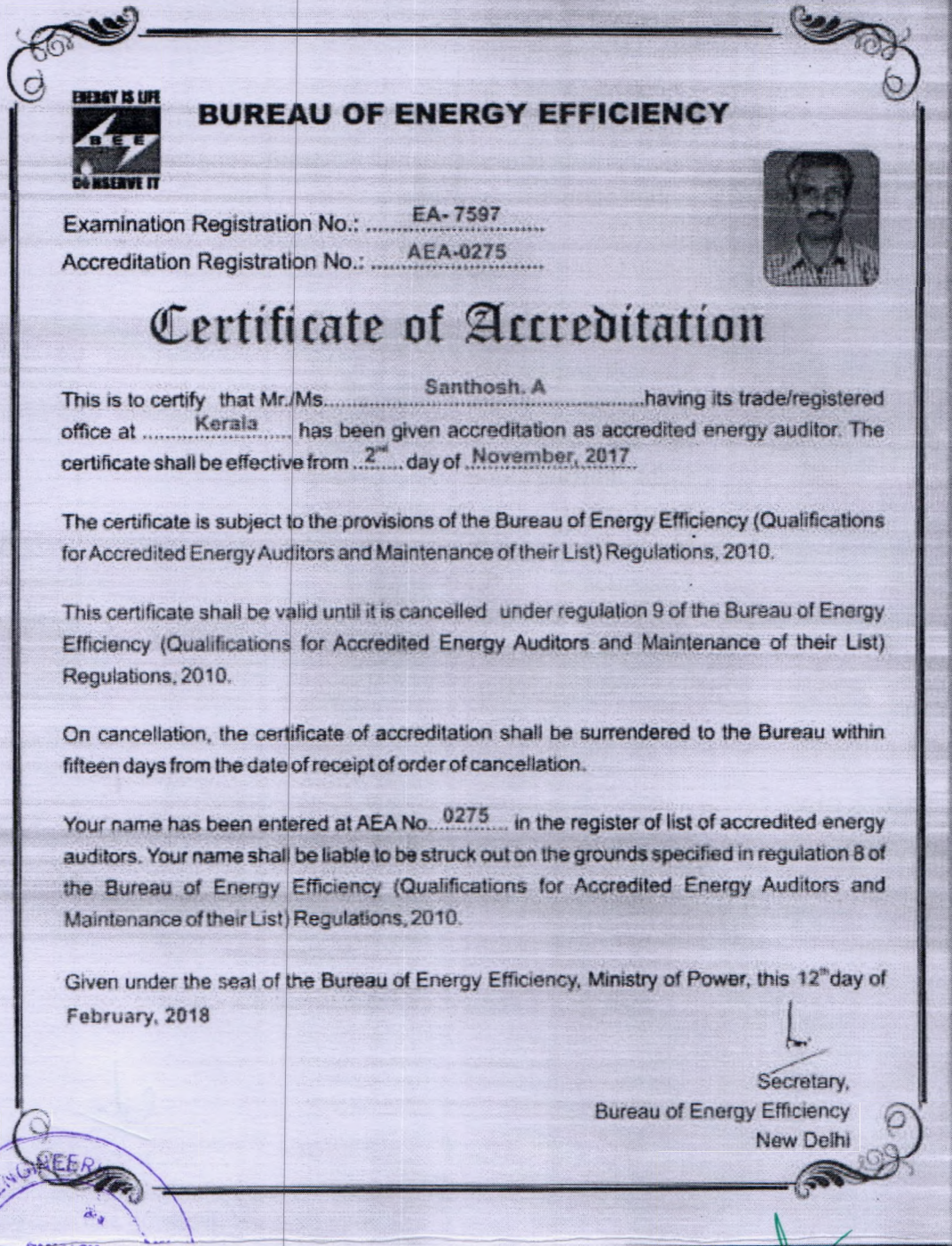



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Pin 680 597 Kerala



VI. CERTIFICATES

I. BEE Accreditation Certificate



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



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Page 46 of 47

II. EMC Empanelment certificate



Energy Management Centre - Kerala (Department of Power, Govt of Kerala)

CERTIFICATE OF EMPANELMENT

This is to certify that **M/s. Athul Energy Consultants Pvt Ltd** (4/2, Capital Legend, Korapath Lane, Round North, Thrissur – 680 020) is empanelled as Energy Audit firm in Energy Management Centre Kerala to conduct mandatory energy audit as per Government of Kerala G.O (Rt) No.2/2011/PD dated 01.01.2011.

Empanelment No:
EMCEEA- 0811F-2

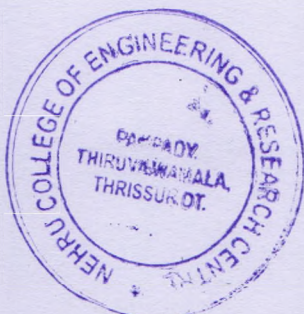
Scope/Area	Building	Industry -Electrical	Industry Thermal
	Yes	Yes	Yes

This empanelment is valid up to 20th December 2020

Issuing Date: 01/01/2018

Place: Thiruvananthapuram

Director,
Energy Management Centre Kerala




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ENVIRONMENT AUDIT - 2020



NEHRU COLLEGE OF ENGINEERING & RESEARCH CENTRE (NCERC)

Pampadi, Thrissur

Kerala

EXECUTED BY

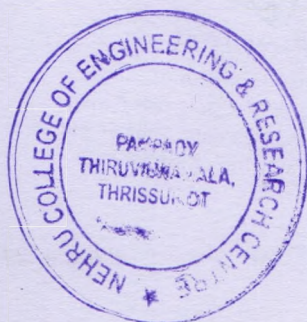


ATHUL ENERGY CONSULTANTS PVT LTD

4th FLOOR, CAPITAL LEGEND BUILDING,

KORAPPATH LANE, ROUND NORTH, THRISSUR, KERALA-680020

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February 2020

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BRIEF CONTENTS

PREFACE 3

ACKNOWLEDGEMENTS..... 4

ENVIRONMENT AUDIT SUMMARY 5

GENERAL DETAILS 6

ABOUT NCERC..... 7

ABOUT ENVIRONMENT AUDIT 9

WASTE MANAGEMENT 9

FACILITIES PROVIDED BY COLLEGE FOR WASTE MANAGEMENT COLLECTION 14

STUDENT ACTIVITIES FOR ENVIRONMENTAL CONSERVATION..... 15

CONCLUSION..... 17

ANNEXURE..... 18

LIST OF TABLES

TABLE 1: GENERAL DETAILS 6

LIST OF FIGURES

FIGURE 1: NCERC CAMPUS..... 8

FIGURE 2 BIO GAS PLANT..... 10

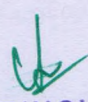
FIGURE 3: SWACHATHA OATH..... 15

FIGURE 4 CAMPUS CLEANING DRIVE..... 15

FIGURE 5 GANDHI JAYANTHI DAY CELEBRATIONS 16

FIGURE 6 RAILWAY ADOPTION PROGRAMME..... 16




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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.




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ACKNOWLEDGEMENTS

We express our sincere gratitude to the **Nehru College of Engineering & Research Centre (NCERC)**, Pampadi, Thrissur, 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. The environment audit conducted in the period of 05th & 06th February 2020.

- | | |
|------------------------|-------------------------------|
| 1. Adv. Dr. Krishnadas | Chairman and Managing Trustee |
| 2. Dr.P. Krishnakumar | CEO and Secretary |
| 3. Dr. Radhakrishnan | Advisor |
| 4. Dr. Ambikadevi Amma | Principal |
| 5. Ms. Bindu | Campus Manager |
| 6. Adv. Suchithra Lal | Legal Advisor |
| 7. Dr. Sudheer Marar | HOD MCA |
| 8. Sri. Ambikadas | Academic Superintendent |

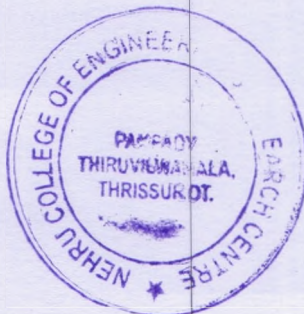
Also congratulating our Environment audit team members for successfully completing the assignment in time and making their best efforts to add value.

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. Ashok K M P**
Registered Energy Manager of Bureau of Energy Efficiency (BEE – Govt. of India)
Accredited Energy Manager No – EA 25612
3. **Mr. Harikrishnan K**, Project Engineer
4. **Ms. Jijiraj K R**, Project Engineer



Yours faithfully



Managing Director
Athul Energy Consultants Pvt Ltd

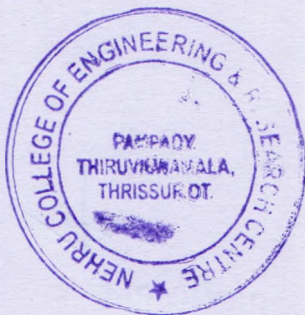
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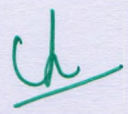
ENVIRONMENT AUDIT SUMMARY

- ❖ 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.
- ❖ FRP Water sealed biogas plant of size 15 m³ installed behind the ladies Hostel.
- ❖ STP plant is installed behind ladies' hostel for treating the sewage treatment from toilet of ladies' hostel.

Suggestions for improvement

- ❖ Separate incinerator for ladies' hostel for treating sanitary napkins because it contains the blood stains hence it is treated as medical wastes.
- ❖ Separate zones to be provided to collect metals, glass waters and plastics in the college.
- ❖ Provide waste flow chart in the laboratory
- ❖ Do s and Don'ts in the laboratory while conducting experiments
- ❖ Vermicompost plant can be installed for treating the leaf and stationary wastes.
- ❖ Separate bins and containers for control wastes and special control wastes, reusable items etc.
- ❖ Internal waste survey to be conducted in every month as collect all the waste items in the college and weighed and keep a track record of the same will use as a indicator for control of the same.



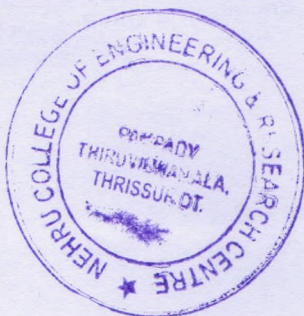

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GENERAL DETAILS

The general details of the NCERC are given below in table.

SL. NO	PARTICULARS	DETAILS
1	Name & Address of college	Nehru College of Engineering & Research Centre (NCERC) Nila Gardens, Pampadi Thiruvilwamala, Thrissur-680588
2	Contact person	Dr. Sudheer Marar Ph: 9656335444
3	Location: Latitude & Longitude	10.74356N, 76.43385E
4	No. of Teaching staff	149
5	No of technical staff	35
6	No. of Non-Teaching staff	54
7	No of students	993
8	Building area	26228 m ²
9	Land area	25 acres
10	Number of UG programs	06 nos
11	Number of PG programs	02 nos
12	Number of departments	08 nos
13	Hostel numbers	03 nos
14	Average annual working days	200 days
15	DG Set	125 & 200 kVA (1 each)
16	Transformer	400 kVA (1 No)
17	Audit dates	05 th & 6 th February 2020

TABLE 1: GENERAL DETAILS



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Pin - 680 597, Kerala

ABOUT NCERC

Nehru College of Engineering and Research Centre (NCERC), situated on the Bank of the river Bharathapuzha, is one of the premier Engineering college in education, research and training in the private sector. Established in 2002 by the founder chairman Shri P.K. Das, NCERC had impart world class quality education in engineering and research. Dedicated to the service in the realm of technical education in Kerala, it is an ISO 9001:2015 certified institution, approved by All India Council for Technical Education (AICTE), affiliated to A P J Abdul Kalam Technological University (KTU) and is accredited by National Assessment and Accreditation Council (NAAC). The college contains 8 departments with almost 1500 students and more than 100 teaching staffs.

VISION OF NCERC

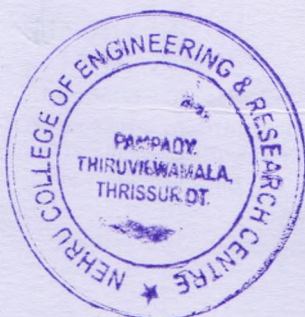
To mould true citizens who are millennium leaders and catalysts of change through excellence in education.

MISSION OF NCERC

NCERC is committed to transform itself into a center of excellence in Learning and Research in Engineering and Frontier Technology and to impart quality education to mould technically competent citizens with moral integrity, social commitment and ethical values. We intend to facilitate our students to assimilate the latest technological know-how and to imbibe discipline, culture and spiritually, and to mould them in to technological giants, dedicated research scientists and intellectual leaders of the country who can spread the beams of light and happiness among the poor and the underprivileged.

GOALS OF NCERC

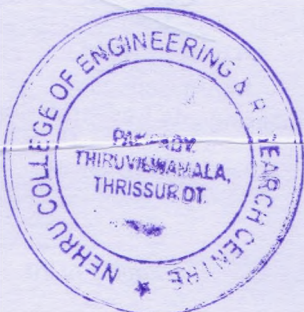
- To mould technically competent engineering professionals who can pioneer a social transformation for a brighter world.
- To facilitate research and learning by maintaining an ambience conducive to academic pursuits.
- To develop Industry – Institute Interaction to expose the students to the challenges of the industrial world and equip them with practical knowledge besides classroom and laboratory learning





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Figure 1: NCERC campus




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ABOUT ENVIRONMENT AUDIT

The ICC defines Environment 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 divided this report waste management initiatives and installations of systems such as biogas plant, vermicompost, incinerator and collection and segregation of waste in the campus etc and students initiates in waste management as a social cause.

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.



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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, biodigester 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.

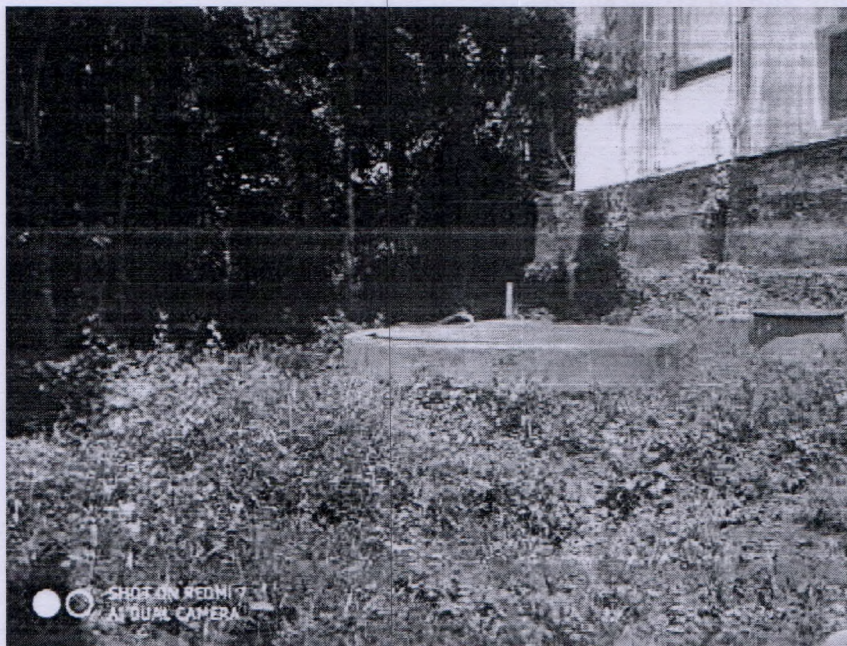
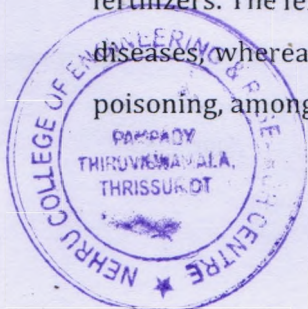


Figure 2 Bio gas plant

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.

Bio gas generation produces organic fertiliser. The by-product of the biogas generation process is enriched organic (digestive), 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.



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The biogas plant converts food wastes into methane gas and usable bio fertilizers which will be 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 manure from the biogas plant is used for gardening, agriculture and for trees. This biowaste also acts as the best bio insecticide and thus the college avoided the usage of environmentally toxic pesticides for environment. Here the college is using a fixed dome permanent structure biogas plant of size 4 M³ 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 for hot water generation which is used for drinking and tea making.

II. 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 vermicast. Vermicompost 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

III. Pipe Compost

Pipe composting is a kind of vermicomposting often called as worm tube composting which is carried out by using PVC tube. This is a simpler method for treating wastes of lower volume.

Benefits of Vermi-compost

a. For Soil

- ❖ Improves soil aeration
- ❖ Enriches soil with micro-organisms (adding enzymes such as phosphatase and cellulase)
- ❖ 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

- ❖ Biowastes conversion reduces waste dumping in landfills.
- ❖ Elimination of biowastes 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).

2. NON-BIODEGRADABLE WASTE

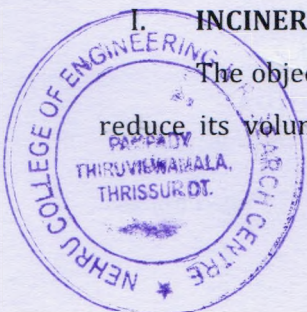
Materials that remain for a long time in the environment, without getting decompose by any natural agents, also causing harm to the environment are called non-biodegradable substances. These materials are metals, plastics, bottles, glass, poly bags, chemicals, batteries, etc. But as these are readily 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



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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.

3. 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. NCERC signed MOU for processing E-waste generated from the college.

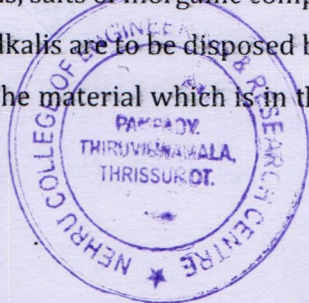
4. LABORATORY WASTES

It is the clear responsibility of the lab users to ensure safe and correct disposal of all wastes produced in the course of their work. Laboratory wastes can be divided into multiple ways such as wastes as of

- ❖ controlled wastes such as dirty paper, plastic, rubber, wood etc which can be collected in a bin and incinerated in an incinerator
- ❖ Special control wastes such as Broken glass wares of lab, sharp edge items, needles etc which needs to collected in a separate bin or container and dispose in a safer way. While collecting in these materials should not have any chemicals in it.

Wastes generated from laboratory experiments which is required multiple disposable mechanisms. (Acid, alkalis, salts of inorganic compounds)

The acids alkalis are to be disposed by wash down procedure by using excess water after maintaining its PH value. The material which is in the RED LIST should not be washed down it should be collected and



treated separately (Heavy metals, mineral oils, hydrocarbons, cyanides, fluorides, nitrites etc. The solvents, mineral oils are to separately incinerate in a incinerator.

In the food, microbiology laboratory the wastes are of biodegradable which can be treated in the biogas or in vermicomposting plant. Other chemicals will be treated by wash down procedure.

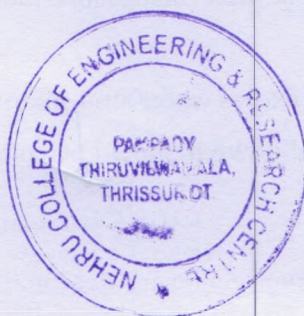
In NCERC ample ventilation is given in all laboratory. The natural illumination is also good.


Suggestions for waste management

- ❖ Existing FRP Biogas plant is not working which needs to be repaired
- ❖ The pit near to canteen Kitchen having all types of wastes (kitchen waste. Plastic glass wares etc.) Proper segregation of wastes is required for better waste management system
- ❖ Presently open pit is used for incinerating the non-biodegradable waste which needs to change with incinerator. Separate incinerator for ladies' hostel for treating sanitary napkins because it contains the blood stains hence it is treated as medical wastes.
- ❖ Provide waste flow chart in the laboratory
- ❖ Do s and Don'ts in the laboratory while conducting experiments
- ❖ Standard disposal procedure in the laboratory for all chemicals used in the lab
- ❖ Separate bins and containers for control wastes and special control wastes, reusable items etc.
- ❖ Internal waste survey to be conducted in every month as collect all the waste items in the college and weighed and keep a track record of the same will use as an indicator for control.

FACILITIES PROVIDED BY COLLEGE FOR WASTE MANAGEMENT COLLECTION

- Toilets in every floor of all buildings separately for girls, boys and staff.
- There is separate toilet facility for department heads, staff rooms, administrative department and common facility.
- Bins are provided in various areas of Campus for segregated collection of biodegradable (food,) and non-bio degradable wastes (Plastic, bottles)
- Every day cleaning and sanitisation is done at each and every toilet by cleaning personnel which used to check by housekeeping supervisor.
- Separate team is maintained by college for maintain the clean campus, removal of wastes from pets, collection wastes from bins, which is supervised by maintenance supervisor.




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STUDENT ACTIVITIES FOR ENVIRONMENTAL CONSERVATION

Swachatha Oath

The NSS technical cell of NCERC units 209 and 596 as part of our honorable prime minister's action plan swachh bharat pakhwada on 1st august 2018, students took the oath of being committed towards the nation by keeping the country neat and clean. The oath of swachtha was dictated by NSS 209 program officer Mr. Rakesh P.R and volunteers took the oath of devoting 100 hours per year for the voluntary service of cleanliness.



Figure 3: Swachatha Oath

Campus Cleaning Drive

NSS Tech cell of unit 209 and 596 of NCERC organized an program on 22nd September 2018 for cleaning the campus as part of nss day celebration in the afternoon session. This makes the beatification of campus and and make clean surrounding for nss day..



Figure 4 Campus Cleaning Drive

GANDHI JAYANTHI DAY CELEBRATIONS

Volunteers of NSS technical cell 209n and 596 organized the cleaning activities as a part of Gandhi Jayanthi at KSRTC depot and civil station Palakkad. Volunteers were thereby engaged in cleaning the



KSRTC buses, clearing the air filters and cleaning the premises of the depot. Thereafter the premises of Palakkad civil station also



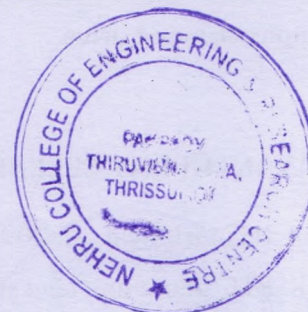
Figure 5 Gandhi Jayanthi Day Celebrations

Railway Adoption Programme

In association with the railway station adoption programme, The nss technical cell units Of ncerc organized a cleaning and beautification programme at lakkidi railwaystation On 31st march 2019. Since the railway station is only 0.5 kms far from College and is the Main source of travel form any of the students and localities, The volunteers cleaned And created shed for the many platforms and took it as an great advantage for their life By painting over the walls of the station.



Figure 6 Railway Adoption Programme



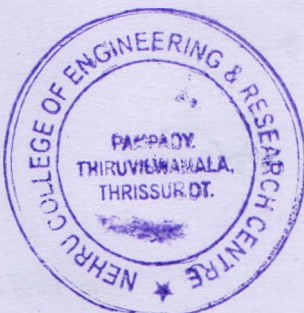
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CONCLUSION

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.

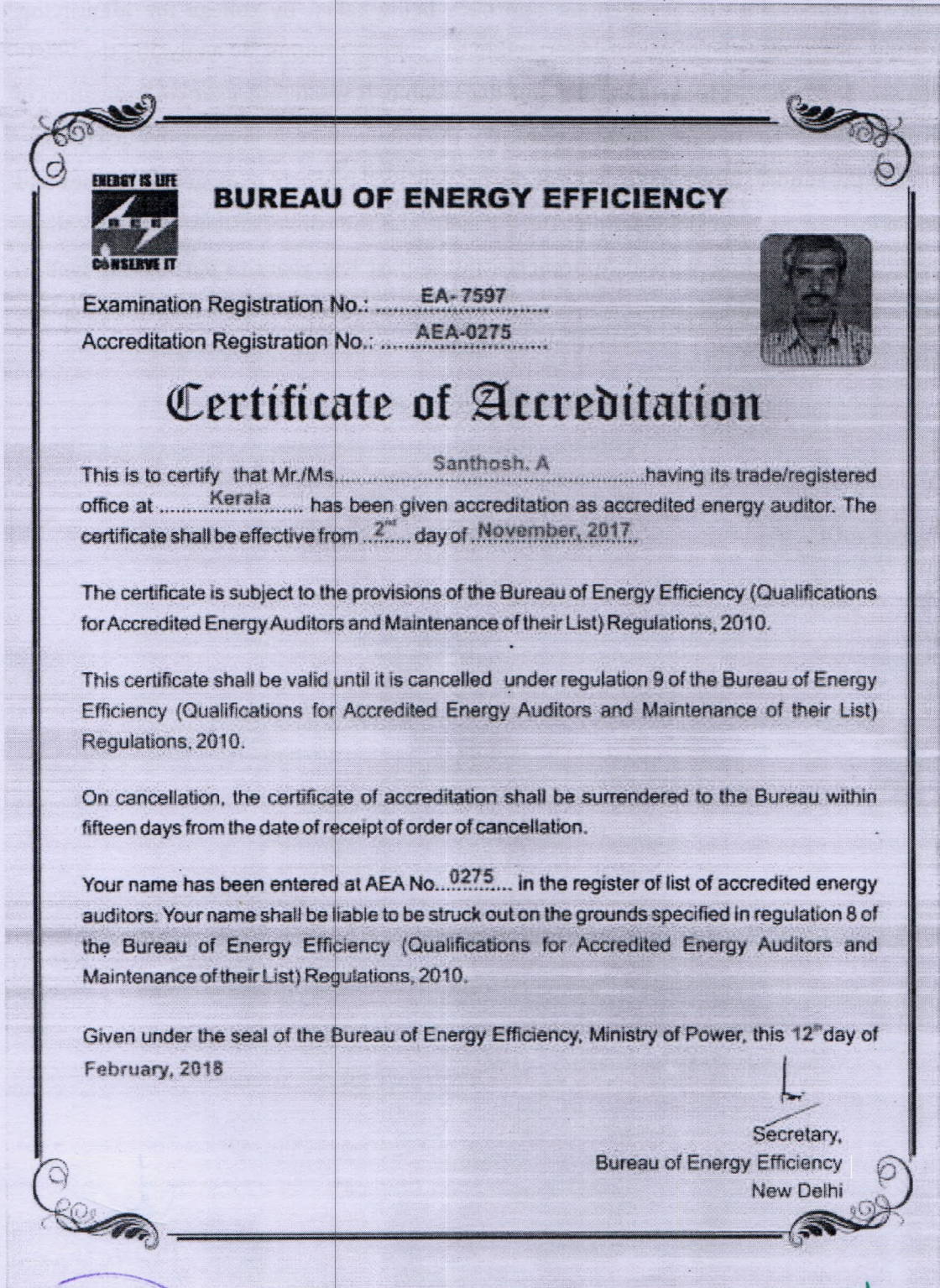
The findings in the report shows that college perform fairly well in waste management issues and taken considerable efforts in a responsible manner. During audit and the conversations with the college team, we observed that NCERC done various approaches in the past few years to performing well to sustainable environment. Even though there is space for further improvement that mentioned in the executive summary.



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ANNEXURE


➤ BEE Accredited energy auditor certificate



ENERGY IS LIFE
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.

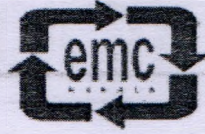
Given under the seal of the Bureau of Energy Efficiency, Ministry of Power, this 12th day of February, 2018

Secretary,
Bureau of Energy Efficiency
New Delhi



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➤ EMC Empanelment certificate



Energy Management Centre - Kerala
(Department of Power, Govt of Kerala)

CERTIFICATE OF EMPANELMENT

*This is to certify that **M/s. Athul Energy Consultants Pvt Ltd** (4/2, Capital Legend, Korapath Lane, Round North, Thrissur - 680 020) is empanelled as Energy Audit firm in Energy Management Centre Kerala to conduct mandatory energy audit as per Government of Kerala G.O (Rt) No.2/2011/PD dated 01.01.2011.*

Empanelment No:
EMCEEA- 0811F-2

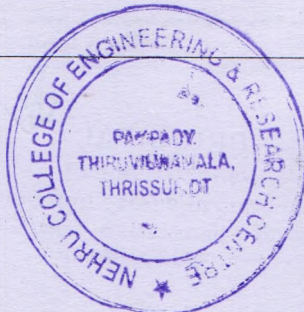
Scope/Area	Building	Industry -Electrical	Industry Thermal
	Yes	Yes	Yes

This empanelment is valid up to 20th December 2020

Issuing Date: 01/01/2018

Place: Thiruvananthapuram

Director,
Energy Management Centre Kerala



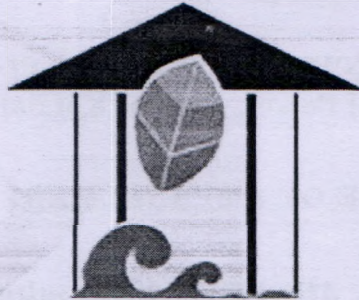
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➤ GRIHA Certified Professional

CERTIFICATE



Ministry of New and Renewable Energy
Government of India



GRIHA Council



The Energy and Resources Institute

This is to certify that

Ashok K M P

of

Athul Energy Consultants Pvt Ltd, Thrissur

has qualified as

GRIHA Certified Professional

on

01st August 2018

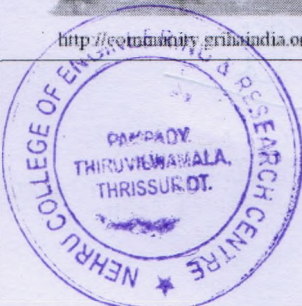
Sanjay Seth
Chief Executive Officer
GRIHA Council

Note: This certification is valid for a period of 2 years from the date of qualification (exam).



http://ecommunity.grihiaindia.org/blocks/verify_certificate/index.php?certnumber=fyiPq2Q5JA

@GRIHA Council



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(Approved by AICTE, New Delhi & Affiliated to AP J Abdul Kalam Technological University)



NCET/NCERC/WO/2020

February 17th of 2020

To

Mr. Santhosh A
 Managing Director
 M/s Athul Energy Consultants PVT.LTD.
 IV/2 Capital Legend Building,
 Korappath Lane, Round North
 Thrissur-680020, Kerala.

Sub: Conducting Energy, Green and Environment Audit at Nehru College of Engineering & Research Centre, Pampady, Thrissur District reg:-

Ref: Your Quotation AEC/QE/19-20/75/Rev

With reference to the above we would like to place the work order as follows:-

WORK ORDER

Sl.no.	Description	Price (Excluding GST)
1	Energy Audit at Nehru College of Engineering & Research Centre Campus	
2	Green Audit at Nehru College of Engineering & Research Centre Campus	
3	Environment Audit at Nehru College of Engineering & Research Centre Campus	

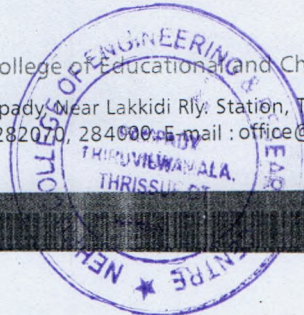
Total (1+2+3)= Rs45,000/- (Rupees Forty five thousand only)

General Conditions:

1. This auditing shall be completed within ten days from the date of work order.
2. All findings shall be documented and draft report shall be presented and discussed with us.

(Sponsors : Nehru College of Educational and Charitable Trust)

College Campus : Pampady Near Lakkidi Rly. Station, Thiruvilwamala, Thrissur (Dist), Kerala - 680 588
 Tel / Fax : +91 4884 - 282070, 284900. E-mail : office@ncerc.ac.in, admissions@ncerc.ac.in, web : www.ncerc.ac.in



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[Handwritten Signature]





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-2-

3. The audit report would be submitted within 20 days from the date of completion of field study.
4. Two hard copy and one soft copy on CD in PDF format of the final report shall be submitted along with executive summary, detailed report annexure and appendices shall be provided.
5. you should keep the confidentiality of all the data and information provided by us.
6. The documents ,details and drawings furnished by us shall be returned after the completion.

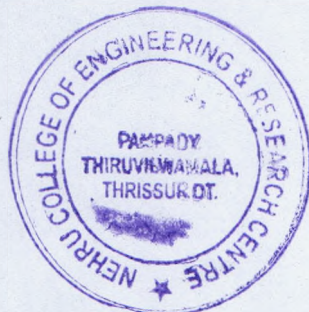
Payment terms:

50% of the total consideration with work order and balance 50% will be given after the submission of Audit report.

Campus Manager

Nehru College of Engineering & Research Centre

Terms and Conditions Accepted



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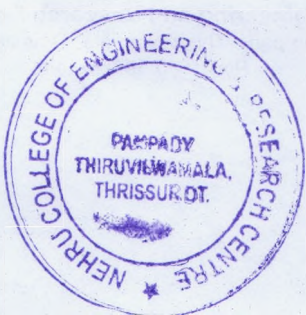
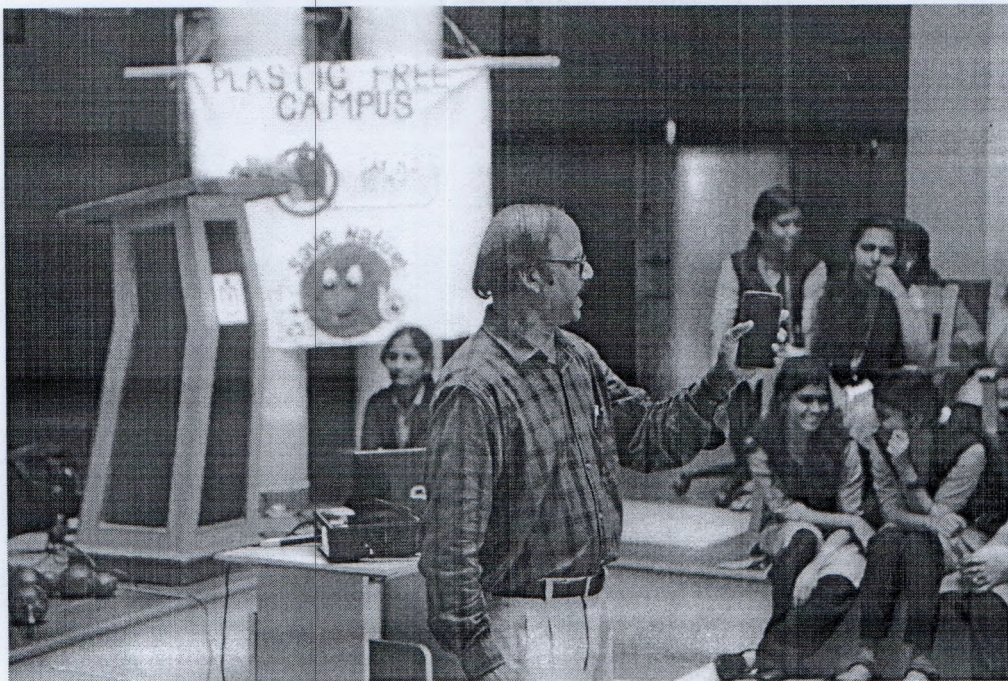
(Sponsors : Nehru College of Educational and Charitable Trust)

College Campus : Pampady, Near Lakkidi Rly. Station, Thiruvilwamala, Thrissur (Dist), Kerala - 680 588

Tel / Fax : +91 4884 - 282070, 284000. E-mail : office@ncerc.ac.in, admissions@ncerc.ac.in, web : www.ncerc.ac.in



Talk on No Plastic Life initiatives..



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Student Faculty team engaged in collection and disposing Plastics from the campus



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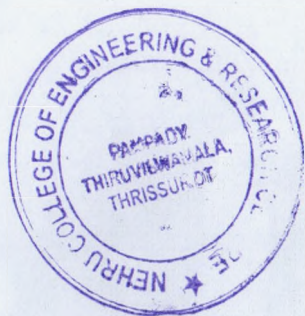
PLASTIC FREE CAMPUS PHASE 1

This is an initiative taken by Asso. Professor of NSM Mr Sijo Joseph Chakola to make the campus plastic free. The idea behind the initiative was to say no to plastic. This was conducted on 11th October 2019 in which Dr Madhusudhanan, Professor of JCET Ikkidi presented a seminar on after effects of usage of plastic.

PLASTIC FREE PHASE 2



As a part of continuation of plastic free campus phase 1 the students and faculty members moved on to the phase 2. The phase 2 was inaugurated by Mr. Sajith CI Ottapalam on 19th October 2019 along with them Director, NSM, NCC coordinators took part in the inauguration. The students of NCC, NSM, MCA students went for the cleaning session as a part of the program.



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**NEHRU GROUP
OF INSTITUTIONS**
TAMILNADU • KERALA
ISO 14001 - 2004 CERTIFIED INSTITUTIONS

24th July 2018

A HELPING HAND TO OUR FELLOW BRETHREN

We are all aware of the heavy damage and loss of lives witnessed by our state due to the unprecedented rain and flood during the past couple of weeks. There are over two lakh refugees in hundreds of relief camps which provide food and shelter to the sick, the aged and even the new born babies in the worst affected districts of Alappuzha and Kottayam. It is indeed our moral responsibility and obligation to partake in the pain and sufferings of the affected people and extend them all possible help. As far as Nehru group is concerned the relatives and friends of many our students and teachers are in such camps. We have already initiated efforts to extend various kinds of assistance to those living in the flood-hit areas. Students, teachers, and other staff members of various colleges under Nehru group participate in this mission. Nehru College alumni association is also part of this endeavor.

You can extend your help by providing financial assistance or by donating the following relief materials.


- 1) Foods like rice, wheat, pickles, biscuits, jams, bananas, vegetables etc.
- 2) Drinking water (5 liters bottles)
- 3) Blankets and dress materials for children.
- 4) Drugs including Paracetamol.
- 5) Milk powder, Lactogen etc.
- 6) Children's diapers, pads, etc.
- 7) Bags for students, umbrella, note book, pen, pencil etc.

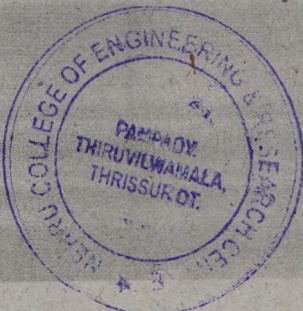
No matter how small your contribution is, it will definitely make a difference. Each rupee that you donate will indeed ensure the success of this mission.


The public also can participate in this great endeavor. You can reach your donations in kind or cash at the offices of Nehru Group's educational institutions in Kerala and Tamil Nadu, P.K Das Institute of Medical Sciences, Vaniamkulam, and admission offices at Kottayam, Kochi, Thrissur, Pattambi, and Ottapalam before 25th of this month.

These relief materials will be supplied at various relief centers in Alappuzha and Kottayam districts in the coming Thursdays and Fridays.

We request your benevolence to contribute generously for the success of this mission.


CEO & SECRETARY




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Bharatha Puzha (River Nila) cleaning



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ലൈസിയം റോഡ്, ചേലക്കര - 680 586
Mob : 9446871047, 9447226458

Ref.

LETTER OF APPRECIATION

Date.....

To
Prof. Sudheer Marar
Nehru Engineering College

I would like to inform you with great pleasure that the *No Plastic campaign*, initiated by your students on 2/11/2019 was a huge success and I would like to thank all of you from the core of our heart.

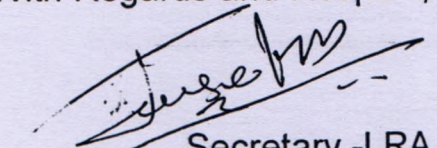
The LRA members have instilled some serious thoughts about anti-plastic concepts, and would have not been possible without your hard work and dedication.

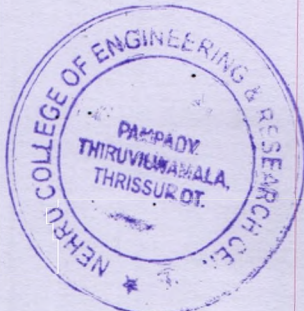
We convey our sincere thanks and appreciation to the entire team of Faculty and Student volunteers of Nehru Engineering College Pambady. Each of you is a valuable asset to your organization and we would like to express our sincere regards and love for each one of you.

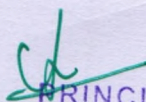
Our Resident Association considers it an honor to work with such a team, which is not only diligent but thinks outside of the box. Let's continue such novel ideas in future also.

With Regards and Respect,




Secretary -LRA




PRINCIPAL
Nehru College of
Engineering and Research Centre
Pampady Thiruvilwamala, Thrissur Dt
Pin 680 597 Kerala

Certificate of Appreciation for NCERC team, who led the ODK Data Survey Project for Thiruvilwamala GramaPanchayath



PRINCIPAL
Nehru College of
Engineering and Research Centre
Pampady, Thiruvilwamala, Thrissur Dt.
Pin 680 597 Kerala

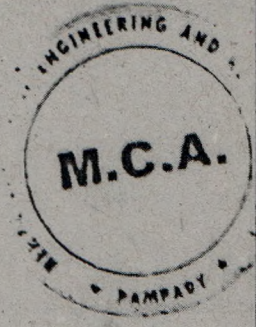
Self attested
Anas H
Anas H

True document
Dr. Sathyan
WOT-mesa



THIRUVILWAMALA GRAMAPANCHAYAT

Certificate of Appreciation



This is to certify that ANAS H
of 2016-19 MCA, NEHRU COLLEGE has worked as a volunteer
at Bharatha Puzha, Narayanamangalam area on 30th and 31st August 2018, as a
part of Kerala Flood Rescue and Relief Operations, coordinated by Thiruvilwamala
Grama Panchayat.

We appreciate all your sincere efforts and Best wishes for a bright future.



Manoj Kumar

Chairman- Development Standing Committee
Thiruvilwamala Gramapanchayat



PRINCIPAL
Nehru College of
Engineering and Research Centre
Pampady, Thiruvilwamala, Thrissur Dt.
Pin - 680 597 Kerala

Self Attested
Aishwarya Rajendran

True document
Dr. Anshu M
HOD-NEERU



THIRUVILWAMALA GRAMAPANCHAYAT

Certificate of Appreciation



This is to certify that AI SWARYA RAJENDRAN
of 2016-19 MCA, NEERU COLLEGE has worked as a volunteer
at Bharatha Puzha, Narayanamangalam area on 30th and 31st August 2018, as a
part of Kerala Flood Rescue and Relief Operations, coordinated by Thiruvilwamala
Grama Panchayat.

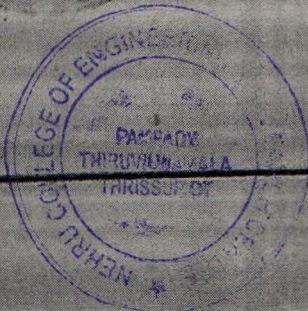
We appreciate all your sincere efforts and Best wishes for a bright future.



Manoj Kumar

Chairman- Development Standing Committee
Thiruvilwamala Gramapanchayat

PRINCIPAL
Neeru College of

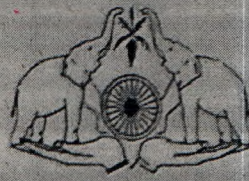


Engineering and Research Centre
Rampady, Thiruvilwamala, Thrissur-DT
Pin - 680 507, Kerala

Self Assessed

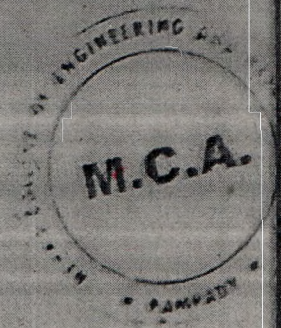
[Signature]
SITIN P

[Signature]
By: *[Signature]*
ADD: *[Signature]*



THIRUVILWAMALA GRAMAPANCHAYAT

Certificate of Appreciation



This is to certify that SITIN P
of MCA 2016-19, NEHRU COLLEGE has worked as a volunteer
at Bharatha Puzha, Narayanamangalam area on 30th and 31st August 2018, as a
part of Kerala Flood Rescue and Relief Operations, coordinated by Thiruvilwamala
Grama Panchayat.

We appreciate all your sincere efforts and Best wishes for a bright future.

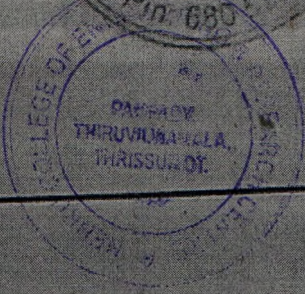


Manoj Kumar

[Signature]

Chairman- Development Standing Committee

Thiruvilwamala Gramapanchayat



PRINCIPAL

Nehru College of
Engineering and Research Centre
Pampady, Thiruvilwamala, Thrissur, Kerala
Pin: 680 015

Self Attested
Amuda

Amuda K

True document
Dr. Indira M
HOD-MCA



THIRUVILWAMALA GRAMAPANCHAYAT

Certificate of Appreciation



This is to certify that AMUDA K
of 2016-19 MCA, NEHRU COLLEGE has worked as a volunteer
at Bharatha Puzha, Narayanamangalam area on 30th and 31st August 2018, as a
part of Kerala Flood Rescue and Relief Operations, coordinated by Thiruvilwamala
Grama Panchayat.

We appreciate all your sincere efforts and Best wishes for a bright future.



Manoj Kumar

Manoj Kumar

Chairman- Development Standing Committee

Thiruvilwamala Gramapanchayat

PRINCIPAL

Nehru College of
Engineering and Research Centre
Pampady, Thiruvilwamala, Thrissur Dt
Pin - 680 597, Kerala



Self Attached
V. D. S. 10
D. S. 10



Handwritten notes and signatures in the top right corner.

THIRUVILWAMALA GRAMAPANCHAYAT

Certificate of Appreciation



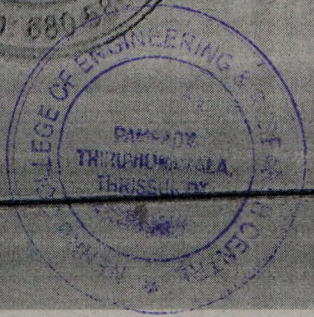
This is to certify that MEERA N
of 2016-19 MCA, NEHRU COLLEGE has worked as a volunteer
at Bharatha Puzha, Narayanamangalam area on 30th and 31st August 2018, as a
part of Kerala Flood Rescue and Relief Operations, coordinated by Thiruvilwamala
Grama Panchayat.

We appreciate all your sincere efforts and Best wishes for a bright future.



Manoj Kumar

Chairman- Development Standing Committee
Thiruvilwamala Gramapanchayat



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Nehru College of

Engineering and Research Centre
Pappady, Thiruvilwamala, Thrissur Dt
Pin: 680 597, Kerala

Student management

[Student](#) [Exam](#) [Result](#) [Forms](#)

- [My Profile](#)
- [Cancellation Requests](#)
- [Course/Semester Exam Registration](#)
- [Honours Degree](#)
- [My Certificates](#)
- [My Fees](#)
- [Non-KTU Course Registration Request](#)
- [★ Grace-mark Request](#)
- [Reports](#)

Add/Edit Student Grace mark Request [Rehabilitation Activities]

SHIVIN WILSON N-NCE16MCA18

Eligible to get grace mark

MCA Regular

[View All Request](#)

MASTERS IN COMPUTER APPLICATIONS

Authorized officer providing certificate

Manojkumar, Chairman-Development Standing Committee, Thiruvilwamala GramaPanchayat

Activity Dates

30/08/2018,31/08/2018

Number of days involved in Activity

2

Remarks

Cleaning, Arranging and rebuilding of BharathaPuzha and Approach Road at Narayanamangalam area

Description

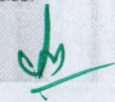
Certificate of Appreciation from Local-self Government

Attachment

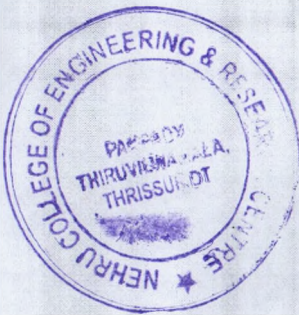
[Student Grace-mark request document](#)

1. I certify that all the documents attached here are issued by the competent authorities and the same are attested by me and Principal/HoD of the institution.
2. I agree that if any document is found incorrect later, the University can withdraw all academic grace marks awarded to me against this request and liable to be penalized also.
3. I understand that once the grace mark is awarded, I will not have any claim to apply for the same again.
4. I agree to bind myself to the decision of the University in awarding grace marks as per the rules and/or guidelines approved for the award of grace marks

I hereby declare that all the information given above are correct.



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Pin 680 597 Kerala



Student Management

Student Exam Result Forms

Grace mark Request

+ Add

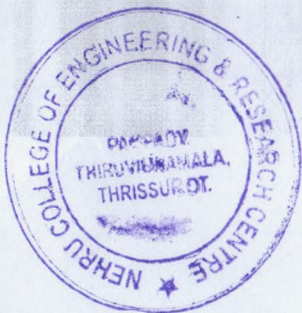
Institution	Request Type	Requested Academic Year
NEHRU COLLEGE OF ENGINEERING AND RESEA	Select	-Select-

Name & Reg. No.	Request Type	Invitation	Status	Date	Action
SHIVIN WILSON N-NCE16MCA18	Rehabilitation Activities	REHABILITATION	Eligible to get grace mark	01/04/2019	

1 items found, displaying 1 to 1

<< < 1 > >>

- My Profile
- Cancellation Requests
- Course/Semester Exam Registration
- Honours Degree
- My Certificates
- My Fees
- Non-KTU Course Registration Request
- ★ Grace-mark Request**
- Reports



PRINCIPAL
 Nehru College of
 Engineering and Research Cent
 Pampady, Thiruvilwamala, Thrissur
 Pin 680 597 Kerala

No 244/18

NCC16ME118

POST-FLOODING REHABILITATION PROGRAMME WORK DONE CERTIFICATE

This is to certify that Mr. VIVEK NAIR . P . A
a student of SS, MECHANICAL course at NEHRU COLLEGE OF ENGINEERING
AND RESEARCH CENTRE college has involved in the work listed in the table below.

Sl No	Date	Nature of work	No of hours	Remarks
1	28/08/2018	Packing and loading at GEC Thrissur	14	ACTIVELY PARTICIPATED IN
2	29/08/2018	Packing and loading at GEC Thrissur	14	COLLECTION AND
3	30/08/2018	Packing and loading at GEC Thrissur	14	DISTRIBUTION
4	31/08/2018	Packing and loading at GEC Thrissur	14	WORK AT GEC
5	01/09/2018	cleaning at GEC	14	THRISSUR IN CONNECTION WITH FLOOD RELIEF CAMP

Place: Thrissur

Date: 01/09/2018

Phone:- NO:- 7034716211

Signature

T. P. George
Dy. Talsildar (Thrissur)

Name and Designation: **VC of Collection & Distribution Centre**
issuing authority. for Flood Relief

Office seal

Self attested by
Vivek Nair P.A

29/08/18
C. S. Sankaran
HOD/ME



PRINCIPAL
Nehru College of
Engineering and Research Centre
Pampady, Thiruvilwamala, Thrissur Dt
Pin 680 597 Kerala

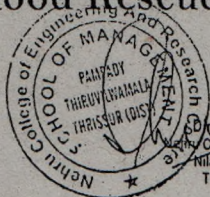


**DISTRICT ADMINISTRATION/DISTRICT COLLECTORATE
PALAKKAD
CERTIFICATE**

This is to certify that Mr/Ms. Jithesh K Reg no. NCEIEMBA 27 student of T4 semester MBA, Nehru School of Management Pambady Thrissur worked as a volunteer at the Rehabilitation work set up at Indoor Stadium Palakkad and Kinfra Integrated Industrial and Textile Park Kanjikode on 29/8/2018, 30/8/2018, 31/8/2018 as a part of Kerala Flood Rescue Operation.

Place: Plakkad

Date : 30/03/19



Dr. Sheela Srivastava
Director - School of Management
College of Engineering & Research Centre
Nila Garden, Pampady, Thiruvilwamala
Thrissur Dist., Kerala, Pin - 680 588

f. Dimple
Authorised Signatory
District Collector
Palakkad
Office Seal

Self attested

JITHESH K

30-Mar-2019



PRINCIPAL
Nehru College of
Engineering and Research Centre
Pampady Thiruvilwamala Thrissur Dt
Pin - 680 597 Kerala

CERTIFICATE OF APPRECIATION

Palakkad District Administration

This is to certify that SONU JOSE

ECE NCERC PANBADY

has worked as a volunteer at INDOOR STADIUM PALAKKAD

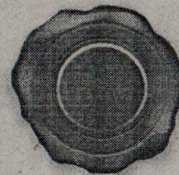
on Aug - 20,21,22,23,24,25,26,27,28,29,30,31, Sep - 1,2,3,4,5 2018 as part of Kerala Flood Rescue and

Relief Operations.

25/09/2018

DATE

Sonu Jose



D. Balamurali

D. Balamurali IAS
Chairperson - DDMA & District Collector
Palakkad

ck

PRINCIPAL
Nehru College of
Engineering and Research Centre
Pampady Thiruvilwamala, Thrissur
Pin 680 597 Kerala



S. Anand
22/09/19
HOD/EC/NCERC



GOVT. OF KERALA - DEPARTMENT OF HIGHER EDUCATION

DIRECTORATE OF TECHNICAL EDUCATION

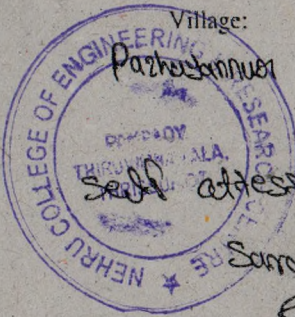
Post-Flooding Rehabilitation Programme

WORK DONE CERTIFICATE

NCE16ME091
3rd year ME-B

This is to certify that Mr./Mrs. SARATH.V.P. a student of SS MECHANICAL course at NEHRU COLLEGE OF ENGG. & RESEARCH CENTRE college has involved in the work listed in the table below.

Sl No.	Date	Nature Of Work	Number Of Hours Worked	Remarks
1	1/9/2018	Survey at Pazhavannur Pondicheth.	8	
2	2/9/2018	"	8	



Village:

Pazhavannur

Taluk:

Thalassery

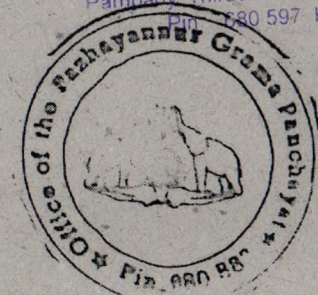
District:

Thirissur

Secretary
Panchayath/Municipality Corporation:
Pazhavannur Grama Panchayath

1. Name & Signature of the concerned NSS Programme Officer :
2. Name & Signature of Concerned A.E.
3. Name & Signature of Concerned E.E.

Signature
30/08/19
S. Sankar



PRINCIPAL
Nehru College of
Engineering and Research Centre
Pamady, Thiruvilwamala, Thiruvananthapuram
Pin - 680 597 Kerala

Scanned by CamScanner



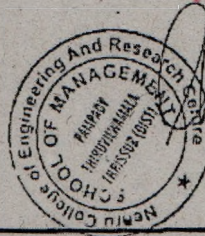
**DISTRICT ADMINISTRATION/DISTRICT COLLECTORATE
PALAKKAD
CERTIFICATE**

Self attested
Fabeena
Fabeena
30/03/19

This is to certify that Mr/Ms. Fabeena P. J Reg no. NCEIEMBA 19 student of T4 semester MBA, Nehru School of Management Pambady Thrissur worked as a volunteer at the Rehabilitation work set up at Indoor Stadium Palakkad and Kinfra Integrated Industrial and Textile Park Kanjikode on 29/8/2018, 30/8/2018, 31/8/2018 as a part of Kerala Flood Rescue Operation.

Place: Palakkad

Date: 30/03/19



Sheela Srivastava
Director - School of Management
Nehru College of Engineering & Research Centre
Nilta Garden, Pampady, Thiruvilwamala
Thrissur Dist., Kerala, Pin - 680 588

[Signature]
Authorised Signatory
District Collector
Palakkad
Office Seal



[Signature]
PRINCIPAL
Nehru College of
Engineering and Research Centre
Pampady, Thiruvilwamala, Thrissur Dt
Pin - 680 597 Kerala

CERTIFICATE OF APPRECIATION

Palakkad District Administration

This is to certify that AISWARYA M.

CSE NCERC PAMBADY

has worked as a volunteer at INDOOR STADIUM PALAKKAD

on Aug - 20,21,22,23,24,25,26,27,28,29,30,31, Sep - 1,2,3,4,5 2018 as part of Kerala Flood Rescue and Relief Operations.

25/09/2018

DATE

Aiswarya M.
Aiswarya M.



D. Balamurali

D. Balamurali IAS

Chairperson - DDMA & District Collector
Palakkad



[Signature]

PRINCIPAL

Nehru College of
Engineering and Research Centre
Pambady, Thiruvilwamala, Thrissur Dt.
Pin - 680 597 Kerala

CERTIFICATE OF APPRECIATION

Palakkad District Administration

This is to certify that BHAYANA.V.

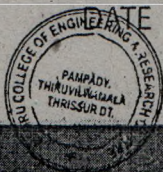
EEE NCERC, PAMBADY

has worked as a volunteer at INDOOR STADIUM PALAKKAD

on Aug - 20,21,22,23,24,25,26,27,28,29,30,31,Sep - 1,2,3,4,5 2018 as part of Kerala Flood Rescue and

Relief Operations.

25/09/2018



Self attested by
Bhavana



D. Balamurali

D. Balamurali IAS
Chairperson - DDMA & District Collector
Palakkad



cd

PRINCIPAL
Nehru College of
Engineering and Research Centre
Pambady Thiruvilwamala Thrikkur Dt
Pin 680 597 Kerala

APJ Abdul Kalam Technological University | Welcome NEHRU COLLEGE OF ENGINEERING AND RESEARCH CENTRE | Change Password | Settings | Logout

Student Details | Activity Point After Academics | Student Data Verification | Migration/Cancellation | Exam Registered Students | Re-admission | Honours Degree | Student Process Fee Details | Break of Study | Ph.D Course/Exam Registration | College Transfer | Branch Change | Student Course Eligibility | Shift College | Student Activity Points

Grace mark Request

Institution: NEHRU COLLEGE OF ENGINEERING AND RESEA | Request Type: Rehabilitation Activities | Requested Academic Year: 2018 - 2019

Program: -Select- | Branch: Select | Status: Select

Name & Reg. No. [Text Field]

Search

Name & Reg. No.	Request Type	Invitation	Status	Date	Action
AJAY ANAND. C-NCE15MC005	Rehabilitation Activities	REHABILITATION	Eligible to get grace mark	28/03/2019	[Icons]
SARUN. R. KUMAR.NCE15MC052	Rehabilitation Activities	REHABILITATION	Eligible to get grace mark	28/03/2019	[Icons]
ATHIRA MENON-NCE15MC015	Rehabilitation Activities	REHABILITATION	Eligible to get grace mark	28/03/2019	[Icons]
ABDUL LATHEEF. A-NCE15ME001	Rehabilitation Activities	REHABILITATION	Eligible to get grace mark	28/03/2019	[Icons]
	Rehabilitation Activities	REHABILITATION	Eligible to get grace mark	28/03/2019	[Icons]

https://app.ktu.edu.in/eu/stu/gracemarkRequestListing.htm IK. K-NCE15ME055

APJ Abdul Kalam Technological University | Welcome NEHRU COLLEGE OF ENGINEERING AND RESEARCH CENTRE | Change Password | Settings | Logout

Student Details | Activity Point After Academics | Student Data Verification | Migration/Cancellation | Exam Registered Students | Re-admission | Honours Degree | Student Process Fee Details | Break of Study | Ph.D Course/Exam Registration | College Transfer | Branch Change | Student Course Eligibility

Add/Edit Student Grace mark Request [Rehabilitation Activities]

AJAY ANAND. C-NCE15MC005 | Eligible to get grace mark

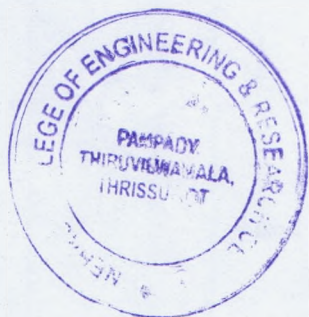
B.Tech Regular | MECHATRONICS ENGINEERING | View All Request

Show History

Authorized officer providing certificate
T.P. George, Dy Tahsildar, Thirissur

Activity Dates: 26/08/2018, 29/08/2018, 30/08/2018, 31/08/2018, 01/09/2018, 02/09/2018, 03/09/2018, 04/09/2018 | Number of days involved in Activity: 8

Remarks: Collection and distribution work at gec Thirissur



[Signature]
PRINCIPAL
 Nehru College of
 Engineering and Research Centre
 Pampady, Thiruvilwamala, Thirissur Dt
 Pin 680 597 Kerala

APJ Abdul Kalam Technological University | Welcome, NEHRU COLLEGE OF ENGINEERING AND RESEARCH CENTRE | Change Password | Settings | Logout

- Exam Registered Students
- Re-admission
- Honours Degree
- Student Process Fee Details
- Break of Study
- Ph.D Course/Exam Registration
- College Transfer
- Branch Change
- Student Course Eligibility
- Shift College
- Student Activity Points
- Non-KTU Course Registration Request
- Grace-mark Request**
- Outside Program/Long term Internship/External registration
- Student Audit Course Marking

Show History

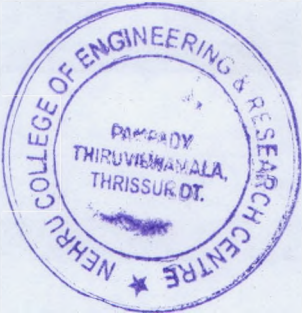
Authorized officer providing certificate
T. P. George, Dy. Tahsildar, Thiruvur

Activity Dates	Number of days involved in Activity
28/08/2018, 29/08/2018, 30/08/2018, 31/08/2018, 01/09/2018, 02/09/2018, 03/09/2018, 04/09/2018	8

Remarks
Collection and distribution work at gac, Thiruvur

Description	Attachment
Flood relief	View Download Print Delete
Flood relief	View Download Print Delete

Certified that the entries made above have been verified and found correct. The application for the grace mark is recommended.



(Signature)
PRINCIPAL
 Nehru College of
 Engineering and Research Centre
 Pampady, Thiruvilwamala, Thrissur Dt
 Pin 680 597 Kerala