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

7.1.6-The institutional environment and energy initiatives are confirmed through the following

1. Green audit / Environmental audit

2. Energy audit

3. Clean and green campus recognitions/awards

4. Beyond the campus environmental promotion and sustainability activities

Please find the Supporting Files Given Below

7/8/21

Principal

PRINCIPAL
U. N. (Auto) College of Sc. & Tech.
Adaspur, Cuttack

ENVIRONMENT AUDIT REPORT

(2022-2023)

U. N. (AUTO) COLLEGE

OF

SCIENCE AND TECHNOLOGY

ADASPUR, CUTTACK-754011

ENVIRONMENT AUDIT REPORT UNC 2022-23

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ACKNOWLEDGEMENT

Udayanath Autonomous College (hereinafter called UNC)has been working at the forefront since its inception by conducting environmental campaigns, workshops and other extension activities to bring about social change for national and international development. It is well aware about the needs of the environment audit for the maintenance and future development of the campus. In its pursuit of excellence, UNC has recognized itself to improve the environmental quality and maintain its unique pristine ecosystem for the future generation of students and all the inhabitants of the campus. Although we have been taking a number of steps to conserve and protect our environment but this report is the first formal effort to document the results of our investigation and interpret the information of all the required parameters of the Environment audit process. UNC aims to take up the policy and efforts at every level to avert ecological catastrophe on a global scale by supporting the climate neutrality goals committed by the Government of India. As a part of this, efforts are taken to continuously monitor the sustainability of the academic process by constituting this Environment Audit Committee consisting of faculty members working in this arena to collect basic data of the environmental parameters within the campus so that the environmental issues are resolved within the campus. The Environment Audit Committee has tried to identify the current / emerging environmental issues so as to monitor the environmental management practices adopted in the campus along with subsequent impact of these on its environment. This report is an outcome of efforts of each and every member of the Environment Audit Committee who undertook this audit to gather information on every parameters of the environment, compiled and analyzed the data to recognize the immediate and serious threats within the campus so that opportunities can be explored to bring about continuous improvement in our environmental performance and standards by our suggestions and recommendations put forth. It is hoped that this report will receive adequate attention of all the stake holders for pursuing a bottom-up approach in which we stand to face the challenges in future.

The sincere encouragement and administrative support of Prof. Arun Kumar Nayak, Principal of U. N. (Auto.) College of Science and Technology during the conduct of the study has been a guiding force and we, the Environment Audit Committee express our heartfelt gratitude to him for his kind gesture.

Special thanks are due to Prof. Santilata Sahoo for her tremendous support in Floral Diversity; Prof. Daityari Singh for providing primary data on Environmental Audit; Prof. Krupasindhu Pradhan, Coordinator, IQAC for providing support to conduct the various assessments.

We are indebted to all the HODs, Teachers, officers, all staff members and all the campus dwellers of this Institute for their kind support in collecting data for the report.

We sincerely hope and believe that the untiring efforts in compiling the reports by the present Environment Audit Committee will be helpful for this Institute and it becomes a responsibility of all the stakeholders of this campus to follow the proposed management plan suggested in the report to reduce its impact on our environment.

Environmental Audit Team

EXECUTIVE SUMMARY

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

This audit report contains observations and recommendations for improvement of environmental consciousness.

Udayanath Autonomous College, Adaspur, a premium educational institution of Odisha, started as a college exclusively dealing with various fields of the Arts stream in its own building at Prachi Jnanapitha on 1991. Soon after that, to manifest the cherished dreams of all the people working hard for the noble cause of providing higher education and entrusting their hopes and faith on the institute, UNC managed to introduce the other two streams of Science (1992) & Commerce (1993), making the institute a full-fledged hub of knowledge and learning. Honours teaching facilities were introduced in Economics, Political Science, History, Odia, Physics, Chemistry, Mathematics, Botany and Zoology in 1996; Accounting and Management in 2002; English and Education in 2003; Psychology and Sanskrit in 2004; Philosophy in 2005; Library Science and Computer Science in 2007. UNC flaunts itself as the only college in the entire state to have a teaching department in the field of Women Studies since 2010, which makes it have a grand total of 26 honours subjects (Arts- 14, Science- 8 and Commerce). To Commensurate with this vertical academic growth, the college was accorded Autonomous status in 2009 and was accredited by NAAC with B+ Grade. The college made tremendous strides with the opening of P.G classes in the subject of Mathematics, Political Science, Economic and Clinical Psychology from the session 2017-18. Now, the college holds its head high as one of the highest ranking institutions of Odisha offering P.G. courses in 20 subjects. In its long journey of 32 years the college has left indelible marks on the stand of time by producing brilliant luminaries in different fields like science, technology, sports, social service, administration and politics.

CHAPTER 1

INTRODUCTION

1.1 BRIEF HISTORY OF THE COLLEGE

Nestled in the lap of Eastern Odisha, the Udayanath Autonomous College of Science & Technology, at- Prachi jnanapitha, Po- Adaspur, Dist- Cuttack has taken long strides to reach its destination- a holistic approach to life through meaningful education. The crest of the college truly symbolizes the mission & goals of the institution. The logo of the college is a magnificent blend of the heritage magnified by modernity & technological progress. The charming college emblem comprises five distinct symbols such as: **sacred flame, the open book, the river, the greenery & the installed factory**. The sacred flame symbolizes the light of knowledge or Jnanaloka fostered by the institution. The open book symbolizes dissemination of knowledge. The holy Prachi River stands for gravity, transparency, solidarity& sanskruti or culture, also suggests unending flow of knowledge. The greenery symbolizes the agricultural development which is essential for overall development of the country. The installed factory suggests advanced technology & scientific development leading to industrial promotion & generation of employment.

Lastly the sacred line in Devanagari Script "तमसो मा ज्योतिर्गमय" appearing in the box at the base of the crest reveals the Motto of the institution, "Lead Me from Darkness to Light" & glorifies the Jnanapitha. The architectural design & the artistic revelations on the box add beauty carrying the impression of a holistic approach towards education.

Under the dynamic leadership of Sj. Trilochan Kanungo, former Member of Parliament (LS), educationist & social thinker & the generous, Nobel financial contribution made by the Late Udayanath Sahoo of the locality, the college managed to weather the difficulties. Named after the patron as Udayanath College of Science & Technology, the college was transferred to its own building at Prachi Jnanapitha on 3 December 1986. The other two streams of science & commerce at the H.S. level were introduced & all the three streams were accorded official recognition & affiliation together in 1987. The college stands on the holy river Prachi; close to Kenduli, the birth place of the renowned classical poet Jayadev. The establishment of U.N. College of Sc. & Tech. at Adaspur has not only added a new dimension to the aspirations of the people of the region but it has also facilitated the spread of education to every corner of

the state. To fulfill the cherished dream of the people for higher education, undergraduate classes were opened in Arts in 1991; Science in 1992 & Commerce in 1993. The college has had 2NCC units- one for boys & another for girls, 4NSS units, 1Rover unit, 1Ranger unit & 2YRC units engaged in welfare schemes.

1.2 VISION & MISSION OF THE INSTITUTE

MOTTO

तमसो मा ज्योतिर्गमय

"**Lead Me from Darkness to Light**"

VISION

❖ To flourish as a premier institute of higher learning to cater the learning needs of rural youths for enhancing their quality of life and nurturing an ambience for promotion of innovative ideas and best practices in teaching , learning, research, extension and outreach activities.

MISSION

❖ To provide meaningful education, environment, opportunities & experiences that enable, more particularly, rural students to grow & prosper in their life & career.

❖ To develop Scientific Temper & Critical Thinking with the inculcation of values of discipline, hard work & team spirit.

❖ To inculcate the students a sense of professionalism, humanism & social responsibility through quality education.

❖ To promote leadership among the students.

❖ To strive for quality education in keeping with motto of the institution and prepare young minds more particularly of rural youth for imbibing knowledge, skills & sensitivity.

1.3 ACADEMIC PROGRAMS

TABLE 1: DETAILS OF ACDEMIC PROGRAMS

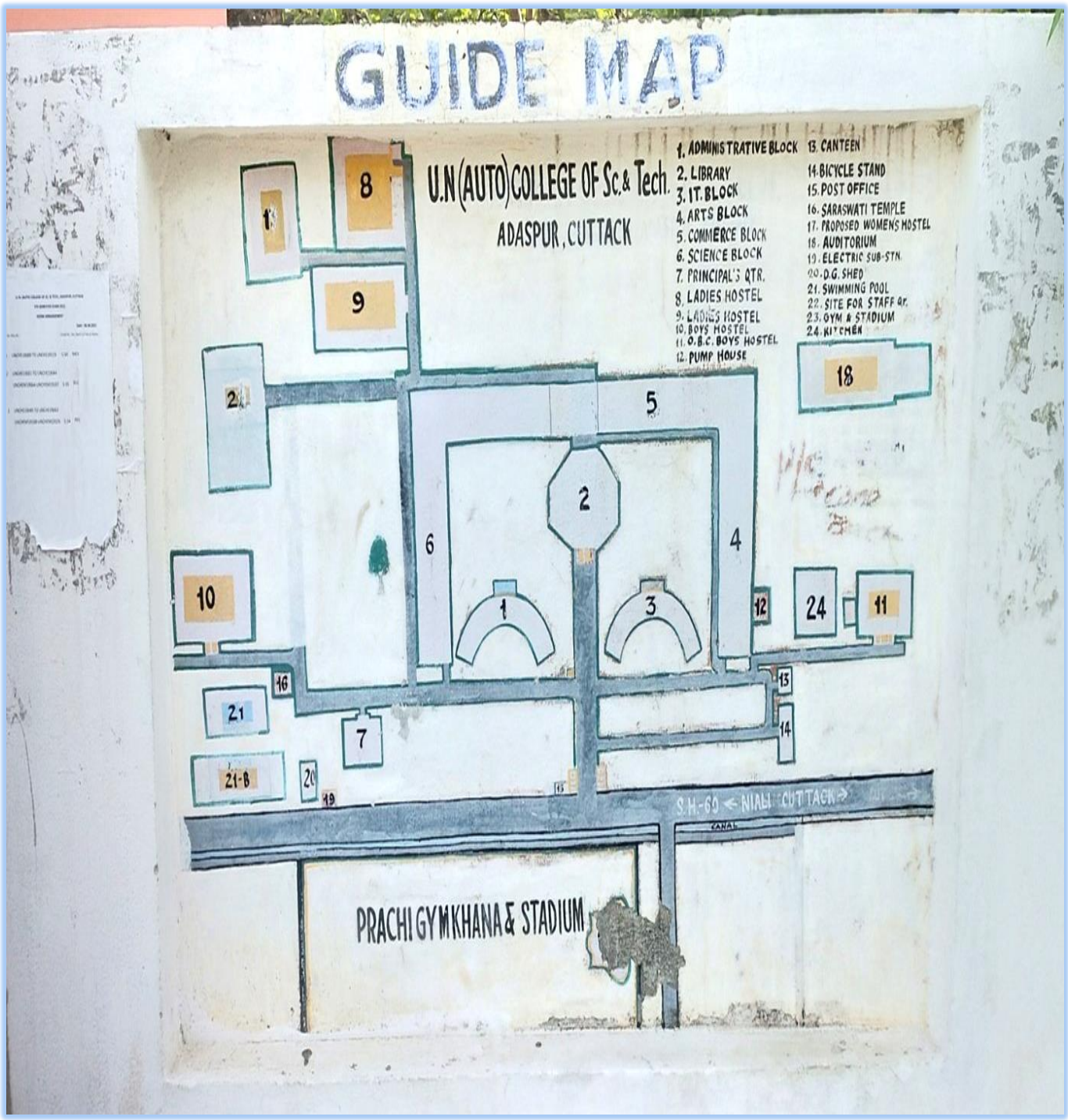
ACADEMIC YEAR 2022-23

NAME OF THE PROGRAMME	NUMBER OF SANCTIONED SEATS
UG PROGRAM	
Bachelor in Arts	416
Bachelor in Commerce	256
Bachelor in Science& comp sc	PCM-416 +64 CBZ-224
BBA	30
BCA	30
B.SC. ITM	30
B.Lib (1 year)	64
PG PROGRAM	
Botany	32
Chemistry	32
Commerce	32
Computer Science	32
Analytical and Applied Economics	32
Education	32
English	32
Hindi	32
History	32
Mathematics	32
MFC	30
MSW	30
Odia	64
Philosophy and Critical thinking	32
Physics	32
Pol. Science	32
Clinical Psychology	32
Sanskrit	32
Sociology	32
Zoology	32

1.4 LAYOUT OF THE CAMPUS

The college covers an area of 30acres of land seated at Prachi jnanapitha of Adaspur village by the side of SH-60 near the bank of holy river Prachi under Kantapada block in the district of Cuttack. It liesat North latitude 20.213059º & East longitude 86.014549º. The institute is surrounded by local village, the holy river Prachi & some other educational centers like coaching centers, computer training centers. The college is situated in between the center of the Twin-city (Cuttack & Bhubaneswar). It's equally far from Bhubaneswar and Cuttack (35 K.M.).

Location & Area of the College (Source- Google Earth)



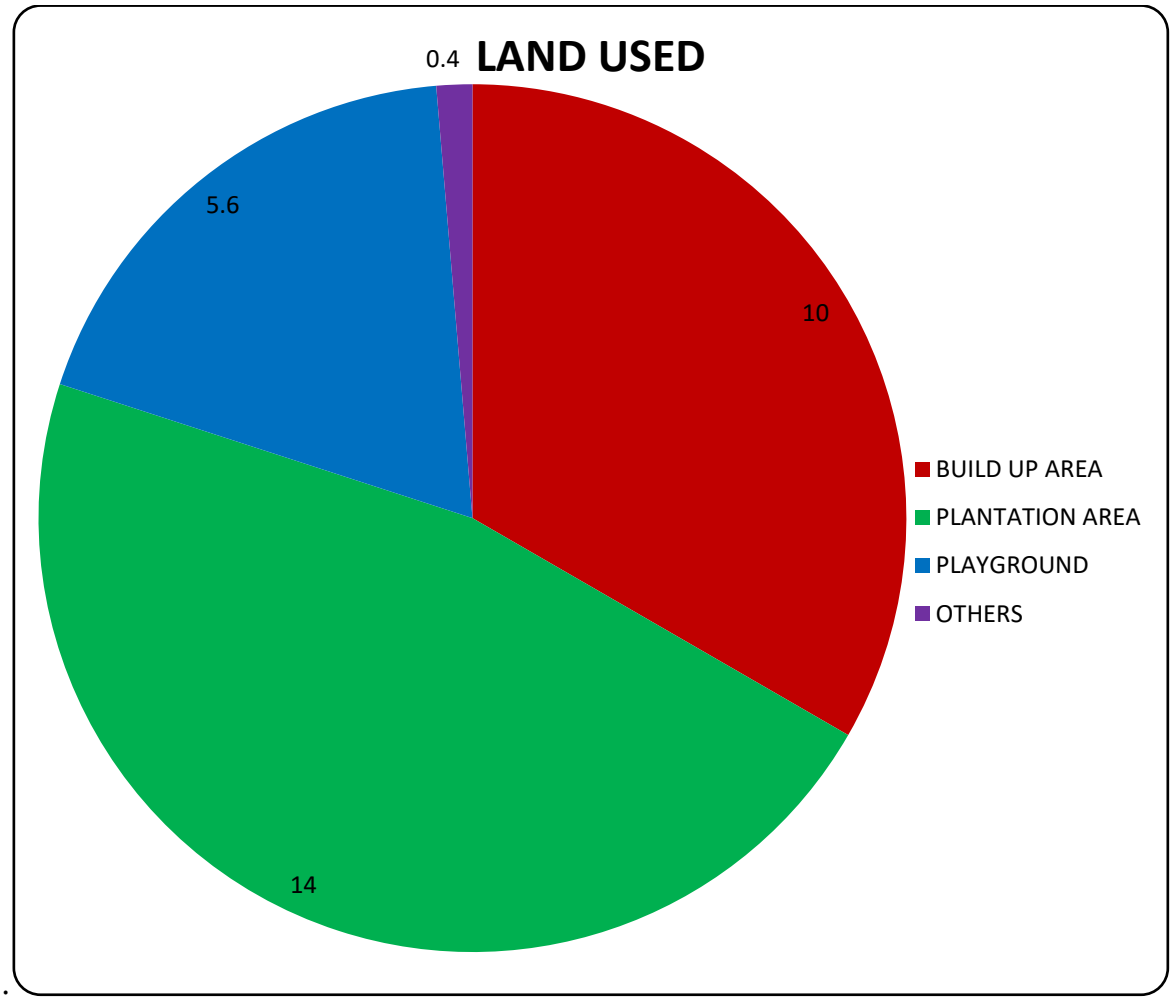
Guide Map of UNC Campus

UNC Main Gate

Aerial View of the College

1.5 LAND USED DATA

The college covers an area of 30acres of land. The maximum coverage of land is occupied by the Plantation area. The construction area comes next with a little bit more land than the half of the land coverage following the plantation area. The playground area covers the minimum area in comparison to plantation and construction area coverage.



Land used data

The whole college area has been divided into two main parts, Stadium site & Main Academic- Administration site. The stadium site constitutes a Gymnasium, Sports Hostel, Playground, Gallery and Canteen for sports hostel. The Academic- Administration site constitutes the Main Administrative building, IT block, Science block, Arts block, Commerce block, P.G. Science block, P.G. Arts block, Central Library, Auditorium, Saraswati temple,

Swimming Pool, Guest House, Staff quarters, Principal quarter, Heritage building, College Main gate, Boys Hostels(02), Girls Hostel (03), Botanical Gardens (02), Flower garden (01), Orchards (02), Students 'Cycle& Bike stand, Car parking for staff, Staff two wheelers parking, Cafeteria, Post-office, Security room, D.G. Shed, transformer area& biofertilizer unit.

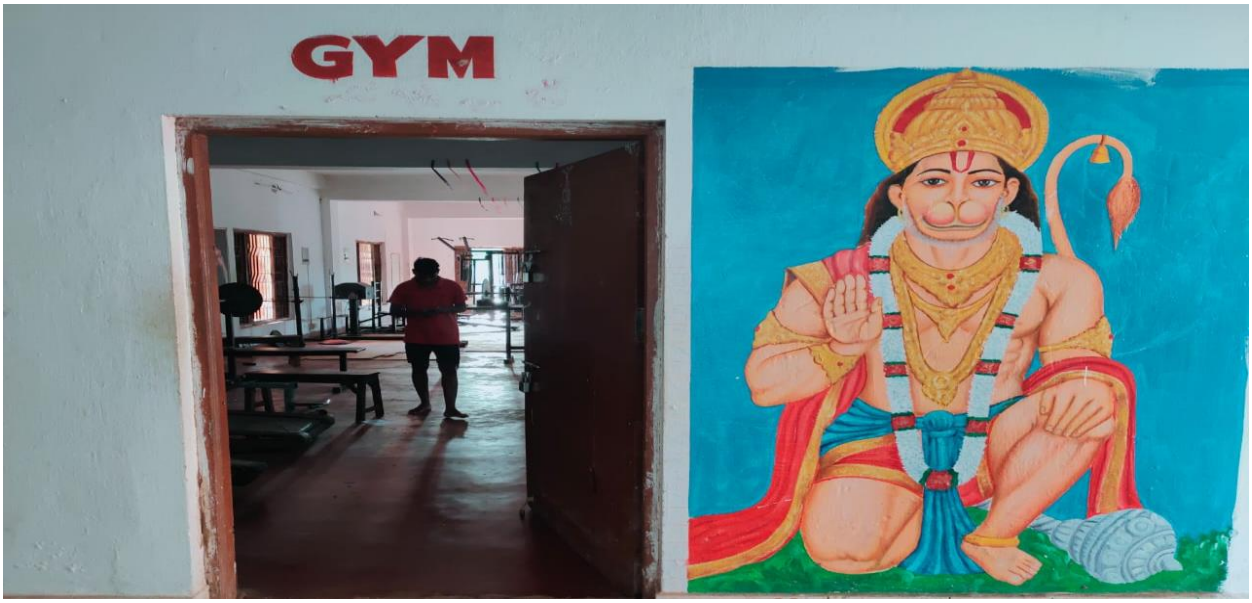
TABLE 2: LAND USED DATA

SERIAL NO.	**NAME OF THE SITE**	**AREA COVERED (in sqft.)**
STADIUM SITE		
1.	Gymnasium	1200 sqft.
2.	Sports Hostel	7500 sqft.
3.	Playground	507909.6 sqft.
4.	Gallery	4500 sqft.
5.	Canteen for sports hostel	2000 sqft.
TOTAL		523109.6 sqft. (12.00 acre)
ACADEMIC- ADMINISTRATION SITE		
1.	Main Administrative building	4300 sqft.
2.	IT block	4300 sqft.
3.	Science block	16500 sqft.
4.	Arts block	11100 sqft
5.	Commerce block	4950 sqft
6.	P.G. Science block	11057 sqft
7.	P.G. Arts block	10376 sqft
8.	Central Library	3500 sqft
9.	Auditorium	700 sqft
10.	Saraswati temple	800 sqft
11.	Swimming Pool	12000 sqft
12.	Guest House	4880 sqft
13.	Staff quarters	1296 sqft
14.	Principal quarter	2100 sqft
15.	Heritage building	3476 sqft
16.	College Main gate	150 sqft
17.	Mahodadhi Boys' Hostel	10000 sqft
18.	Meghasan OBC Boys' Hostel	7700 sqft

19.	Mahadevi Girls' Hostel	10542 sqft
20.	Mandakini Girls' Hostel	10300 sqft
21.	P.G. Ladies Hostel	11700 sqft
22.	Botanical garden 1	30000 sqft
23.	Botanical garden 2	25000 sqft
24.	Flower garden	20000 sqft
25.	Orchard 1	30000 sqft
26.	Orchard 2	50000 sqft
27.	Students' Cycle stand	20000 sqft
28.	Students' Bike stand	20000 sqft
29.	Car parking for staff	13800 sqft
30.	Two wheeler parking for Staff	6500 sqft
31.	Cafeteria	1000 sqft
32.	Post-office	300 sqft
33.	Security room	250sqft
34.	D.G. Shed	350 sqft
35.	Transformer area	800 sqft
36.	Road	60000 sqft
37.	Biofertilizer unit	1850 sqft
38.	Vermi compost unit	1156 sqft
39.	Plantation area	6 acres
40.	Others	2.43acres
	TOTAL	789742 sqft (18.13 acres)

Stadium & Sports Hostel

Playground



Gymnasium

Central library

Saraswati temple

CHAPTER 2

ENVIRONMENT AUDIT

Modernization and industrialization are the two important outputs of the twentieth century that have made human life more luxurious and comfortable. Simultaneously, they are responsible for voracious use of natural resources, exploitation of forests and wildlife, producing massive solid waste, polluting the scarce and sacred water resources, and finally making our mother Earth ugly and inhospitable. Today, people are getting more familiar with global issues like global warming, greenhouse effect, ozone depletion, climate change, etc. Now, it is considered as a final call by mother Earth to walk on the path of sustainable development. The time has come to wake up, unite and combat together for a sustainable environment.

Environment audit refers to a system that has been devised to monitor the environmental performances of higher education institutions. Many institutions and organizations have started adopting compatible environmental management systems either voluntarily or by external certification. The environmental management and monitoring system not only helps the institution to set an example for the community pertaining to protection of the environment but also educates young student-teachers of the institutions to carry out best practices of the system for sustainable development of the institution.

The process of environmental audit was first mentioned under the Environmental Protection Act (1986) by the Ministry of Forest, government of India on 13 March 1992. Later, various higher education institutes took responsibilities and opportunities to foster environmental sustainability and create their individual institutional policies based on national and international declarations for protection of the environment. The National Assessment and Accreditation Council, New Delhi (NAAC) has made it mandatory that all higher education institutes must submit an annual environment audit report since 2016-17.

In view of NAAC circular regarding environment audit, Udayanath Autonomous College has taken upon itself the task of conducting an environment audit and has evaluated it profoundly by a team of dedicated and hardworking members. The team focuses on greenery of the campus, air pollution, noise pollution, waste management, energy management and carbon footprint being implemented by the institute. It examines the degree to which environmental policies and environmental management system are implemented in the institute and how

effectively they are being performed to attain a sustainable environment. Environment audit is very critical for an institute that intends to measure the outcomes of the policies it has executed.

2.1 OBJECTIVES OF THE AUDIT

- Understanding the current practices of sustainability with regard to the use of water and energy, generation of wastes, transportation, purchase of goods, etc.
- Establishing a baseline of existing environmental conditions with focus on natural and physical environment.
- Creating awareness among students and staff concerning real issues of environment and its sustainability.
- To create a report that documents the baseline data of good practices and provide strategies and action plans towards improving environmental quality for future.

2.2 BENEFITS OF ENVIRONMENT AUDIT TO EDUCATIONAL INSTITUTIONS

There are many advantages of environment audit to an Educational Institute:

- It would help to protect the environment in and around the campus.
- Recognize the cost saving methods through waste minimization and energy conservation. Empower the organization to frame a better environmental performance.
- It portrays good image of institution through its clean and green campus.
  Finally, it will help to built positive impression for through green initiatives the upcoming NAAC visit.
- To create a green campus.
- To enable waste management through reduction of waste generation.
- To create plastic-free campus and evolve health consciousness among the stakeholder.
- Recognize the cost-saving methods through waste minimizing and managing.
- Authenticate conformity with the implemented laws.
- Empower the organizations to frame a better environmental performance.
- Enhance the alertness for environmental guidelines and duties

- Impart environmental education through systematic environmental management approach and Improving environmental standards
- Benchmarking for environmental protection initiatives
- Financial savings through a reduction in resource use
- Development of ownership, personal and social responsibility for the UNC and its environment
- Invoking a sense of urgency to understand environmental ethics and value systems among youngsters
- Environment auditing should become a valuable tool in the management and monitoring of environment and sustainable development programs of the UNC.

2.3 PERFORMANCE INDICATORS FOR ENVIRONMENT AUDIT

1**. Energy Consumption**: This performance indicator measures the amount of energy consumed by the campus. It examines the energy consumption patterns, identifies areas of high energy usage, and recommends strategies for energy efficiency and conservation.

2. Waste Management: This indicator assesses how effectively the college manages its waste, including measures taken to reduce, reuse, and recycle waste materials. It evaluates waste management processes, analyzes the waste disposal methods, and suggests improvements to minimize environmental impact.

3. Water Usage: Water usage is another essential performance indicator. It tracks the college's water consumption, identifies water-intensive areas, and suggests measures to reduce water usage and promote water conservation practices.

4. Environmental Compliance: This indicator evaluates the college's adherence to environmental regulations, permits, and licenses. It examines whether the college is complying with local and national environmental regulations and recommends actions to address any non-compliance issues.

5. Greenhouse Gas Emissions: This performance indicator focuses on quantifying the college's greenhouse gas emissions. It measures the carbon footprint of the college, identifies sources of emissions, and suggests strategies to reduce emissions and combat climate change.

6. Biodiversity Conservation: This indicator assesses the college's efforts in preserving and promoting biodiversity on its campus. It evaluates measures taken to protect local flora and fauna, enhance green spaces, and introduce native species. It also recommends initiatives to raise awareness about biodiversity conservation among students and staff.

7. Transportation Management: This performance indicator examines the college's transportation practices and policies. It assesses the college's efforts to promote eco-friendly modes of transport, such as carpooling, public transportation, and cycling. It also evaluates the availability of parking spaces for electric vehicles and suggests measures to reduce reliance on fossil fuel-based transportation.

8. Education and Awareness: This indicator evaluates the college's initiatives to educate and raise awareness about environmental issues among students, staff, and the wider community. It assesses the effectiveness of environmental education programs, awareness campaigns, and sustainability-focused events organized by the college.

9. Green Building Practices: This performance indicator focuses on the college's infrastructure and building practices. It assesses whether the college follows green building principles, such as energy-efficient design, use of sustainable materials, and integration of renewable energy sources. It also suggests ways to improve the sustainability and environmental performance of existing buildings.

10. Stakeholder Engagement: This indicator evaluates the college's engagement with various stakeholders, including students, faculty, staff, local community, and government agencies. It assesses the level of collaboration, consultation, and involvement of these stakeholders in the college's environmental initiatives. It also recommends ways to enhance stakeholder engagement and facilitate partnerships for sustainable development.

2.4 METHODOLOGY FOLLOWED FOR CONDUCTING ENVIRONMENT AUDIT

The management of the Institution has shown a commitment towards environment auditing during the pre-audit meeting. They were ready to encourage all green activities. It was decided to promote all activities that are environment friendly such as awareness programs on the environment, campus farming, planting more trees in the campus, etc. In order to perform environment audit, the methodology included different tools such as preparation of questionnaires, physical inspection of the campus, observation and review of the documentation, interviewing key persons and data analysis, measurements and recommendations. The study covered the following areas to summarize the present status of environmental management in the campus:

- Energy Management
- Water Management
- Waste Management
- Environment Management

The audit process was carried out in three phases. At first, all the primary and secondary data required for the study was collected from various sources by concerned departments. A broad reference work was carried out to clear the idea of environment auditing. Different case studies and methodologies were taken into consideration and the following methodology was adopted for the present audit. The methodology of the present study is based on onsite visits, personal observations, door to door visit and questionnaires. Initially, based on data requirements, various sets of questionnaires were prepared. The surveyors then visited all the departments of the UNC and the questionnaires were filled. The generated data is subsequently gathered and used for further analysis. From the outcome of the overall study, a final report is prepared.

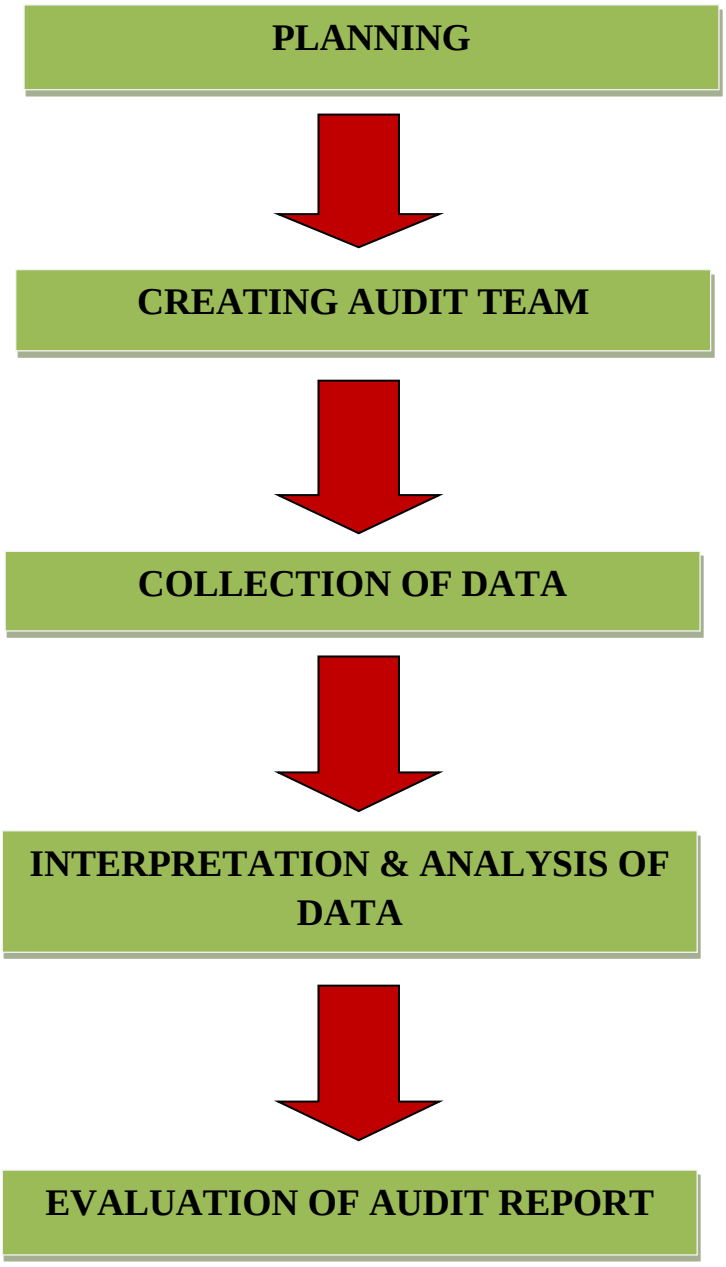
Step 1: Collection of primary data through observation, surveys, interaction and discussions

Step 2: Collection of secondary data through observation, surveys, interaction and discussions

Step 3: Conduction of comprehensive Environment Audit

Step 4: Reporting the Environment Audit

METHODOLOGY



2.4.1 DATA COLLECTION

UNC has a vast built-up area comprising various departments under various academic buildings, staff quarters, many facilities including gymnasium and swimming pool. All these amenities have different kinds of infrastructure as per their requirement. All these buildings were visited by the surveyors and the present condition is checked with the help of the questionnaires. Personal observations were made during the onsite visit. All the amenities

were clubbed in, as per their similarities and differences, which makes the survey and further analysis easier. For the data compilation purpose, the Departments of the Institution and support services were clubbed into four types of buildings and given names as academic buildings, administrative building, hostel building, sports complex & Guest house. The details of the Buildings are as follows:

TABLE 3: DETAILS OF MAIN BLOCKS

SERIAL NO.	NAME OF THE BUILDING
1.	Administrative Building
2.	Academic Building
3.	Hostel Buildings
4.	Guest house
5.	Sports complex

After the collection of secondary data, the reviews related to each environmental factor were taken by the environment audit team. The data were tabulated, analyzed and graphs were prepared. Depending upon the observations and data collected, interpretations were made. The lacunas and good practices were documented. The Environmental Management Plan (EMP) was prepared for the next academic year in order to have better environmental sensitization. Finally, all the information was compiled in the form of the Environment Audit Report.

2.4.2 DATA ANALYSIS & RECOMMENDATIONS

Proper analysis and presentation of data produced from work is a vital element. In case of aenvironment audit, the filled questionnaires of the survey from each group were tabulated as per their modules, in Excel spreadsheets. The tabulated data is then used for further analysis. For a better understanding of the results and to avoid complications, averages, and percentages of the tables were calculated. A graphical representation of these results was made to give a quick idea of the status. Interpretation of the overall outcomes was made which incorporates all the primary and secondary data, references, and interrelations within. Final report preparation was done using this interpretation.

CHAPTER 3

PRE AUDIT QUESTIONNAIRES & CAMPUS ENVIRONMENT

PRE AUDIT QUESTIONNAIRES

Questionnaires were prepared to conduct the Environment audit in our campus based on the guidelines, rules, acts, and formats prepared by the Ministry of Environment, Forest and Climate Change (New Delhi), Central Pollution Control Board, and other statutory organizations. Most of the guidelines and formats are based on broad aspects and some of their issues and formats were not applicable for our campus. Therefore, using these guidelines and formats, combinations, modifications, and restructuring were done and sets of questionnaires were prepared for solid waste management, energy management, water management, hazardous waste and e-waste management data.

All the questionnaires were a group of modules. The first module was related to the general information of the concerned department, which broadly includes the name of the department, month and year, the total number of students and employees, visitors of the department, average working days and office timings, etc. The next module was related to the present consumption of resources like water and energy, or the handling of solid and hazardous waste. Maintaining records of the handling of solid and hazardous waste is much important in environment audits. There are possibilities of loss of resources like water and energy due to improper maintenance, and taking precautions for this kind of probability from the beginning of the survey is necessary for an environment audit. One separate module was based on the questions related to this aspect. Another module was related to maintaining records, like records of disposal of solid waste, records of solid waste recovery, etc. For better convenience of the surveyor, some statistics like basic energy consumption characteristics for electrical equipment, etc. were provided with the questionnaires.

General questionnaires

1. Where is the institute located?
2. What is the strength of the institute?
3. What is the total area of the campus?
4. Does the institute have
    a. Playground
    b. Library
    c. Laboratory
    d. Toilet
    e. Garden area
    f. Canteen
    g. Hostel
    h. Staff quarters
    i. Garbage or waste store yard
5. Does the institute have the following nearby
    a. Dispensary
    b. Municipal dump yard
    c. Open drainage
    d. Industry
    e. Sewer line
    f. Public convenience
    g. Bus stop
    h. Railway station
6. Does the institute conduct an environment audit of the campus?
7. Climate & topography of the institute
8. Soil analysis report

Questionnaires on water storage, consumption and conservation

1. What are the water sources to the institute?
2. What is the water storage system in the institute?
3. What are the ways in which water is consumed in the institute?
4. Is there any water recycling system?
5. How many water purifiers are used in the campus?
6. What are the number of bathrooms in academic, administrative and hostel buildings?
7. Does the institute have any rainwater harvesting system?
8. Does the institute follow any special method for safe disposal of water released from the laboratory?
9. What are the techniques used to save water by the institute?

Questionnaire on energy consumption and conservation

1. How many CFL/LED bulbs are used in the institute?

2. What is the source of energy in the institute?
3. Does the institute follow any energy saving techniques?
4. What are the various forms in which energy is used in the institute (firewood, electricity, fuel, etc.)?
5. How many air conditioners are installed in the institute?
6. Does the institute run on DG as an alternative to electricity?
7. Do people of the institute ensure to completely turn off electronic devices such as PCs and ACs?
8. Are electronic devices such as PCs and ACs run on power saving mode?

Questionnaires on solid waste generated and its management

1. What are the sources and types of waste generated in the institute?
2. How much waste per day is generated in the campus approximately?
3. Is there any adoption of waste treatment system?
4. How the waste generated is managed?
5. Is any waste recycling method is adopted?
6. Are the domestic and agricultural waste convertedto compost?
7. How can the institute achieve a state of zero garbage?

Questionnaire on greenery of the campus

1. Does the campus have a garden?
2. What is the total number of tree, herb and shrub species in the campus?
3. Name the different type of plants in the institute
4. Is there an active involvement of students in the management of the garden?
5. Does the garden have any RET plants?

Questionnaire on air quality of the campus

1. What is the approximate size of a classroom and how many windows are present in each classroom?
2. What is the approximate number of vehicles owned by
    a. Staffs
    b. Students
3. Is proper ventilation of every floor ensured by the institute?
4. Are there any cases of respiratory ailments among students of the institute?
5. What are the steps taken by the institute to improve overall air quality of the campus?

Questionnaire on biodiversity of the institute

1. Has the institute accurately recorded accounts of every plant species found in the campus?

2. Does the institute conduct any kind of biodiversity awareness programs?

Questionnaire on environment legislative compliance

1. Does the institute regularly monitor the quality of water supplied to the campus?
2. Does the institute release any kind of hazardous waste? If yes, what are their plans for safe disposal/ treatment of such waste produced?
3. Is there proper propagation of necessary pre-required knowledge of environmental laws and innovative methods of managing waste produced among the students?
4. What are the steps taken by the management /governing body against people who pollute the environment or violate environmental laws of the institute?

Answers to questionnaires and the campus environment

1. Where is the institute located?

The college covers an area of 30acres of land. It is seated at Prachi jnanapitha of Adaspur village, by the side of SH-60 and near the bank of holy river Prachi under Kantapada block in the district of Cuttack. It is located precisely at north latitude 20.213059º & east longitude 86.014549º. The institute is surrounded by local village, the holy river Prachi and some other educational centers like coaching centers, computer training centers etc. The college is situated between the twin-cities, Cuttack and Bhubaneswar.

2. What is the strength of the institute?

The institute provides UG courses in 26 subjects and PG courses in 20 subjects with a total strength of about 7000 students. The institute is well known for pursuing academic excellence by inculcating a progressive sense of discipline, punctuality, unity, honesty, accountability and overall constructive practices.

3. What is the total area of the campus?

The college covers an area of 30acres of land. The whole college area has been divided into two main parts, stadium site & main academic- administration site. The stadium site covers an area of 12 acres & main academic-administration site stretches over an area of 18 acres.

4. Does the institute have the following?

SERIAL NO.	AREA	AVAILABLE	DETAILS
1.	Playground	Available	❖ Gymnasium ❖ Badminton court ❖ Volleyball court ❖ Kho – kho court ❖ Football ground ❖ Cricket ground
2.	Library	Available	❖ Central library ❖ E-library ❖ Reading room
3.	Laboratory	Available	❖ Botany ❖ Chemistry ❖ Comp.Sc. ❖ Clinical Psychology ❖ Geology ❖ Geography ❖ Mathematics ❖ Physics ❖ Zoology
4.	Garden area	Available	❖ Flower garden ❖ Orchard 1 ❖ Botanical garden 1 ❖ Orchard 2 ❖ Botanical garden 2
5.	Toilet	Available	❖ Separate toilets for male & female in academic, administrative, hostel, guest house buildings. ❖ Separate toilets are also available for physically challenged.
6.	Canteen	Available	❖ An open well furnished, hygienic canteen is present.
7.	Hostel	Available	❖ Mahodadhi Boys' Hostel ❖ Meghasan OBC Boys' Hostel ❖ MahaDevi Girls' Hostel ❖ Mandakini Girls' Hostel ❖ P.G. Women's' Hostel
8.	Staff quarters	Available	
9.	Garbage or waste store yard	Available	❖ Portable dustbins are placed for waste deposition.

5. Does the institute have the following nearby?

SERIAL NO.	AREAS	REMARKS
1.	Dispensary	❖ Adaspur PHC is available at a distance of 1.3 K.M.
2.	Municipal Dump Yard	❖ Not available
3.	Open drainage	❖ Not available
4.	Industry	❖ Not available
5.	Sewer line	❖ Not available
6.	Public convenience	❖ Available
7.	Bus Stop	❖ Mo bus stop & Private bus stops are very close to the campus.
8.	Railway station	❖ Both the twin- city railway stations are available at a distance of 30 K.M.
9.	Airport	❖ Biju Pattnaik International Airport is available at a distance of 27 K.M.

6. Does the institute conduct an environment audit of the campus?

Yes, the institute conductsannual environment audit report every year.

7. Climate & topography of the institute

Climate & Meteorology

UNC is located in the coastal region of Odisha, about 50 km west from the Bay of Bengal. Due to its location, the climatic conditions remain tropically humid. The campus experiences all six seasons but generally, only three seasons are noticeably appreciated. The monsoon season generally starts here in the months between June and October. Winter starts from mid November to February, followed by a hot & humid summer from mid- March to mid- June.

Rainfall

Due to such tropical, humid climate, UNC receives an amount of about 100-115 cm of rainfall during the South-West Monsoon (Mid June to September), which contributes about 80% of annual rainfall. South- west Monsoon generally reaches Cuttack by mid- June (2nd week of June) and prevails up to the end of September or 1st week of October. During this period, the place experiences more than 50% of the rainy days from the total monsoon period. Another factor of rainfall is the Nor'wester, which takes place during the hot-humid summer

(March- June). It comes with a heavy thunderstorm along with heavy, localized rainfall which makes 5 % of the annual irregular rainfall.

Wind

During winter season (December- February) surface winds in the Campus are light and variable. However during March to August strong (8 to 30 km/h) South Western wind prevails (Nor'wester). During September to November winds are relatively light & variable.

Temperature

Hot weather prevails over the campus during March to May. May is the hottest month with average maximum temperature around 30-35ºC. Long term analysis of average maximum temperature during the summer shows marginal rising of temperature. The greenery of the campus protects and controls the rising temperature during the heavy heat wave. The temperature of the campus remains in a control condition during summer in comparison to the heavy temperature of the Twin-city. Relatively winter is not that severe due to proximity to the sea. Due to the greenery the temperature remains slightly cool than the twin-city. During December to February the average minimum temperature varies in between 10- 12ºC. During the end of December the average minimum temperature gets down up to the 10ºC.

Topography

Topographically UNC campus belongs to the East & south-eastern coastal plain Agro-climatic zone. The soil type is deltaic alluvial & laterite. The altitude of this place is nearly 17 meters (55.77 ft) above the sea level.

Geology

Geologically, Cuttack &it's adjacent areas comes under the Gondwana landmass, one of the oldest and stable landmass in the world. The campus is situated as a deltaic zone lying in between the Devi & Prachi River. The deltaic zone comprises of a very good quality of agricultural soil.

Vegetation

The Flora of UNC &it's surroundings are broadly classified as Northern Tropical Moist Deciduous (mixed) type.

8. Soil quality assessment 2022- 2023

The soil samples were collected from the campus, placed in clean, labeled polyethylene bags and then transported to the laboratory for quality analysis after air drying under room

temperature. The soil samples were ground using mortar and pestle to reduce the particle size and then sieved through a 2 mm mesh to obtain acceptable and homogeneous samples. The samples were stored at room temperature until the physicochemical analysis was performed. Various soil edaphic parameters like soil pH, electrical conductivity (EC), total organic matter (OM) as carbon content, available nitrogen, available phosphorous, potassium, calcium, magnesium and sodium were estimated.

The fundamental characteristics of soil samples are very important because soil health determines the various types of plant and microbial diversities in terms of the number of Genera and species diversity and richness. Besides, the population density as well as diversity determines the human population intervention, anthropogenic sources, municipal sewage disposal, solid / garbage waste disposal, industries activities and use of large number of vehicles and agrochemicals which will pollute the soil health. The availability of macro and micro-elements of soil determines the number of beneficial microorganisms such as nitrogen fixing, potassium solubilizing and phosphorous mobilizing microorganisms for example bacteria, fungi and actinomycetes. The soil nutrients are being considered as essential elements for enhancing the profuse growth of various plant species and microbial organisms.

Soil physic-chemical properties influence the behavior of soil and hence, knowledge of soil property is important. Soil testing is the only way to determine the available nutrient status in soil and the only way we can develop specific fertilizer recommendations. Soil properties that are sensitive to changes can be used as indicators to improve soil quality.

The fertility of the soil depends on the concentration of N, P, K, organic and inorganic materials, conductivity. The physicochemical properties such as moisture content, nitrogen, phosphorus and organic matter required for the growth of plant. Potassium is used for flowering purpose, for building of protein, photosynthesis, fruit quality and reduction of diseases and phosphate is used for growth of roots in plants. The soil profile and soil edaphic parameters of the campus observed to be low in the essential nutrients which are needed for the plant growth. The soil fertility has to be enhanced by adapting vermi-composting and proper irrigation facility which is now well implemented in the campus.

The above results indicated that pH and EC recorded values were 7.14 and 340µS/cm respectively. The soil macro-elements like the amount of total Organic Nitrogen, Phosphorous and Potassium were found to be 234Kg/Ha, 32.4Kg/Ha and 165 Kg/Ha respectively. The micro-elements like Sodium, Calcium, Magnesium recorded were

330Kg/Ha, 78.56Kg/Ha, 55.2 Kg/Ha. So, from the soil sample analysis report it was revealed that all the values are within the optimal range for overall indicator of soil fertility.

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Enlisted in Construction Industry Development Council (CIDC) established by the Planning Commission (Govt. of India)
MoEF&CC, Govt. of India, Recognised Environment Laboratory under Environment (Protection) Act, 1986 & NABL Accredited Laboratory

Report No. - CEMC/UNAC/060623/S1 **Issued Date-06.06.2023**

SOIL QUALITY TEST REPORT

Name & Address of the Client : M/s U.N AUTONOMOUS COLLEGE OF SCIENCE & TECHNOLOGY
Date of Sampling : 29.05.2023
Sampling by : Mr. Chinmaya Barik
Date of Sample Received : 29.05.2023
Sample Description : Soil
Sample Quantity : 1 kg
Sample Location : **College Garden**
Date of Analysis : 29.05.2023 to 05.06.2023
Reference No. : CEMC-06062023S1

ANALYSIS RESULT

1	pH	------	7.14
2	EC	µS/cm	340
3	Colour	-----	Grey
4	Sand	%	43.2
5	Slit	%	13.2
6	Clay	%	42.4
7	Texture	%	Sandy clay
8	Specific Gravity	------	1.2
9	moisture	%	4.6
10	Organic matter	%	1.48
11	Nitrogen	Kg/Ha	234
12	Potassium	Kg/Ha	165
13	sodium	Kg/Ha	330
14	phosphorous	Kg/Ha	32.4
15	Calcium	Mg/kg	78.56
16	Magnesium	Mg/kg	55.2

Authorized Signatory **Seal of Laboratory**

Notes:
- The result given above related to the tested sample, as received. The customer asked for the above test only.
- This Test Report shall not be reproduced wholly or in part without prior written consent of the laboratory.
- The samples received shall be destroyed after two weeks from the date of issue of the Test Report unless specified otherwise

Environmental Studies (EIA & EMP),Monitoring, Forest Diversion Planning, DPR, Wildlife Management Plan, Hazardous & Safety Studies, RS& GIS, Baseline Survey, Hydrological & Geological Studies, Socio-economic Studies, DGPS & ETS Survey.
Regd. Office: Plot No.-522/3458, Near Utkal Hyundai, Opposite Apex College, Pahal, Bhubaneswar-752101, Odisha, India, Mobile: 9861032826
E-mail- cemc_consultancy@yahoo.co.in, cemc122@gmail.com, website: www.cemc.in.
Laboratory At: Plot No. 800/1274, Johal, Pahal, Bhubaneswar-752101, Odisha, India, Mobile: 7752014842
E-mail: cemclab@yahoo.in

Questionnaires on water storage, consumption and conservation

1. What are the water sources to the institute?

The major source of water in UNC is a self-reliant water boring system installed in the campus. There are Ground Water Tube wells installed in the campus with aRCC 2HP Single Phase Submersible Motor and a 2HP 3 Phase Submersible Motor, which operate to fill the varioustanks.

2. What is the water storage system in the institute?

A number of main buildings of the campus, like hostels, commerce, arts and science blocks are equipped with many RCC tanks of varying capacities to meet the specific demands of the said establishments. These tanks are enabled with fast and efficient RCC 2HP Single Phase Submersible Motors for further convenience.

Other buildings including the library building and principal quarter are supplied with water through various PVC Syntax tanks having a capacity of 1000L. And finally, the stadium building is equipped with a 2HP 3 Phase Submersible Motor.

3. What are the ways in which water is consumed in the institute?

Water is a crucial amenity and its usage in all hostels, cafeterias, academic buildings, on-campus, on-gardens, at construction sites, laboratories etc. is judicially carried out.

4. Is there any water recycling system?

Yes, there is water recycling system in the campus. The college has initiated for the installation of STP and Rain Water Harvesting system in the campus and has already started working on it.

5. How many water purifiers are used in the campus?

There are 20 water purifiers used in the campus, which was set up under '**MO COLLEGE AVIJANA'**, a program introduced by the State Government.

6. What are the number of bathrooms in academic, administrative and hostel buildings?

There are a total number of 429 bathrooms (with toilets) present in the academic, administrative & hostel buildings.

7. Does the institute have any rainwater harvesting system?

UNC is already planning to set up multiple units of rain water harvesting units and has started working on it. Setting and installing them will leadto another step towards water conservation and management.

8. Does the institute follow any special method for safe disposal of water released from the laboratory?

The various kinds of wastewater released from the campus include sewerage, residence (water used in cooking, showering and washing clothes) as well as chemical and biological laboratories, which ultimately go down in the sink or drainage system.

9. What are the techniques used to save water by the institute?

Several practices have been adopted to save water. Pipes, overhead tanks, and plumbing systems are maintained properly to reduce leakages and unnecessary wastages of water.The college is also planning to build a common distillation plant for all the laboratories to reduce loss of water.

Questionnaire on energy consumption and conservation:

1. How many CFL/LED bulbs are used in the institute?

There is a total of 310 nos. of CFL & 1120 nos. of tube lights are used in the institute. A total no. of 35 LED Street lights are also placed in the campus.

2. What is the source of energy in the institute?

The energy source of the institute is solar electrical energy & the electricity provided by the TP Central Odisha Distribution Limited (Electricity through transformer).

3. Does the institute follow any energy saving techniques?

Yes, College adopts practices like turning off lights when not in use, using energy-efficient appliances, and optimizing computer usage by enabling power-saving settings.

4. What are the various forms in which energy is used in the institute (firewood, electricity, fuel, etc.)?

The institute mainly depends on the solar energy & the electrical energy provided by the govt. for use. The firewood as energy source by the institute is negligible. The canteen, hostel mess uses the LPG as fuel for preparation of food.

5. How many air conditioners are installed in the institute?

There are 20 air conditioners that have been installed in the institute. This includes the principal's office, auditorium, tissue culture laboratory, IT block, etc.

6. Does the institute run on DG as an alternative to electricity?

Yes, the institute runs on DG as an alternative source of electricity. It operates on automated programming. This remains on during power disruption only. There are 2 DG sets, installed for the academic, administrative & hostel purposes. The capacities of the DGs are 125kV& 250kV respectively.

7. Do people of the institute ensure to completely turn off electronic devices such as PCs and ACs?

The employees of the institution have been instructed to turn off all the electrical devices during leisure hours. A number of peons are appointed to monitor the usage of electrical equipments on a daily basis.

8. Are electronic devices such as PCs and ACs run on power saving mode?

Yes, all the lab equipments, PCs &ACs run on power saving mode.

Questionnaires on solid waste generated and its management

1. What are the sources and types of waste generated in the institute?

Different types of wastes, such as paper waste, plastic waste, construction waste, glass waste, etc. are released from various buildings of UNC and the same is directly handed over to the Municipalities' Bin for further segregation and recycling purposes.

2. How much waste per day is generated in the campus approximately?

Approximately, a net weight of 130 kg of waste is generated every day.
The rate of waste generated has been increasing in the recent times, reaching up to an estimated amount of about 6 tonnes per month during peak academic sessions and the minimum amount generated during the lean period is about 4 tonnes per month.

3. Is there any adoption of waste treatment system?

The institute is committed to ensure that all forms of wastes generated are handled based on the RRRR (Reduce, Reuse, Recycle, Recover) principles, following appropriate source segregation protocols, including safe disposal of bio, medical and hazardous E-wastes.

4. How the waste generated is managed?

Hazardous waste generated in solid and liquid states during experiments in the laboratory is properly disposed off after decontamination. Biodegradable waste is one of the major kinds of solid waste generated in the campus, which is further treated through organic composting and vermi-composting. The institute has banned single-use of plastic for any administrative as well as academic purposes.

5. Is any waste recycling method adopted?

Glass wasteis generated from laboratories mainly in the form of bottles, and many times bottles are reused for storing other chemicals. The e-waste generated is collected by Ecoclub of the college and is sent for recyclingand made ready for reuse.

6. Are the domestic and agricultural waste converted to compost?

UNC has taken initiatives for the management of biodegradable waste by processes like dry & wet waste management and vermin-composting technology, which relies upon the conjoint action of earthworms and microorganisms to rapidly transform various types of solid wastes. Considering the simplicity and flexibility of the technology, a vermi-composting unit was established in January 2018 in the campus under the supervision of the environment audit team.

7. How the institute can achieves a state of zero garbage?

Provisions for installation of a garbage unit should be introduced where the multilevel segregation of various wastes such as paper, construction, glass, metal scrap and food waste should be done. Further, various waste recycling plans for different types of waste should be introduced.

Questionnaire on greenery of the campus:

1. Does the campus have a garden?

Yes, the institute has two botanical gardens, one flower garden along with two Orchards.
The total plantation area & garden occupy half of the total land area covered by the institute.

2. What is the total number of tree, herb and shrub species in the campus?

The total numbers of tree, herb & shrub species in the campus is about 1500 with around 212 species.

3. Name the different type of plants in the institute

Some of the most noticeable plants found inside the campus are *Terminalia catappa, Cocos nucifera, Dypsis leutescens, Polyalthia longifolia, Mimusops elengi, Pongamia pinnata, Mangifera indica, Carica papaya* and *Azadiracta indica*, which are foundin 15 observational sites inside the campus.

4. Is there an active involvement of students in the management of the garden?

Yes, the students take active role during plantation programs. They also used to adopt at least one plant and nurture it till the completion of their course. They are also instructed to take precautionary measures and follow proper protocols for the overall development of plants.

5. Does the garden have any RET plants?

Yes, there is a RET garden established in the year 2021 for the conservation of rare, endangered & threatened plant species. Till now, there are a total of 18 plant species under the conservation program.

Questionnaire on air quality of the campus:

1. What is the approximate size of a classroom and how many windows are present in each classroom?

The approximate sizes of the classrooms are 35'* 25'ft. . In average, there are 6 windows per classroom.

2. What is the approximate number of vehicles owned by
   a. Staffs
   b. Students

a. Staffs

Not all the staffs use their own vehicles. They rather opt for public transport services. About 70% of the total staffs havetheir own vehicles, and many of them prefer carpooling.

b. Students

Most of the students use public transport.Approximately 50% of the students come to the institute via personal transit system & the remaining 50% use public transit systems.

3. Is proper ventilation of every floor ensured by the institute?

Yes, proper ventilation has been ensured by the institute at every floor. All the classrooms are well ventilated by natural air, as there are open windows built into every classroom.

4. Are there any cases of respiratory ailments among students of the institute?

No. Yet, there have been no cases reported regarding any respiratory ailment among students of the institute.

5. What are the steps taken by the institute to improve overall air quality of the campus?

The institute has taken all the measures to provide the best greenery to the campus environment. During the last 3 years the number of plantation made by the members of the UNC family increased rapidly. The main motto of the plantation program is to improve the overall air quality and make the environment ambient.

Questionnaire on biodiversity of the institute

1. Has the institute accurately recorded accounts of every plant species found in the campus?

Yes, the institute has accurately recorded every plant species found in the campus. The recorded data is interpreted as the total floristic record of UNC.

2. Does the institute conduct any kind of biodiversity awareness programs?

Yes, the institute conducts many biodiversity-related awareness programs for educational purposes and spreading awareness about the value and importance of public involvement in the conservation of biodiversity. The plantation programs, in particular are managed by the NSS & YRC unit of the institute and now it has been carried out by Ecoclub with the help of student members from various departments. They choose any barren land or field&do avenue plantations inside & outside of the campus.

Questionnaire on environment legislative compliance

1. Does the institute regularly monitor the quality of water supplied to the campus?

The institute monitors the quality of water supplied to the campus on an annual basis as contaminants in our water can lead to serious health issues. The water quality is monitored with respect to its suitability for various purposes such as drinking or swimming.

2. Does the institute release any kind of hazardous waste? If yes, what are their plans for safe disposal/ treatment of such waste produced?

The institute does not produce any kind of hazardous waste. The waste produced by the institute follows the 3R rule. The non biodegradable wastes are disposed by land filling, e-wastes are sent for recycling and biodegradable wastes are converted to compost&that can be used as fertilizer.

3. Is there proper propagation of necessary pre-required knowledge of environmental laws and innovative methods of managing waste produced among the students?

The institute has prepared guidelines for staffs& students regarding the waste management produced from different sources.

4. What are the steps taken by the management /governing body against people who pollute the environment or violate environmental laws of the institute?

Although the institute is placed in a rural area but the local people have knowledge & respect towards the institute which protects the institute from external pollution.Common violation such as dumping hazardous wastes or improper handling of wastes, littering, destruction of wetland, burning of fossil fuels etc. are strictly checked by the authority and warned if anyone is found guilty.

CHAPTER 4

WATER CONSUMPTION& MANAGEMENT

4.1 WATER

Water is a precious natural resource available with a fixed quantum. The availability of water is decreasing due to the increasing population of the nation, as per capita availability of utilized water is going down. Due to the ever-rising standard of living of people and advancements in industrialization and urbanization, demands for freshwater is increasing day by day. The unabated discharge of industrial effluents into nearby freshwater bodies is reducing the quality of these precious sources of water continuously. Hence, the national mission on water conservation, 'Jal Shakti Abhiyan' was declared by the Honorable Prime Minister, NarendraModi as an appeal to all citizens requesting cooperation in collectively addressing the problem of water shortage by conserving every drop of water and conducting water audits for all sectors of establishment. Water audit can be defined as a qualitative and quantitative analysis of water consumption to identify means of reducing, reusing, and recycling water. Water Audit is nothing but an effective measure for minimizing losses and optimizing various uses of water and thus, enabling effective management of water in the irrigation, domestic, power, and industrial sectors. A water audit is a technique or method which makes it possible to identify ways of conserving water by determining any inefficiency in the system of water distribution. The measurement of water losses due to differences in usage and utility is essential for implementing water conservation measures in such an establishment.

4.2 SOURCES OF FRESH WATER

The major source of water in UNC is a self-reliant water boring system installed in the campus. There are Ground Water Tube wells installed on the campus with RCC 2HP- Single Phase Submersible Motor and 2HP -3 Phase Submersible Motor, which operate to fill the various tanks.

Bore well in the Campus

Bore well in the Hostel

TABLE 4: DETAILS OF BORE WELLS

SL. NO.	DESCRIPTION	LOCATION IN THE CAMPUS
1.	Borewell-1	Near commerce block
2.	Borewell-2	Garden
3.	Borewell-3	Administrative block
4.	Borewell-4	Arts block
5.	Borewell-5	Meghasan OBC Boys Hostel
6.	Borewell-6	Mahodadhi Boys Hostel
7.	Borewell-7	Mandakini Girls Hostel
8.	Borewell-8	Mahadevi Girls Hostel
9.	Borewell-9	P.G. Women's Hostel
10.	Borewell-10	Guest House
11.	Borewell-11	Stadium
12.	Borewell-12	Stadium
13.	Borewell-13	Near Vermicompost Unit

4.3 WATER STORAGE CAPACITY IN THE CAMPUS

A number of main buildings of the campus, like hostels, and art and science blocks are equipped with many RCC tanks of varying capacities to meet the specific demands of the said establishments. These tanks are enabled with fast and efficient RCC 2HP Single Phase Submersible Motors for further convenience. Other buildings including the library building and principal quarter are supplied with water through various PVC Sintex tanks, having a capacity of 1000L. And finally, the stadium building is equipped with a 2HP 3 Phase Submersible Motor. There are 20 nos. of water purifiers used in the campus, which were set up under the project of State govt. i.e. **MO COLLEGE AVIJANA**

Sintex Tanks of Hostel

Overhead RCC tanks

TABLE 5: STATUS OF WATER STORAGE CAPACITY IN UNC

SL. NO.	DESCRIPTION	CAPACITY	TYPE
1.	Mahodadhi Boys Hostel	20763L	RCC 2HP Single Phase Submersible Motor
2.	Meghasan Boys Hostel	12506L	
3.	Mahadevi Ladies Hostel	21432L	
4.	Mandakini Ladies Hostel	21232L	
5.	Swimming Pool	13875L	
6.	Science Block	21057L	
7.	Arts Block	14877L	
8.	PG Ladies Hostel (2)	2000L	PVC Sintex
9.	Auditorium	1000L	
10.	Silver Jubilee Building	1000L	
11.	Library Building	1000L	
12.	Administrative and IT block (2)	2000L	
13.	Principal Quarter	1000L	
14.	Cycle Stand	1000L	
15.	Stadium Building	2000L	2HP 3Phase Submersible Motor

4.4 WATER CONSUMPTION IN THE CAMPUS

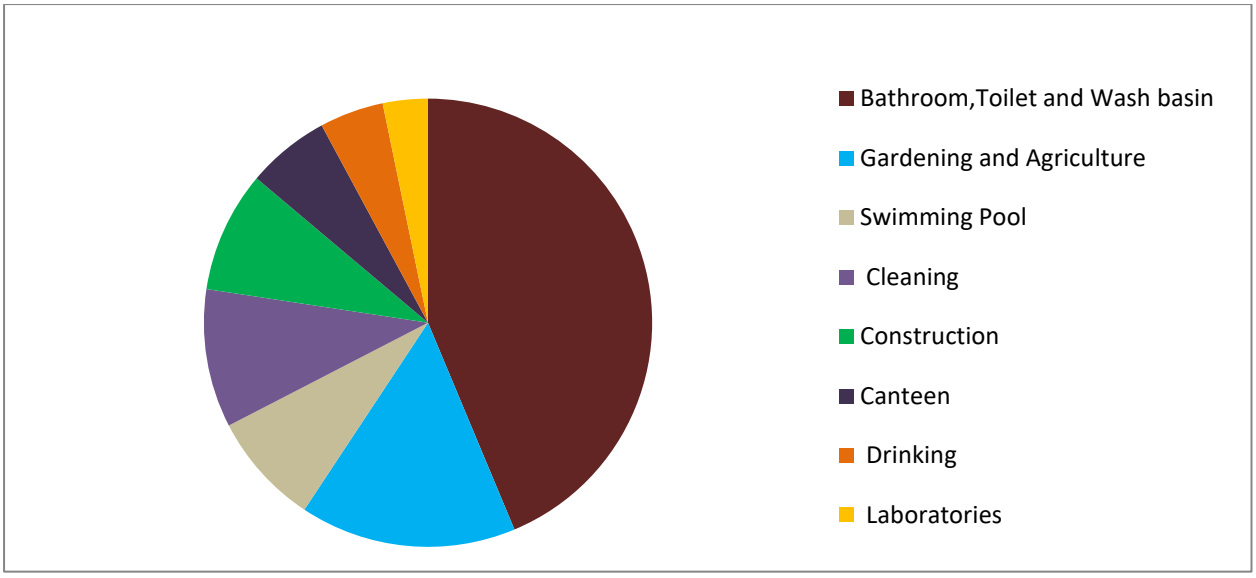
Water usage can be defined as water used for all activities which are carried out on campus from different water sources. This includes usage in all hostels, academic buildings, on-campus, on-grounds, laboratories etc.

Total water consumption of the campus is approx. 801 Kilo Litres per day by operating discharge pumps with a total discharge capacity of 140 Kilo Litres for 8 hours per day. The water is used to cover the total daily consumption in the UNC Campus including Drinking, Bathroom, Toilet, Garden, Urinals, Wash Basin, Laboratory etc. in the total population of 7,000 (Including office staff, strength and residential buildings) of the UNC campus. Hence total approx. **114.4 L** per day per head is used for Bathroom, Toilet, Garden, Urinals, Shower, Drinking, and Laboratories etc. However, the above data varies as per the requirement on the basis of academic Calendar.

TABLE 6: STATUS OF WATER CONSUMPTION IN UNC

Sl. No.	**Sector**	**Total Daily Use (KL)**	**Total Monthly Use (KL)**	**Total Yearly Use (KL)**	**Percentage**
1.	Gardening and Agriculture	125	3750	45,000	16.97
2.	Bathroom, Toilet and Wash basin	350	10500	1,26,000	47.53
3.	Laboratories	26	780	9,360	3.53
4.	Canteen	48	1440	17,280	6.51
5.	Construction	70	2100	25,200	9.50
6.	Drinking	37	1110	13,320	5.02
7.	Swimming Pool	65	65	130	0.04
8.	Cleaning	80	2400	28,800	10.86
	Total	**801**	**22,135**	**2,65,090**	**100**

N.B.: The above data is obtained on the basis of maximal usage of water during peak academic period



Daily water consumption status of UNC

Drinking water facility

Swimming Pool of UNC

Water Filtration Unit

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Enlisted in Construction Industry Development Council (CIDC) established by the Planning Commission (Govt. of India)
MoEF&CC, Govt. of India, Recognised Environment Laboratory under Environment (Protection) Act, 1986 & NABL Accredited Laboratory

Report No. - CEMC/UNAC/060623/W1 **Issued Date-06.06.2023**

WATER QUALITY TEST REPORT

Name & Address of the Client : **M/s U.N AUTONOMOUS COLLEGE OF SCIENCE & TECHNOLOGY**
Date of Sampling : 29.05.2023
Sampling by : Mr. Chinmaya Barik
Date of Sample Received : 29.05.2023
Sample Description : Drinking water
Sample Quantity : 1.0 Ltr
Sample Location : **Swimming Pool**
Date of Analysis : 29.05.2023 to 05.06.2023
Reference No. : CEMC-06062023W1

ANALYSIS RESULT

Sl. No	Parameter	Unit	Standard as per IS: 10500	Testing Method	Result
1	Colour	Hazen	10	APHA 2120 B,C	<5
2	Odour	-	Odour less	APHA 2150 B	Odour less
3	Taste	-	Palatable	APHA 2160 C	Palatable
4	Turbidity	NTU	10	APHA 2130 B	<1
5	pH Value	-	7.5-8.5	APHA 4500H^+ B	7.61
6	Iron (as Fe)	mg/l	0.1	APHA 3500Fe, B	0.06
7	Chloride (as Cl)	mg/l	500	APHA 4500Cl^- B	33.9
8	Residual, Chlorine(min)	mg/l	0.2	APHA 4500Cl, B	0.3
9	Total Dissolved Solids	mg/l	1500	APHA 2540 C	213
10	Lead (as Pb)	mg/l	0.1	APHA 3111 B,C	<0.01
11	Alkalinity (as $CaCO_3$)	mg/l	50-500	APHA 2320 B	140
12	Aluminium (as Al)	mg/l	0.1	APHA 3500Al B	<0.01

Authorized Signatory **Seal of Laboratory**

Notes:

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Swimming pool maintenance in a college is a complex task, as it involves keeping the pool clean, safe, and in good condition for use by students and staff. Here are some essential aspects to consider for effective swimming pool maintenance in a college:

- **Regular cleaning:** The pool is regularly cleaned to remove debris, leaves, and other floating materials, skim the surface and vacuum the pool floor to maintain cleanliness. The pool walls are scrubbed to prevent algal growth.
- **Water balance and chemistry:** The chemical balance of the pool water is crucial to ensure it is safe and sanitary. Regularly the water for pH levels, chlorine/bromine levels, alkalinity, and calcium hardness is tested. Chemicals such as TCCA, Alum, and Soda etc are added to maintain proper balance.
- **Filter maintenance:** The pool's filtration system is responsible for removing impurities from the water. The filtersare cleaned or backwashed regularly to ensure their proper functioning and effectively removing contaminants.
- **Equipment inspection:** Regularly the pool's equipments are inspected, including pumps, motors, and heaters, to ensure that they are in good working condition. Faulty components are replaced promptly to prevent further damage and to ensure uninterrupted pool operation.
- **Safety measures:**A regular inspection of safety equipment like ladders, diving boards, and lifeguard chairs is conducted.
- **Regular testing and maintenance:** The pool water is tested for bacteria regularly to ensure that it meets health and safety standards. Additionally routine maintenance tasks such as checking and cleaning drains, checking pool lights, and monitoring water level is performed.
- **Staff training:** Staffs handling the pool are trained in proper maintenance techniques, water chemistry, and safety protocols. This will help them efficiently manage the pool's maintenance needs.
- **Record-keeping:** Detailed records of all maintenance activities, pool chemistry testing results, and repairs are maintained. This documentation will help track the pool's overall condition, identify recurring issues, and ensure regulatory compliance.

RECOMMENDATIONS

- ❖ Non-teaching staff or peons in the concerned section should take responsibility for monitoring the overflow of water tanks
- ❖ A Large amount of water is wasted during the practical process in Science laboratories. Designs of small water recycling systems help to reuse of water.
- ❖ Producing distilled water in the laboratories required a large amount of water tothe distillate. To produce 1 liter of distilled water required more than 33 liters of water. To avoid more wastage institute should design a common distillation plant for Science Department.
- ❖ Reduce chemical waste formation in the Chemistry laboratory; adopt the principles of green chemistry to reduce chemical waste.
- ❖ Pipes, overhead tanks, and plumbing systems should be maintained properly to reduce leakages and wastages of water.
- ❖ UNC should install its own Sewage Treatment Plant (STP). By doing so there will be a great reduction in water usage, as the water after treatment can be used for various purposes in the campus.

4.5 WATER TEST AND ANALYSIS REPORT

Water quality testing is important because it identifies contaminants and prevents waterborne diseases. Drinking or using contaminated water can result in severe illness or death. That is why it is important to ensure that drinking water is safe, clean and free from bacteria and disease. The parameters for water quality are determined by the intended use. Work in the area of water quality tends to be focused on water that is treated for human consumption, or in the environment.

The following indicators are often measured for drinking water like Alkalinity, Color of water, pH value, Taste and odor, Dissolved metals and salts (chloride, manganese, magnesium etc.), Dissolved metals and metalloids (lead, mercury, arsenic, etc.), Microorganisms such as fecal coli form bacteria (*Escherichia coli*) etc. The major parameters analyzed include dissolved oxygen, acidity, alkalinity, chloride, hardness, pH, conductivity, total dissolved solids and salinity.

CENTRE FOR ENVOTECH AND MANAGEMENT CONSULTANCY PVT. LTD.

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Date of Sample Received : 29.05.2023
Sample Description : Drinking water
Sample Quantity : 1.0 Ltr
Sample Location : College Borewell
Date of Analysis : 29.05.2023 to 05.06.2023
Reference No. : CEMC-06062023W1

ANALYSIS RESULT

Sl. No	Parameter	Unit	Standard as per IS: 10500	Testing Method	Result
1	Colour	Hazen	5	APHA 2120 B,C	<5
2	Odour	-	AL	APHA 2150 B	AL
3	Taste	-	AL	APHA 2160 C	AL
4	Turbidity	NTU	1	APHA 2130 B	<1
5	pH Value	-	6.5-8.5	APHA 4500H$^+$ B	6.81
6	Total Hardness (as $CaCO_3$)	mg/l	200	APHA 2340 C	106
7	Iron (as Fe)	mg/l	0.3	APHA 3500Fe, B	0.2
8	Chloride (as Cl)	mg/l	250	APHA 4500Cl$^-$ B	33.9
9	Residual, free Chlorine	mg/l	0.2	APHA 4500Cl, B	ND
10	Total Dissolved Solids	mg/l	500	APHA 2540 C	260
11	Calcium (as Ca)	mg/l	75	APHA 3500Ca B	23.2
12	Magnesium (as Mg)	mg/l	30	APHA 3500Mg B	11.6
13	Copper (as Cu)	mg/l	0.05	APHA 3111 B,C	<0.03
14	Manganese (as Mn)	mg/l	0.1	APHA 3500Mn B	<0.05
15	Sulphate (as SO_4)	mg/l	200	APHA 4500 SO_4^{2-} E	24.8
16	Nitrate (as NO_3)	mg/l	45	APHA 4500NO_3^- E	32.1
17	Fluoride (as F)	mg/l	1.0	APHA 4500F$^-$ C	0.09
18	Phenolic Compounds (as C_6H_5OH)	mg/l	0.001	APHA 5530 B,D	<0.001
19	Mercury (as Hg)	mg/l	0.001	APHA 3500Hg	<0.001
20	Cadmium (as Cd)	mg/l	0.003	APHA 3111 B,C	<0.003
21	Selenium (as Se)	mg/l	0.01	APHA 3114 B	<0.001
22	Arsenic (as As)	mg/l	0.01	APHA 3114 B	<0.001
23	Cyanide (as CN)	mg/l	0.05	APHA 4500CN$^-$ C,D	ND
24	Lead (as Pb)	mg/l	0.01	APHA 3111 B,C	<0.01
25	Zinc (as Zn)	mg/l	5	APHA 3111 B,C	<0.05
26	Total Chromium (as Cr)	mg/l	0.05	APHA 3500Cr B	<0.05
27	Mineral Oil	mg/l	0.01	APHA 5220 B	<0.01
28	Alkalinity (as $CaCO_3$)	mg/l	200	APHA 2320 B	80
29	Aluminium (as Al)	mg/l	0.03	APHA 3500Al B	<0.01
30	Boron (as B)	mg/l	0.5	APHA 4500B, B	<0.2
31	Total Coliform	--	Absent	IS 15185	Absent
32	E. Coli	--	Absent	IS 15185	Absent

NB: AL- Agreeable, ND-Not Detected

*** As per the result mentioned above parameters, these are within the drinking water standard/norms.**

Authorized Signatory **Seal of Laboratory**

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4.6. RAIN WATER HARVESTING AND SEWAGE TREATMENT PLANT

Rain Water Harvesting refers to the collection and storage of rainwater for various uses. It is an effective method of conserving water and reducing the dependency on other sources of water. Rainwater can be collected from rooftops, surface runoff, or even underground sources.

There are various ways to harvest rainwater, including the use of rain barrels, cisterns, and underground tanks. The collected rainwater can be used for non-potable purposes such as watering plants, washing cars, flushing toilets, or even for groundwater recharge.

Sewage Treatment Plant is a facility that treats wastewater to remove contaminants and pollutants before discharging it into the environment or reusing it for various purposes. STPs use various treatment processes such as physical, chemical, and biological processes to treat wastewater.

STPs are an essential part of maintaining a clean and sustainable environment. They help prevent water pollution by removing harmful substances and pathogens from wastewater before it is released back into rivers, lakes, or oceans. The treated water can also be used for irrigation, industrial processes, or even for non-potable purposes in areas where water scarcity is a significant concern.

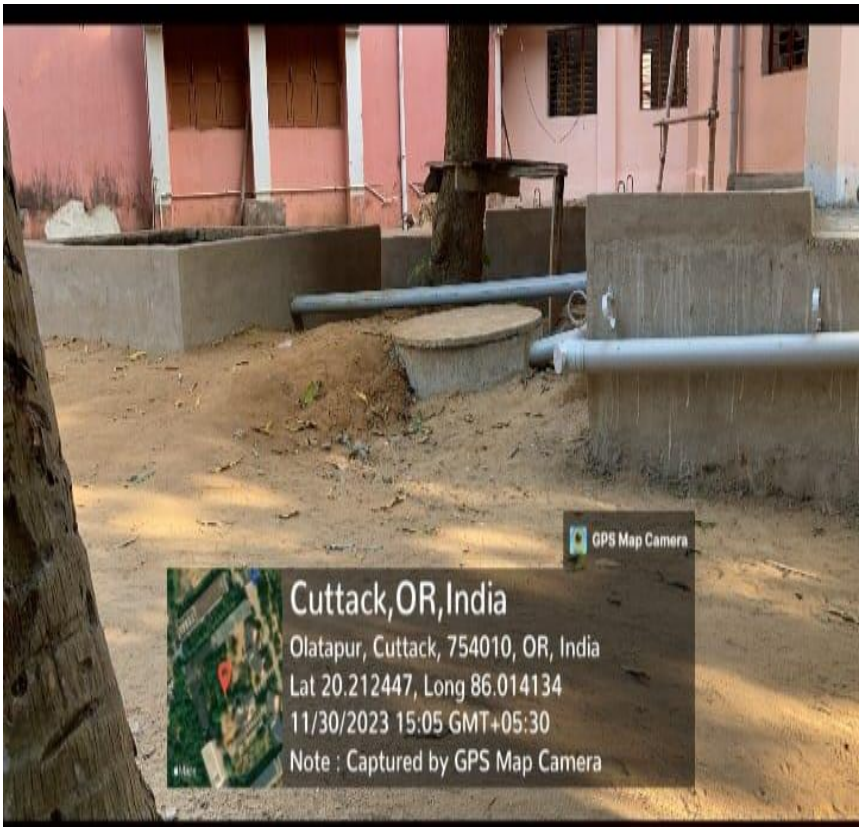
Rainwater harvesting and STPs complement each other in terms of water conservation and environmental sustainability. While rainwater harvesting reduces the demand for freshwater sources, STPs treat wastewater to make it safe for reuse or discharge. Together, these methods contribute to water conservation, reduce the strain on freshwater sources, and help in the overall management of water resources.

To recharge the ground water table, the Institute is planning to construct Rain Water Harvesting system and construction work has already been started.

STP installation in the proposed plan

STP treats the water by removing the impurities and contaminants from it. To get recycled water that can be used for irrigation and flushing purpose, the Institution has also taken steps to construct STP in the proposed plan.

Installation of Rain Water Harvesting System in the Campus



CHAPTER 5

SOLID WASTE GENERATED & MANAGEMENT PRACTICES

5.1 SOURCES OF SOLID WASTES IN THE CAMPUS

Solid waste is the unwanted or useless solid material generated from human activities in a residential, industrial, or commercial area. Solid waste management reduces or eliminates the adverse impact on the environment and human health. A number of processes are involved inefficiently managing waste for an organization. It is necessary to manage the solid waste properly to reduce the load on the waste management system. Solid waste generation and its management is a burning issue in current days. The rate of generation of solid waste is very high and yet we do not have adequate technology to manage the generated waste. Unscientific handling of solid waste can create threats to public health and environmental safety issues. Thus, it is necessary to manage solid waste properly to reduce the load on the waste management system. The purpose of this audit is to find out the quantity, volume, type, and current management practice of solid waste generation in the UNC campus. This report will help for further solid waste management and to go for green campus development.

Solid waste from UNC campus is collected from all the Building areas and the same is directly handed over to the Municipalities' Bin for further segregation and recycling purpose. There are different types of waste are recorded such as paper waste, plastic waste, construction waste, glass waste, etc. However biodegradable waste is recycled through the organic and vermicomposting processes. The daily rate of waste generation has been increasing in the recent time reaching up to an estimated amount of about 6tonnes per month during peak academic sessions and the minimum amount generated during the lean period is about 4 tonnes per month. The wastes generated in the campus include;

- Kitchen wastes
- Wastes from construction sites
- Liquid waste (residential and eateries)
- Sewage and sludge

- Biomedical waste
- Chemical wastes
- Plastic wastes
- Cans and bottles
- Damaged or spoiled laboratory glassware
- Unused tools and machinery including battery
- Papers including packaging materials
- Electronics waste
- Garden waste and sweeping litters etc.

The total solid waste generated in the annual year is **60,780 Kg**.

The campus is committed by ensuring that all forms of wastes generated are handled based on the RRRR (Reduce, Reuse, Recycle, Recover) principles following appropriate source segregation protocols including safe disposal of bio, medical and hazardous wastes. There are studies from time to time to estimate the amount and nature of wastes, particularly solid waste which indicates the increasing trend of the volume. A preliminary survey reveals the domination of biodegradable components (volume basis) over the non-biodegradable counterparts in the campus. The students' hostels share the highest amount of solid waste mostly dominated by food/kitchen wastes (a substantial amount of papers, plastics, metals are also seen with waste also generated in hostels) followed by residential areas, eateries and offices including academic buildings, construction sites (occasionally), open areas including gardens and road.

5.2 DETAILS OF SOLID WASTE GENERATED IN THE CAMPUS

TABLE-7 SHOWING THE DETAILS OF SOLID WASTE GENERATED IN THE CAMPUS DURING THE ACADEMIC SESSION 2022-23

SERIAL NO.	MONTH	SOLID WASTE GENERATED IN KG
1.	Jan 2022	4500
2.	Feb 2022	5450
3.	Mar 2022	5265
4.	Apr 2022	5745
5.	May 2022	3658

6.	June 2022	3262
7.	July 2022	6051
8.	Aug 2022	6249
9.	Sep 2022	5350
10.	Oct 2022	5226
11.	Nov 2022	5174
12.	Dec 2022	4850
	TOTAL	**60,780**

5.3 WASTE MANAGEMENT SYSTEM OF THE INSTITUTE (WASTE COLLECTION PLANT)

- **NON BIODEGRADABLE WASTE MANAGEMENT**

Collection of non biodegradable wastes via separate dustbins

The three steps that can be followed for management of non biodegradable waste are Recycle, Reuse, and Reduce which can save energy and other resources as well. This Institute adopts one of the safest way of disposal i.e., Land filling. The non biodegradable substances are segregated via dustbins and dumped in a low lying region nearby the campus and covered with soil.

❖ BIODEGRADABLE WASTE MANAGEMENT

(i) Vermicomposting

UNC has taken initiatives for Biodegradable Waste Management by processes like Dry & Wet Waste Management. Vermicomposting technology relies upon the conjoint action of earthworms and microorganisms to rapidly transform varied types of solid wastes. Considering the simplicity and flexibility of the technology, a vermicompost unit was established in January 2020 in the campus under the supervision of the Environment audit team. The prime objectives are to recycle a fraction of biodegradable waste in a sustainable manner and curtail the cost of purchasing organic manure from the market for landscaping ventures. Presently, the unit is running successfully to fulfill the need for organic manure for plantation/gardening works of the campus. So far, the ready-to-use vermicompost is produced entirely from garden waste (grass) and leaf litter of the campus.

The vermicomposting unit has a waste accommodating capacity of about 16.5 m^3, i.e., about 10 quintals (on a fresh weight basis) at a given time. On average, one vermicomposting period (or one batch) takes about 60-90 days depending on the nature of the feedstock. Epigeic earthworm species (*Eisenia fetida*, *Eudrilus eugeniae*, and *Perionyx excavatus*) are applied at a rate of 10 worms/kg (approximately) feedstock to carry out the composting process. Approximately 93.52quintal vermicompost has been produced in the last three years (i.e. April 2020 to March 2023). The produced vermicompost is used for all sorts of plantation and landscaping activities at the campus. The unit is ready for expansion to accommodate various other kinds of biodegradable solid wastes generated in the campus. Apart from utilizing the required amount of vermicompost for landscaping work, Institute is selling certain quantities to the campus dwellers.

Vermicomposting

Packed vermicompost bags for selling

(ii) Organic Composting

Standing strong by its vision for transforming UNC into an institute which truly realizes the value of adhering to various laws and standards of environmental compliance, we always strive to arrive at possibilities for reducing and managing waste. Kitchen-waste composting is thus, an effective practice that extends its efforts towards putting every bit of waste produced. For converting organic waste into compost, an automated machine was installed in the campus with a capacity of 250 kg.

Organic- waste composting

Organic waste converter

TABLE 8: PRODUCTION RECORD OF COMPOST AND COLLECTION OF REVENUE

SL. NO.	FINANCIAL YEAR	COMPOST PRODUCED (IN QUINTALS)	REVENUE COLLECTED (INR)
1.	April 2022 - March 2023	41.37	11,200

The kitchen wastes, agricultural wastes and animal wastes which constitue about 60% of the total wastes is used for generation for compost.

INITIATIVES TAKEN BY THE INSTITUTE FOR WASTE MANAGEMENT

- Glass waste is generated from the laboratory mainly in the form of bottles; Many times bottles are reused for storing other chemicals.
- The e-waste generated at is sent for recycling and reuse.
- Hazardous waste generated in a solid and liquid state during experiments in the laboratory is disposed of properly.
- Biodegradable waste is a major solid waste generated on campus which is further treated by organic waste and vermicompost technology.
- UNC has banned single-use of plastic for any administrative as well as other purposes.

RECOMMENDATIONS

- Provision of installation of garbage unit should be introduced where the multilevel segregation of various wastes such as paper, construction, glass, metal scrap and food waste should be done. Further various waste recycling plans for different types of waste should be introduced.
- Provision for E-waste management should be introduced in the Campus.
- Paper waste like answer sheets, old bills, and confidential reports should be sent for shredding, pulping, and recycling after completion of their preservation period.
- Recycling facilities should be introduced and should be supported by City Municipality and private suppliers, including glass, cans, white, colored, and brown paper, plastic bottles, batteries, print cartridges, cardboard, and furniture.

CHAPTER 6

ENERGY CONSUMPTION AND MANAGEMENT

Energy is one of the major inputs for the economic development of any country. The fundamental goal of energy management is to produce goods and provide services with the least cost and least environmental effect. Also, it can be said as “the strategy of adjusting and optimizing energy, using system and procedure so as to reduce energy requirements per unit of output while holding constant or reducing total costs producing the output from these systems”. The energy audit is key to a systematic approach for decision-making in the area of energy management. It attempts to balance the total energy inputs with its use and serves to identify all the energy streams in a facility. Energy resources utilized by all the departments, support services, and the administrative buildings of the Institute, include Electricity, Solar Roof Top Systems, and Diesel Generators installed on the campus.

OBJECTIVES OF ENERGY AUDIT

Primary:

- The first objective is to acquire and analyze data and find the necessary consumption pattern of these facilities.
- The second objective will be to calculate the wastage pattern based on the results of the first objective.
- The final objective is to find and implement solutions that are acceptable and feasible.

Secondary:

- This would be our first exposure to this field hence experience gain would be vital.
- This project will precede many follow up projects and hence helps to gain technical and management exposure required for future energy projects.
- It is sure to help create a repertoire of vital contacts hence will develop interaction with alumni, faculty and students.

Source of Energy

UNC draws Energy from the Followings:

- Electricity from TPCODL
- Solar Energy

The Following are the Major consumers of Electricity in the facility

- Lighting
- Air Conditioner
- Fans
- Computers
- Other Lab Equipment

Indirect Benefits of Energy Audit

Every time the Energy Audit is carried out it rekindles the interest in Energy Conservation as an important function. Energy Auditors sharing their experience and knowledge with the Plant Personnel helps in fueling the innovative ideas for further action of reduction in Specific Power consumption (SPC). Any loose connections or heating of cables come to timely vision. For an external agency due to unbiased vision, a few points for Energy Conservation may be visible each time they perform the audit and this would help in achieving further saving. Inform any irregularities in Energy meter HT connections for rectification.

6.1. ENERGY CONSUMPTION IN THE CAMPUS

In conducting an environmental audit of an autonomous college, it is essential to examine the energy consumption and utilization on campus. Energy plays a crucial role in every aspect of campus life, including classrooms, residential halls, laboratories, and administrative buildings. Thus, understanding how energy is consumed and utilized is vital in identifying opportunities for efficiency and sustainability.

One significant aspect to consider is the source of energy in the campus. Analyzing whether the energy predominantly comes from non-renewable sources such as coal or oil, or from renewable sources like solar or wind power, is crucial. Transitioning towards renewable

energy sources can greatly reduce the college's carbon footprint and contribute to environmental sustainability.

The next aspect to assess is the energy consumption patterns within different areas of the campus. Conducting a comprehensive survey of energy consumption in classrooms, laboratories, and residential halls can provide insights into areas where energy efficiency measures can be implemented. For instance, retrofitting buildings with energy-efficient lighting, optimizing heating and cooling systems, and promoting responsible energy usage can result in significant energy savings.

Furthermore, it is crucial to promote and educate the campus community about energy conservation and sustainable practices. Raising awareness through workshops, campaigns, and informational sessions can encourage students, faculty, and staff to adopt energy-saving habits. Additionally, providing incentives for energy-efficient behaviours, such as organizing competitions or offering rewards, can further motivate individuals to actively participate in reducing energy consumption on campus.

In conclusion, assessing energy consumption and utilization in the campus environment audit of U.N. autonomous college is vital for promoting sustainability and reducing the institution's environmental impact. By analyzing energy sources, patterns of consumption, and implementing energy-saving measures, it is possible to create a more sustainable and efficient campus. Furthermore, fostering awareness and behavior change among the campus community can lead to long-lasting energy conservation practices that benefit not only the college but also the larger environment.

It includes energy sources, it’s consumption and monitoring, lighting, appliances and vehicles. Energy sources utilized by all the departments and services of college include electricity, liquid petroleum and LPG. Data for electricity consumption of the college from various buildings were collected and listed as below:

SL.NO	NAME OF APPLIANCE	WATTAGE	QUANTITY	WATTAGE
1	Tube light (LED)	20	1120	22,400
2	CFL(LED)	09	310	2,790
3	Fan	80	1330	106,400
4	Water Cooler	1500	05	7,500
5	Exhaust Fan	150	20	3,000
6	Aquaguard	500	20	10,000
7	Computer	200	180	36,000
8	Projector	750	10	7,500
9	Printer	500	20	10,000
10	Smart Board	500	03	1,500
11	TV(LED)	150	06	900
12	Motor(water pump)	1000	10	10,000
13	AC	2000	20	40,000
14	Submersible Pump	746	08	5,968

Lighting system

Lighting is an essential service for all industries, institutions, hospitals, malls, etc.Innovation and continuous improvement in the field of lighting, have given rise to tremendous energy-saving opportunities in this area. Lighting is an area, which provides a major scope to achieve energy efficiency at the design stage, by incorporation of modern energy-efficient lamps, luminaries, and gears, apart from good operational practices.

Ceiling Fans

Ceiling Fans constitute a major part of the total energy expended by the institute. However, in places like India, with its hot, tropical climate, it is very common to find ceiling fans in households, institutes, offices, and almost every other building or establishment. Hence, innovations and continuous improvement in the field of fans, have given rise to tremendous energy-saving opportunities in this area The fan is an area, which provides a major scope to achieve energy efficiency at the design stage, by incorporation of modern energy-efficient Fans, BLDC Fans, smart Fans, apart from good operational practices.

6.2. CONSUMPTION AND UTILIZATION OF FUEL

Fuel is a significant component for various aspects of campus operations, including transportation, powering equipment, and maintaining infrastructure. Understanding the sources of fuel used on campus, such as gasoline, diesel, or propane, allows for an assessment of the college's carbon emissions and environmental impact. By analyzing the consumption patterns of fuel across different departments and facilities, opportunities to improve efficiency and reduce reliance on fossil fuels can be identified. Implementing measures like promotion of carpooling or supporting the use of electric vehicles can contribute to a greener and more sustainable campus, ultimately reducing the college's carbon footprint.

DG Set 250 KVA

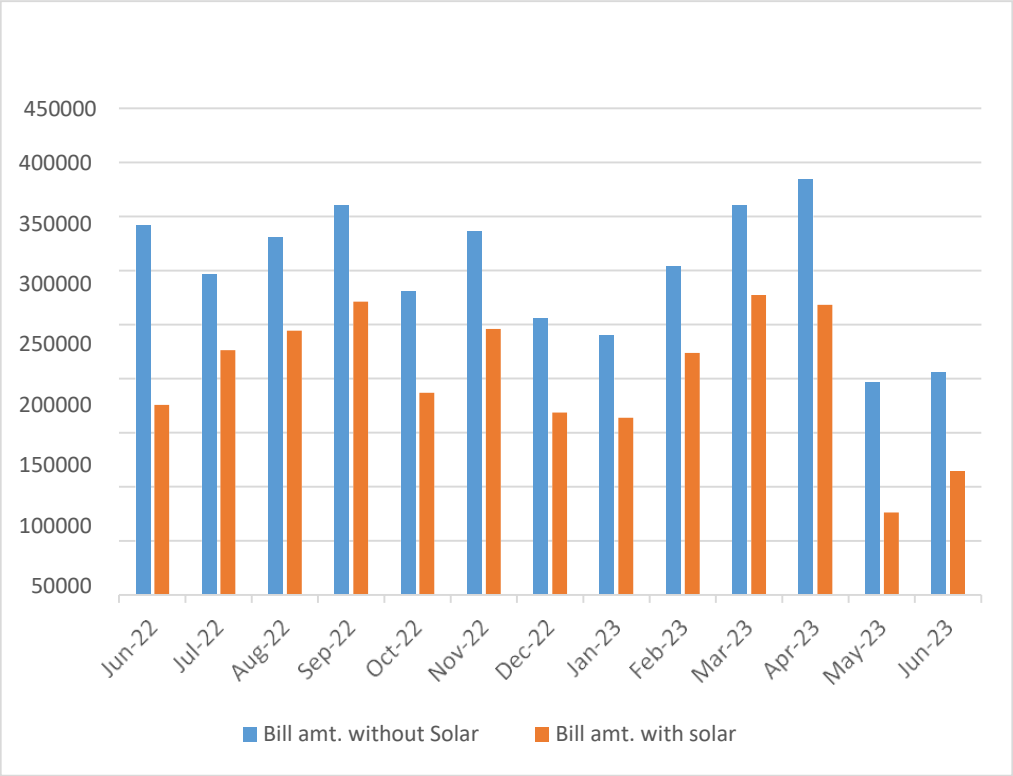
Transformer

6.3. SOLAR PANEL

TABLE: DETAILS OF ELECTRICITY BILL

Bill Month	Consumption Unit	Contract Demand	Actual Demand	Bill amount	Power Factor
2022- April	30245	92.0	102.2	3,99,279.00	100.00
2022- May	26234	92.0	102.2	2,46,554.00	97.00
2022- June	27828	92.0	102.2	2,20,203.00	97.90
2022- July	37285	177.78	142.2	3,36,204.00	98.30
2022-Aug	30681	177.78	142.2	2,26,107.00	98.93
2022- Sep	33669	177.78	142.2	2,41,961.00	98.84
2022- Oct	37302	177.78	142.2	2,67,210.00	98.09
2022- Nov	33964	177.78	142.2	1,83,751.00	97.43
2022- Dec	33273	177.78	142.2	2,41,492.00	97.20
2023- Jan	21513	177.78	144.2	1,68,486.00	96.96
2023- Feb	20709	177.78	142.2	1,63,675.00	98.40
2023- Mar	30360	177.78	142.2	4,01,455.00*	98.44

SOLAR POWER PLANT PERFORMANCE
ANALYSIS OF ELECTRICITY BILL FOR THE PERIOD FROM JUN-22TOJUN-23



RECOMMENDATIONS

- The institute must conduct energy audits to identify areas where buildings can be retrofitted for better energy efficiency. This may include upgrading insulation, windows, and doors, installing energy-efficient lighting systems, and optimizing heating, ventilation, and air conditioning (HVAC) systems. These measures can reduce energy waste and result in long-term energy and cost savings.
- The Institute must implement educational campaigns, workshops, and seminars to highlight the importance of turning off lights when not in use, using energy-efficient appliances, and optimizing computer usage by enabling power-saving settings. Incentives, such as rewards or recognition, can also be introduced to encourage individuals and departments to actively participate in responsible energy usage.
- The college must utilize smart technology and automation systems to manage energy consumption more effectively. Installing motion sensors and timers for lighting, HVAC

controls, and smart meters for monitoring energy usage can provide real-time data and insights that can drive energy-saving decisions. Additionally, implementing energy management systems can help identify energy inefficiencies and adjust usage patterns accordingly.

- The college must incorporate sustainability and energy conservation topics into the college curriculum. This can include offering courses or workshops on renewable energy, energy management, or sustainable architecture and design. By empowering students with knowledge and skills in sustainable practices, the college can create a generation of environmentally conscious individuals who can contribute to a more sustainable future.
- The institute must collaborate with local energy agencies, NGOs, or sustainability initiatives to access resources, funding, and expertise in energy conservation. Partnering with energy service companies (ESCOs) can also provide opportunities for comprehensive energy efficiency projects that can yield substantial savings over time.

Overall, the college should adopt a holistic approach towards energy consumption and utilization, encompassing education, technology, and infrastructure upgrades, to create a more sustainable campus environment. By prioritizing energy efficiency and sustainable practices, the college can actively contribute to mitigating climate change and promoting environmental stewardship.

CHAPTER 7

AIR & NOISE

7.1 AMBIENT NOISE STATUS

The major source of noise in UNC is from automobiles and construction sites. At the main gate of the Campus, human communication and transportation are producing high sound levels. Ambient noise monitoring was carried out in different areas of UNC campus like at the campus entry, administration building, and construction sites and plantation areas. The sampling was carried out using calibrated Sound Level Meter (AZ 8921) by logarithmic scale in decibels (dB). The noise readings were collected in the campus and calculated. The details of noise status in UNC campus is given in the below table.

TABLE 9: NOISE LEVELS IN UNC CAMPUS

SERIAL NO.	AREA	LEQ (DB) DAY TIME
1	Main Gate	**65**
2	Administration block	**51**
3	Academic blocks	**47**
4	Canteen	**64**
5	Plantation area	**59**
6	Construction site	**63**

- ❖ All parameters expressed in dB (A) Leq. and observed under permissible limits.
- ❖ Monitoring is carried out during the daytime.

RECOMMENDATIONS

- ❖ Campus should follow the Environmental aware laws for different aspects of environmental management.
- ❖ Campus should make the rule provide posters and slogans in the campus for protecting the environment.

Noise level near the administrative building of the campus was measured by a **decibel meter** by sound professional of CEMC with great accuracy on dt.02.06.2022. The details of the report are as follows:

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Enlisted in Construction Industry Development Council (CIDC) established by the Planning Commission (Govt. of India)
MoEF&CC, Govt. of India, Recognised Environment Laboratory under Environment (Protection) Act, 1986 & NABL Accredited Laboratory

Report No. - CEMC/UNAC/060623/N1 **Issued Date-06.06.2023**

NOISE MONITORING TEST REPORT

Name & Address of the Client : M/s U.N AUTONOMOUS COLLEGE OF SCIENCE & TECHNOLOGY
Date of Sampling : 29.05.2023
Sampling by : Mr. Chinmaya Barik
Sample Description : NOISE
Reference No. : CEMC-06062023N1

ANALYSIS RESULT

Sl No.	Location	NL Day Time dB (A)			NL Night Time dB (A)		
		Max	Min.	Avg.	Max.	Min.	Avg.
1	Near Ad. Building	70.8	67.6	69.2	68.2	61.4	64.8

Authorized Signatory **Seal of Laboratory**

Notes:

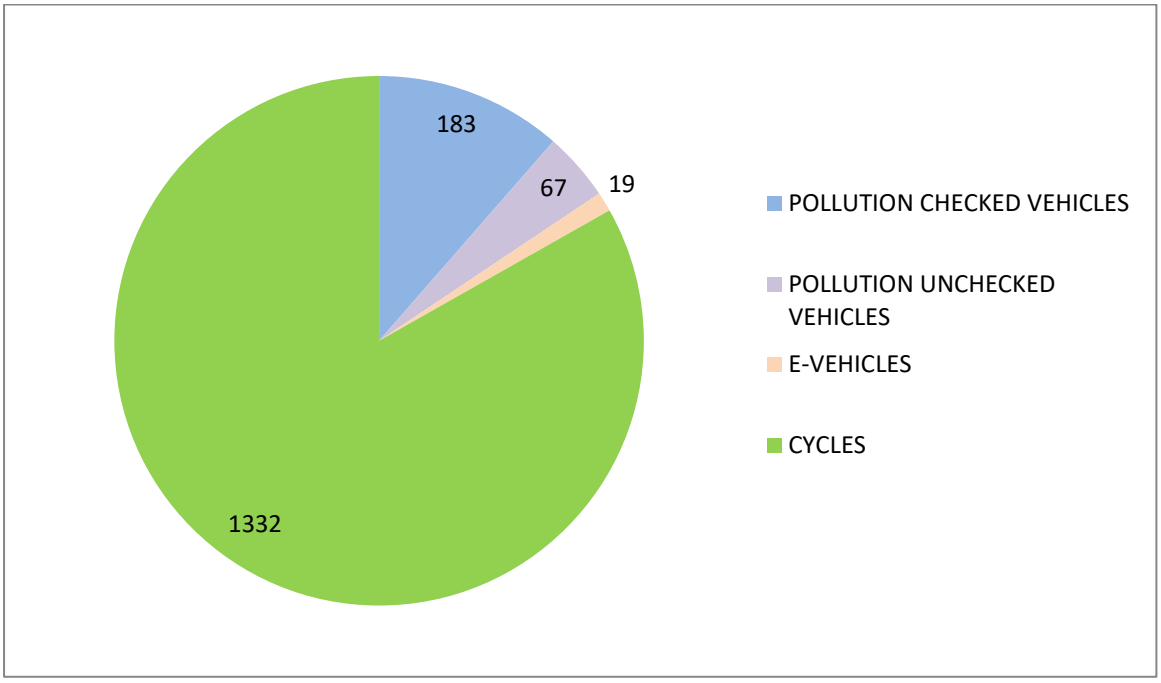
- The result given above related to the tested sample, as received. The customer asked for the above test only.
- This Test Report shall not be reproduced wholly or in part without prior written consent of the laboratory.
- The samples received shall be destroyed after two weeks from the date of issue of the Test Report unless specified otherwise

7.2 AMBIENT AIR QUALITY STATUS

- Central Pollution Control Board, New Delhi initiated National Ambient Air Quality Monitoring (NAAQM) program in the year 1984 to get a spatial and temporal variation of ambient air concentrations for a wide range of pollutants that are considered relevant for evolving strategic.
- A vehicle information data in the Pre audit stage of the college campus was collected through Google form. It was found that only 73.2% vehicle owner had pollution checked certificates. Based upon this, the administration made it mandatory to obtain PUC for all the vehicles inside the campus.

PRE-AUDIT STAGE

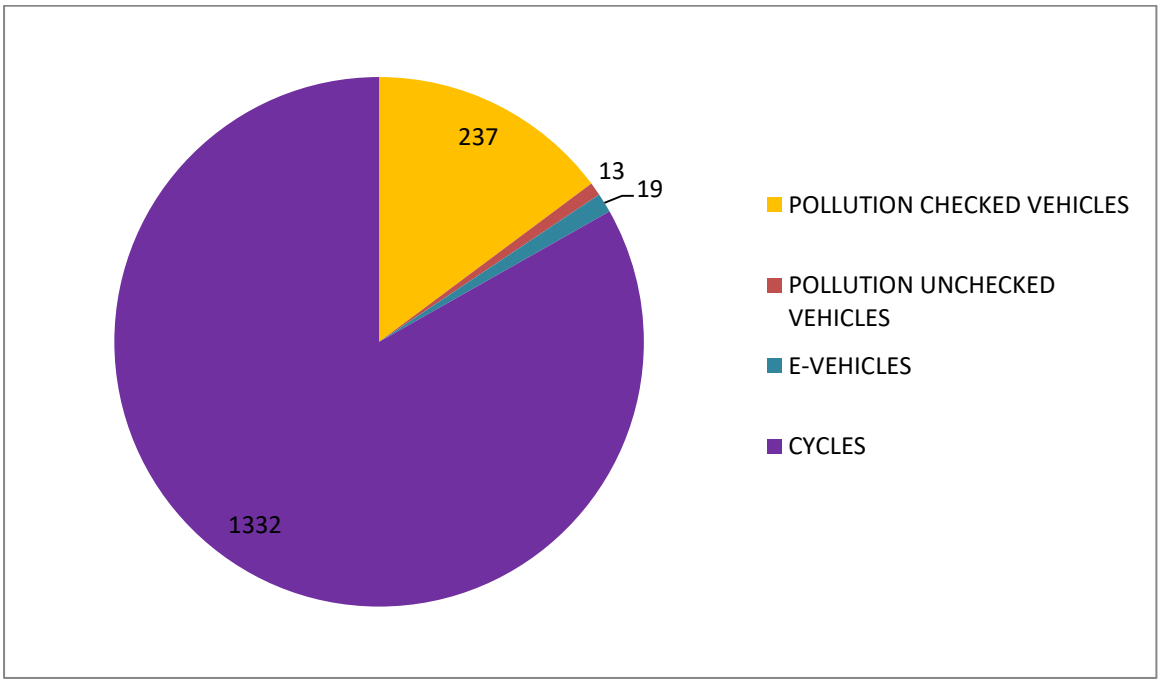
No. of Cycles	No. of Two Wheelers	Pollution Checked Two wheelers	No. of Four Wheelers	Pollution Checked Four Wheelers	No. of e-vehicles
1332	224	165	26	18	19



Pre audit Pollution status of vehicles

POST-AUDIT STAGE

No. of Cycles	No. of Two Wheelers	Pollution Checked Two wheelers	No. of Four Wheelers	Pollution Checked Four Wheelers	No. of e-vehicles
1332	224	211	26	26	19



Post audit Pollution status of vehicles

Under NAMP(National Air Quality Monitoring Program), three air pollutants viz., Sulphur dioxide (SO_2), Nitrogen dioxides (NO_2), and Respiratory Suspended Particulate Matter (RSPM/PM10) have been identified for regular monitoring at various locations. Monitoring of pollutants has been carried out for 24 hours (4-hourly sampling for gaseous pollutants and 8-hourly sampling for particulate matter) as per CPCB monitoring protocol. One **Respirable Dust Sampler(RDS)** machine is installed at the Main Gate of the Campus which monitored the changes in ambient air quality during 24- hours. The trees cover on the campus is the leading sources to absorb CO_2 and release enough fresh O_2 across the Campus. The result shows that the Campus's air quality status is good as compared to other locations. It is identified that the campus is a green campus. UNC campus observed minimum air pollution as compared to other Ambient Air Pollution Centers located in different parts of the city.

The air sample analyzed by analytical method is as follows:

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Report No. - CEMC/UNAC/060623/A1 **Issued Date-06.06.2023**

AMBIENT AIR QUALITY TEST REPORT

Name & Address of the Client	: **M/s U.N AUTONOMOUS COLLEGE OF SCIENCE & TECHNOLOGY**
Date of Sampling	: 29.05.2023
Sampling by	: Mr. Chinmaya Barik
Date of Sample Received	: 29.05.2023
Sample Description	: AMBIENT AIR
Sample Location	: **Near Admin Building**
Date of Analysis	: 29.05.2023 to 03.06.2023
Reference No.	: CEMC-06062023A1

ANALYSIS RESULT

Parameter	Unit	Result	NAAQ Standard-2009
Particulate Matter (PM_{10})	$\mu g/m^3$	66.8	100
Particulate Matter ($PM_{2.5}$)	$\mu g/m^3$	36.6	60
Sulphur Dioxide (SO_2)	$\mu g/m^3$	10.8	80
Oxides of Nitrogen (NO_x)	$\mu g/m^3$	15.2	80

Authorized Signatory **Seal of Laboratory**

Notes:

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CHAPTER 8

SUSTENANCE OF GREEN COVER IN THE CAMPUS

Udayanath Collegecovers an area of about 30 acres. The major portion is covered with vegetation and the main aim is to protect and conserve its biodiversity, fresh and clean ambiance through many initiatives. The institute has taken the following green initiatives to protect and conserve nature.

8.1 PLANTATION DRIVES

The college takes pride in its plantation efforts to enhance the green cover on the campus. Various native and non-invasive plant species are carefully selected and planted in designated areas. The plantation activities are carried out with the goal of promoting biodiversity and creating a sustainable ecosystem. The college also actively encourages students and faculty to participate in plantation drives, instilling a sense of environmental responsibility and fostering a connection with nature. Many plantation drives are taken by the campus. Every year on 5th June i.e. World Environment Day, the college takes Plantation activity.

Under 33 Crore tree plantation scheme of Government, UNC has taken many plantation drives.. The trees are watered by students of various Departments. They nurture these trees throughout the year. Students of various departments along with the faculty memebers make the plantation and nurturing program successful. A total of 54 plant saplings of different species (like ornamental, fruit and medicinal plant, etc.) were planted in various sites of the campus during this year's environment day program.

Plantation by students during World Environment Day

In addition to new plantation drives and landscaping/beautification activities, all essential maintenance work (like lawn, hedge, existing plants /shrubs, growing of seasonal flowers) for previously developed flower and other gardens, as well as other locations of the campus, is done regularly under the supervision of Horticulture Section. Apart from the maintenance of gardens, all old plantations (like roadside and other plantations) in different locations of the UNC campus are regularly nurtured by cleaning, fertilization, watering, etc. In addition to that campus celebrates various events like Special Plantation Drive every year on World Environment Day and other extension activities like the Plantation program

The various occasions on which plantation is done in the campus are

- ❖World Environment Day
- ❖Van Mahotsav week
- ❖Superannuation day of Employees
- ❖Special visit by Dignitaries
- ❖Alumni day

Plantation program organized on the occasion of Van Mahotsav week

8.2LANDSCAPING AND GARDENING ACTIVITIES

The landscaping and gardening activities of our Autonomous College are carried out with great enthusiasm and dedication. The college takes pride in creating beautiful and well-maintained landscapes that enhance the overall aesthetic appeal of the campus. Expert horticulturists and gardeners are employed to design and implement various landscaping projects. Their creative vision is evident in the diverse array of plants, flowers, and decorative features that adorn the college grounds.

8.3MAINTENANCE OF GARDEN AND LANDSCAPE

The maintenance of garden and landscape is a meticulous task undertaken by the college administration. A dedicated team of gardeners ensures that the plants are regularly watered, fertilized, and pruned. They also undertake pest control measures to protect the plants from

any infestation. Additionally, the college conducts regular inspections to identify any issues or areas that require attention. The maintenance efforts are aimed at preserving the beauty of the gardens while ensuring a safe and clean environment for the college community.

8.4 HOUSE PLANTS

House plants have found their place within the college premises. The college understands the positive impact of indoor plants on air quality and overall well-being. As such, various species of house plants are strategically placed in classrooms, common areas, and offices. These plants not only improve air quality by absorbing pollutants but also create a calming and inviting atmosphere. The college administration ensures that these house plants receive proper care and maintenance, contributing to a healthy indoor environment.

8.5 CAMPUS INVOLVEMENT

The college campus is deeply involved in sustaining the green cover and promoting environmental consciousness. The students actively participate in tree plantation drives, creating small forests and groves within the campus. These efforts not only enhance the beauty of the campus but also contribute to carbon sequestration and mitigating climate change. Additionally, the college organizes awareness programs and workshops on sustainable practices like composting, waste reduction, and water conservation. The campus community is encouraged to actively participate in these initiatives, fostering a sense of responsibility towards the environment.

8.6ENVIRONMENTAL CONSERVATION PROGRAMS OF THE INSTITUTE

The college has developed a comprehensive environment conservation program that encompasses various initiatives. One of the key aspects of this program is waste management, which includes proper segregation, recycling, and composting. The college also emphasizes the reduction of plastic usage on campus and advocates for eco-friendly alternatives. Additionally, energy conservation measures such as the use of solar power and energy-efficient lighting systems have been implemented. The college regularly organizes awareness campaigns, workshops, and seminars on environmental conservation to educate and empower its students and faculty in sustainable practices. The efforts of the college in

creating a greener and more sustainable campus showcase its commitment towards environmental stewardship.

In addition to new plantation drives and landscaping/beautification activities, all essential maintenance work (like lawn, hedge, existing plants /shrubs, growing of seasonal flowers) for previously developed flower and other gardens, as well as other locations of the UNC campus, is done regularly under the supervision of Horticulture Section. Apart from the maintenance of gardens, all old plantations (like roadside and other plantations) in different locations of the UNC campus are regularly nurtured by cleaning, fertilization, watering, etc. In addition to that campus celebrates various events like Special Plantation Drive every year on World Environment Day and other extension activities like the Plantation program.

Greeneries of the Campus

CHAPTER 9

BIODIVERSITY OF THE CAMPUS

9.1 FLORAL DIVERSITY OF UNC

UNC is within the geo-position between latitude 20.211299^0N and longitude 86.015066^0 E, Prachi Jnanapitha, Adaspur, Cuttack, Odisha, India. It encompasses an area of about 30 acres. The area is immensely diverse with a variety of tree species performing a variety of functions. Most of these tree species are planted in different periods of time through various plantation programmes organized by the college authority & have become an integral part of the college. The trees of the college have increased the quality of life, not only the college fraternity but also the people around the college in terms of contributing to our environment by providing oxygen, improving air quality, climate amelioration, conservation of water, preserving soil, and supporting the faunal species, controlling climate by moderating the effects of the sun, rain & wind. Leaves absorb the radiant energy of the sun, keeping things cool in summer. Many species of birds are dependent on these trees mainly for food & shelter. Nectars of different flowers & plants are a favorable source of food for birds & squirrels. Different species display a seemingly endless variety of shapes, forms, texture & vibrant colors. Even individual trees vary their appearance throughout the course of the year as the seasons change. The strength, long lifespan & regal stature of trees give them a monument like quality. They also remind us the glorious history of our institution in particular. A thick belt of large shady trees in the periphery of the college have found to be bringing down noise & cut down dust & storms. Thus the college has been playing a significant role in maintaining the environment of the entire Adaspur village.

The campus has 2 large gardens with vast plant diversity and 15 blocks / areas named according to various buildings. They are Arts block , Commerce block , Science block attached with one of the garden , Library building block , Administrative block , I.T Department , cycle stand , canteen area, Meghasana boys hostel area associated with the field behind it , the second garden area (in front of the administrative block) , Principal's quarter along with the pump house area , staff quarters area associated with swimming pool and the Saraswati temple , Mahodadhi boys hostel area , vermi-compost unit and the field area associated with it and Girls's hostel area (New PG hostel , Mahadevi hostel , and Mandakini hostel).

ASSESSION OF VEGETATION DIVERSITY IN UNC CAMPUS

Techniques & tools used for monitoring & assessment of natural vegetation in different landscapes in a traditional or modern system can focus on qualitative or quantitative aspects. Understanding the unequal distribution of plant diversity is one of the greatest challenges in ecology. Standardized sampling protocol for diversity assessment is there for essential to reflect diversity across spatial scales and to compare the diversities of different ecosystems.

For quantitative assessment of vegetation parameters analyzed are density, frequency Curtis & Mc Intosh (1950) and their relative values like relative density, relative frequency as per Philips (1959).

The vegetation diversity analysis of UNC was carried out for the academic session 2022-23. The data collected via quadratic analysis method. Quadrat size **25ft. x 25ft.**

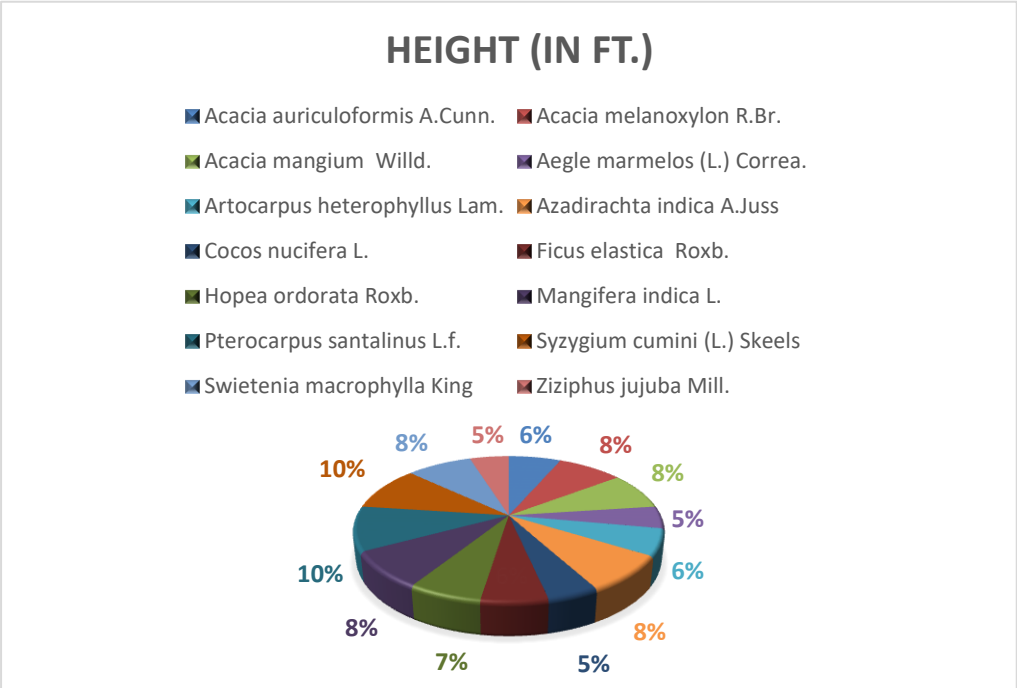
QUANTITATIVE ASSESSMENT OF VEGETATION

SL NO.	PLANT NAME	Frequency %	Relative Frequency	Density	Relative Density
1.	*Acacia auriculoformis* A. Cunn.	40	16.32	0.8	7.01
2.	*Acacia melanoxylon* R.Br.	30	12.24	0.5	6.75
3.	*Acacia mangium* Willd.	30	12.24	0.8	8.33
4.	*Aegle marmelos* (L.) Correa.	50	20.40	0.10	8.06
5.	*Artocarpus heterophyllus* Lam.	60	24.48	0.14	8.48
6.	*Azadirachta indica* A. Juss	70	28.57	0.18	9.23
7.	*Cocos nucifera* L.	60	24.48	0.5	3.03
8.	*Ficus elastica* Roxb.	20	8.16	0.6	16.66
9.	*Hopea ordorata* Roxb.	30	12.24	0.6	12
10.	*Mangifera indica* L.	60	24.48	0.12	7.27
11.	*Pterocarpus santalinus* L.	30	12.24	0.5	5.55
12.	*Syzygium cumini* (L.) Skeels	30	12.24	0.4	4.44
13.	*Swietenia macrophylla* King	20	8.16	0.5	13.88
14.	*Ziziphus jujuba* Mill.	30	12.24	0.6	12

TOTAL QUADRAT STUDIED:10 nos.

CANOPY COVERAGE

SL NO.	PLANT NAME	Height (in ft.)	Canopy Diameter (E-W) (in ft.)	Canopy Diameter (N-S) (in ft.)	Plant Canopy (in Cubic ft.)
1.	*Acacia auriculoformis* A. Cunn.	20	15	14	2198.7
2.	*Acacia melanoxylon* R.Br.	25	16	14	2926
3.	*Acacia mangium* Willd.	25	11	13	1867.9
4.	*Aegle marmelos* (L.) Correa.	15	27	29	6136.7
5.	*Artocarpus heterophyllus* Lam.	18	11	12	1241.4
6.	*Azadirachta indica* A. Juss	25	15	18	3526.8
7.	*Cocos nucifera* L.	14	24	26	4564.5
8.	*Ficus elastica* Roxb.	18	17	15	2398.2
9.	*Hopea ordorata* Roxb.	20	15	19	2978.2
10.	*Mangifera indica* L.	25	25	26	8490.6
11.	*Pterocarpus santalinus* L.	30	20	18	5643
12.	*Syzygium cumini* (L.) Skeels	30	10	12	1881
13.	*Swietenia macrophylla* King	25	12	10	1567.5
14.	*Ziziphus jujuba* Mill.	15	12	16	1512



The canopy density of each plant was calculated by using the protocols formulated by Throne *et. al.* (2002).

COLLECTION OF DATA

Overall, the vegetation diversity on the UNC campus is considered to be excellent. The campus administration and groundskeepers prioritize maintaining a diverse and healthy plant community, which contributes to the aesthetic beauty of the campus and provides numerous environmental benefits

Garden-1 with greenery

Flower garden

Orchard-1

RET Section

Mangrove Section

Orchard-2

TABLE 10: FLORAL DIVERSITY OF THE INSTITUTE

SERIAL NO.	PLANT TYPE	APPROX. NUMBER
1.	**Herbs**	1000
2.	**Shrubs**	350
3.	**Trees**	150
4.	**Grasses**	300
5.	**Climbers**	50
6.	**Parasites**	20
7.	**Epiphytes**	10
8.	**Gymnosperms**	08
9.	**Pteridophytes**	15
10.	**Bryophytes**	05
11.	**Hydrophytes**	20
12.	**Mangrove & mangrove associates**	55
13.	**RET species**	23
14.	**TOTAL**	2006

TABLE 11: TOTAL FLORISTIC RECORD OF UNC CAMPUS, ADASPUR, CUTTACK

HERBS

SL. NO.	SCIENTIFIC NAME	FAMILY
1.	*Acalypha indica*	Euphorbiaceae
2.	*Achyranthes aspera*	Amaranthaceae
3.	*Adhatoda vasica*	Acanthaceae
4.	*Aerva lanata*	Amaranthaceae
5.	*Althernanthera brasiliana*	Amaranthaceae
6.	*Alternanthera sessilis*	Amaranthaceae
7.	*Amaranthus viridis*	Amaranthaceae
8.	*Ammania multiflora*	Lythraceae
9.	*Antirhinum majus*	Plantaginaceae
10.	*Argemone mexicana*	Papaveraceae
11.	*Asparagus racemosus*	Liliaceae
12.	*Ayapana triplinervis*	Asteraceae
13.	*Begonia cucullata*	Begoniaceae
14.	*Blumea lacera*	Asteraceae
15.	*Boerhavia diffusa*	Nyctaginaceae
16.	*Cana indica*	Cannaceae
17.	*Cardiospermum helicacabum*	Sapindaceae
18.	*Centella asiatica*	Apiaceae
19.	*Chromolaena odorata*	Asteraceae
20.	*Chrysanthamum coronarium*	Asteraceae
21.	*Cleome gynandra*	Capparaceae
22.	*Cleome rutidosperma*	Capparaceae
23.	*Cleome visoca*	Capparaceae
24.	*Clerodendrum inerme*	Verbenaceae
25.	*Clerodendrum serratum*	Verbenaceae
26.	*Clerodendrum viscosum*	Verbenaceae
27.	*Coelus amboinicus*	Lamiaceae
28.	*Coelus scutellarioides*	Lamiaceae
29.	*Colocasia esculenta*	Araceae

30.	*Commelina kurzii*	Commelinaceae
31.	*Commelina longifolia*	Commelinaceae
32.	*Costus specious*	Zingiberaceae
33.	*Crinum asiticum*	Amaryllidaceae
34.	*Croton bonplandianus*	Euphorbiaceae
35.	*Desmodium gangeticum*	Fabaceae
36.	*Desmodium triflorum*	Fabaceae
37.	*Dianthus chinesis*	Caryophyllaceae
38.	*Diffenbachia aurora*	Araceae
39.	*Diptheracantus prostratus*	Acanthaceae
40.	*Eclipta alba*	Asteraceae
41.	*Eichhornia crassipes*	Pontederiaceae
42.	*Elettaria cardamomum*	Zingiberaceae
43.	*Emilia sonchifolia*	Asteraceae
44.	*Euphorbia hirta*	Euphorbiaceae
45.	*Evolvus alsinoids*	Convolvulaceae
46.	*Evolvus nummularius*	Convolvulaceae
47.	*Gladiolus dalenii*	Iridaceae
48.	*Gnaphalium polycaulon*	Asteraceae
49.	*Hedychium coronarium*	Zingiberaceae
50.	*Hedyotis corymbosa*	Rubiaceae
51.	*Hedyotis umbellata*	Rubiaceae
52.	*Heliconia rostrata*	Musaceae
53.	*Heliotropicum indicum*	Boraginaceae
54.	*Hemidesmus indicus*	Periplocaceae
55.	*Ipomoea pes-tigridis*	Convolvulaceae
56.	*Jatropha podagrica*	Euphorbiaceae
57.	*Justicia gendarussa*	Acanthaceae
58.	*Kalanchoe blossfeldiana*	Crassulaceae
59.	*Lathyrus aphaca*	Fabaceae
60.	*Leucas aspera*	Lamiaceae
61.	*Mecardonia procumbens*	Scrophulariaceae
62.	*Melochia corchorifolia*	Steruculiaceae
63.	*Mimosa pudica*	Mimosaceae
64.	*Mollugo pentaphylla*	Molluginaceae
65.	*Musa paradisiaca*	Musaceae

66.	*Oxalis corniculata*	Oxalidaceae
67.	*Parthenium hysterophorous*	Asteraceae
68.	*Petunia hybrida*	Solanaceae
69.	*Phyllanthus niruri*	Euphorbiaceae
70.	*Phyllanthus simplex*	Euphorbiaceae
71.	*Physalis minima*	Solanaceae
72.	*Plumbago zeylanica*	Plumbaginaceae
73.	*Portulaca grandiflora*	Portulacaceae
74.	*Portulaca oleracea*	Portulacaceae
75.	*Pouzolzia indica*	Utricaceae
76.	*Rothia indica*	Fabaceae
77.	*Ruellia tuberosa*	Acanthaceae
78.	*Salvia splendens*	Lamiaceae
79.	*Scoparia dulcis*	Scrophulariaceae
80.	*Sida rhombifolia*	Malvaceae
81.	*Solanum nigrum*	Solanaceae
82.	*Spermacoce articularis*	Rubiaceae
83.	*Spermacoce mauritiana*	Rubiaceae
84.	*Spermacoce pusilla*	Rubiaceae
85.	*Spilanthes paniculata*	Asteraceae
86.	*Stachytarpheta jamaicensis*	Verbenaceae
87.	*Syndrella nodiflora*	Asteraceae
88.	*Tithonia rotundifolia*	Asteraceae
89.	*Tradescantia pallida*	Commelinaceae
90.	*Tradescantia zebrina*	Commelinaceae
91.	*Tribulus terrestris*	Zygophyllaceae
92.	*Tricosanthes dioica*	Cucurbitaceae
93.	*Urena sinuata*	Malvaceae
94.	*Vernonia cinera*	Asteraceae
95.	*Vinca rosea*	Apocyanaceae

SHRUBS

SERIAL NO.	SCIENTIIFIC NAME	FAMILY
1.	*Acalypha wilkesiana*	Euphorbiaceae
2.	*Allamanda blanchetii*	Apocynaceae
3.	*Allamanda cathartica*	Apocynaceae
4.	*Annona squamosa*	Annonacceae
5.	*Breynia retusa*	Phyllanthaceae
6.	*Brunfelsia uniflora*	Solanaceae
7.	*Callistemon lanceolatus*	Myrtaceae
8.	*Carmona retusa*	Boraginaceae
9.	*Cassia ocedentalis*	Fabaceae
10.	*Cestrum nocturnum*	Solanaceae
11.	*Commiphora wightii*	Burseraceae
12.	*Croton variegatum*	Euphorbiaceae
13.	*Dracaena reflexa*	Asparagaceae
14.	*Duranta erecta*	Verbenaceae
15.	*Euphorbia tithymaloides*	Euphorbiaceae
16.	*Gardenia jasminoides*	Rubiaceae
17.	*Glycomis pentaphylla*	Rutaceae
18.	*Indigofera tinctoria*	Fabaceae
19.	*Ixora coccinea*	Rubiaceae
20.	*Ixora finlaysoiana*	Rubiaceae
21.	*Jasminum multiflorum*	Oleaceae
22.	*Jasminum sambac*	Oleaceae
23.	*Juniperus communis*	Cupressaceae
24.	*Kopsia fruticosa*	Apocyanaceae
25.	*Lantana camara*	Verbenaceae
26.	*Lawsonia inermis*	Lythraceae
27.	*Lipia javanica*	Verbenaceae
28.	*Melaleuca alternifolia*	Myrtaceae
29.	*Nerium oleander*	Apocyanaceae
30.	*Philodendrun xanadu*	Araceae
31.	*Rauvolfia tetraphylla*	Apocyanaceae
32.	*Sauropus androgynous*	Phyllanthaceae

33.	*Solanum torvum*	Solanaceae
34.	*Tabernaemonata divaricate*	Apocyanaceae
35.	*Tecoma stans*	Bignoniaceae
36.	*Urena lobata*	Malvaceae
37.	*Wrightia antidysenterica*	Apocyanaceae
38.	*Zamia furfuracea*	Zamiaceae

TREES

SL. NO.	SCIENTIFIC NAME	FAMILY
1.	*Acacia auriculiformis*	Mimosaceae
2.	*Aegle marmelos*	Rutaceae
3.	*Albizia lebbeck*	Fabaceae
4.	*Alstonia scholaris*	Apocynaceae
5.	*Anacardium occidentale*	Anacardiaceae
6.	*Anogeissus acuminata*	Combretaceae
7.	*Araucaria heterophylla*	Araucariaceae
8.	*Areca catechu*	Arecaceae
9.	*Artocarpus heterophyllus*	Moraceae
10.	*Artocarpus lacucha*	Moraceae
11.	*Averrhoa carambola*	Oxalidaceae
12.	*Bauhinea purpurea*	Fabaceae
13.	*Bauhinea variegata*	Fabaceae
14.	*Bauhinia racemose*	Fabaceae
15.	*Bixa orellana*	Bixaceae
16.	*Bombax ceiba*	Malvaceae
17.	*Calamus rotang*	Arecaceae
18.	*Callophylum inophyllum*	Clusiaceae
19.	*Carica papya*	Caricaceae
20.	*Casuarina euqisetifolia*	Casuarinaceae
21.	*Calliandra haematocephala*	Fabaceae
22.	*Cinnamomum zeylanicum*	Lauraceae
23.	*Citrus grandis*	Rutaceae
24.	*Citrus limon*	Rutaceae
25.	*Cocus nucifera*	Arecaceae
26.	*Couropita guianensis*	Lecythidaceae

27.	*Delonix regia*	Fabaceae
28.	*Dillenia indica*	Dilleniaceae
29.	*Dypsis lutescens (Areca Palm)*	Arecaceae
30.	*Elaeocarpus sphaericus*	Elaeocarpaceae
31.	*Euphorbia tirucalli*	Euphorbiaceae
32.	*Feronia lemonia*	Rutaceae
33.	*Ficus elastica (Indian Rubber)*	Moraceae
34.	*Ficus hispida*	Moraceae
35.	*Ficus religiosa*	Moraceae
36.	*Gardenia gummifera*	Rubiaceae
37.	*Gmelina arborea*	Lamiaceae
38.	*Grewia subinaequalis*	Tiliaceae
39.	*Lagerstroemia indica*	Lythraceae
40.	*Lagerstroemia reginae*	Lythraceae
41.	*Licuala grandis*	Arecaceae
42.	*Litchi chinessis*	Sapindaceae
43.	*Litsea glutinosa*	Lauraceae
44.	*Magnolia grandiflora*	Magnoliaceae
45.	*Mangifera indica*	Anacardiaceae
46.	*Manihot esculenta*	Euphorbiaceae
47.	*Manilkara hexandra*	Sapotaceae
48.	*Mesua ferrea*	Callophyllaceae
49.	*Michelia champaca*	Magnoliaceae
50.	*Mimisops elengi*	Sapotaceae
51.	*Murraya koenigii*	Rutaceae
52.	*Murraya paniculata*	Rutaceae
53.	*Moringa oleifera*	Moringaceae
54.	*Nyctanthes arbor-tristis*	Oleaceae
55.	*Pandanus fasicularis*	Pandanaceae
56.	*Phoenix dactylifera*	Arecaceae
57.	*Phyllanthus acidus*	Euphorbiaceae
58.	*Phyllanthus emblica*	Euphorbiaceae
59.	*Plumeria rubra*	Apocyanaceae
60.	*Polyalthia longifolia*	Annonaceae
61.	*Pongamia pinnata*	Fabaceae
62.	*Pterospermum acerifolium*	Sterculiaceae

63.	*Punica granatum*	Lythraceae
64.	*Santalum album*	Santalaceae
65.	*Sapindus trifoliata*	Sapinadaceae
66.	*Saraca asoca*	Fabaceae
67.	*Simarouba glauca*	Simaroubaceae
68.	*Spondias pinnata*	Anacardiaceae
69.	*Streblus asper*	Moraceae
70.	*Syzygium cumini*	Myrtaceae
71.	*Syzygium jambos*	Myrtaceae
72.	*Tectona grandis*	Lamiaceae
73.	*Terminalia bellirica*	Combretaceae
74.	*Terminalia catappa*	Combretaceae
75.	*Terminalia chebula*	Combretaceae
76.	*Thevetia peruviana*	Apocyanaceae
77.	*Thuja occidentalis*	Cupressaceae
78.	*Vitex negundo*	Verbenaceae
79.	*Ziziphus jujuba*	Rhamnaceae

GRASSES

SERIAL NO.	**SCIENTIFIC NAME**	**FAMILY**
1.	*Bambusa ventricosa*	Poaceae
2.	*Chloris barbata*	Poaceae
3.	*Cymbopogon flexuosus*	Poaceae
4.	*Cynodon dactylon*	Poaceae
5.	*Cyperus rotundus*	Cyperaceae
6.	*Dactyloctenium aegyptium*	Poaceae
7.	*Digitaria ciliaris*	Poaceae
8.	*Echinochloa colona*	Poaceae
9.	*Eleusine indica*	Poaceae
10.	*Eragrostis ciliaris*	Poaceae
11.	*Eragrostis ciliata*	Poaceae
12.	*Eragrostis pilosa*	Poaceae
13.	*Leptochloa chinessis*	Poaceae
14.	*Panicum psilopodium*	Poaceae
15.	*Perotis indica*	Poaceae
16.	*Saccharum spontaneum*	Poaceae

CLIMBERS

SERIAL NO.	SCIENTIFIC NAME	FAMILY
1.	*Abrus precatorius*	Fabaceae
2.	*Aganosma caryophyllata*	Apocynaceae
3.	*Bougainvillea spectabilis*	Nyctaginaceae
4.	*Cephalandra indica or Coccinia grandis*	Cucurbitaceae
5.	*Gymnema sylvestre*	Apocyanaceae
6.	*Ipomoea nil*	Convolvulaceae
7.	*Meremmia tridentate*	Convolvulaceae
8.	*Meremmia umbellata*	Convolvulaceae
9.	*Meremmia vitifolia*	Convolvulaceae

PARASITES

SERIAL NO.	SCIENTIFIC NAME	FAMILY
1.	*Cassytha filiformis*	Lauraceae
2.	*Cuscuta reflexa*	Cuscutaceae

EPIPHYTES

SERIAL NO.	SCIENTIFIC NAME	FAMILY
1.	*Dendrobium nobile*	Orchidaceae
2.	*Pteris vittata*	Pteridaceae
3.	*Vanda tessellata*	Orchidaceae

GYMNOSPERMS

SERIAL NO.	SCIENTIFIC NAME	FAMILY
1.	*Cycas revoluta*	Cycadaceae
2.	*Cycas circinalis*	Cycadaceae
3.	*Pinus roxburghii*	Pinaceae

PTERIDOPHYTES

SERIAL NO.	SCIENTIFIC NAME	FAMILY
1.	*Adiantum pedatum*	Pteridiaceae
2.	*Azolla pinnata*	Azollaceae
3.	*Christella parasitica*	Thelypteridaceae
4.	*Christella dentata*	Thelypteridaceae
5.	*Dryopteris filix-mas*	Dryopteridaceae
6.	*Lygodium palmatum*	Lygodiaceae
7.	*Lygodium speciosum*	Lygodiaceae
8.	*Marsilea minuta*	Marseliaceae
9.	*Nephrolepis biserrata*	Nephrolepidaceae
10.	*Nephrolepis cordifolia*	Nephrolepidaceae
11.	*Nephrolepis exaltata*	Nephrolepidaceae
12.	*Pteridium aquilinum*	Pteridaceae
13.	*Pteris cretica*	Pteridaceae
14.	*Pteris vittata*	Pteridaceae
15.	*Selaginella indica*	Selaginellaceae

BRYOPHYTES

SERIAL NO.	SCIENTIFIC NAME	FAMILY
1.	*Funaria hygrometrica*	Funariaceae
2.	*Marchantia polymorpha*	Marchantiaceae
3.	*Riccia huebeneriana*	Ricciaceae

HYDROPHYTES

SERIAL NO.	SCIENTIFIC NAME	FAMILY
1.	*Eichhornia crassipes*	Pontederiaceae
2.	*Hydrilla verticillata*	Hydrocharitaceae
3.	*Hydrolea zeylanica*	Hydroleaceae
4.	*Lemna perpusilla*	Lemnaceae
5.	*Nymphaea pubescens*	Nymphaeaceae
6.	*Pistia stratiotes*	Araceae
7.	*Spirodela polyrhiza*	Lemnaceae

MANGROVE & MANGROVE ASSOCIATES

SERIAL NO.	SCIENTIFIC NAME	FAMILY
1.	*Acanthus illicifolius*	Acanthaceae
2.	*Acrostichum aureum*	Pteridaceae
3.	*Aegiceras corniculatum*	Primulaceae
4.	*Avicennia alba*	Acanthaceae
5.	*Avicennia marina*	Acanthaceae
6.	*Brugiera gymnorrhiza*	Rhizophoraceae
7.	*Brugiera sexangula*	Rhizophoraceae
8.	*Ceriops decandra*	Rhizophoraceae
9.	*Exoecaria agallocha*	Euphorbiaceae
10.	*Kandelia candel*	Rhizophoraceae
11.	*Phoenix paludosa*	Arecaceae

RET SPECIES

SERIAL NO.	SCIENTIFIC NAME	FAMILY
1.	*Alphonsea madraspatana*	Annonaceae
2.	*Anogeissus latifolia*	Combretaceae
3.	*Dimorphocalyx glabellus*	Euphorbiaceae

4.	*Litsea glutinosa*	Lauraceae
5.	*Mesua ferrea*	Callophyllaceae
6.	*Polyalthia simiarum*	Annonaceae
7.	*Pterocarpus santalinus*	Fabaceae
8.	*Schleichera oleosa*	Sapindaceae
9.	*Shorea talura*	Dipterocarpaceae
10.	*Strychnos nux-vomica*	Loganiaceae
11.	*Terminalia arjuna*	Combretaceae

TABLE 12: DOMINANT TREE SPECIES OF DIFFERENT ACADEMIC BLOCKS OF THE COLLEGE CAMPUS

SL NO.	ACADEMIC BLOCKS	DOMINANT TREE SPECIES
1.	Arts Block	*Terminalia catappa*
2.	Commerce Block	*Cocos nucifera*
3.	Science Block (with Garden)	*Dypsis leutescens*
4.	Library Building Block	*Polyalthia longifolia*
5.	Administrative Block	*Mimusops elengi*
6.	I.T. Department	*Mimusops elengi*
7.	Cycle Stand	*Polyalthia longifolia*
8.	Canteen Area	*Pongamia pinnata*
9.	Meghasana Boys Hostel (with the Field)	*Azadiracta indica*
10.	Garden (in front of Administrative block)	*Mangifera indica*
11.	Principal's quarter (with pump house area)	*Carica papaya*
12.	Staff quarters (with swimming pool area & Saraswati temple premises)	*Dypsis leutescens*
13.	Mahodadhi Boys Hostel Area	*Cocos nucifera*
14.	Vermicompost Unit (with the field)	*Dypsis leutescens*
15.	Girl's Hostel Area (New PG hostel , Mahadevi hostel & Mandakini hostel)	*Polyalthia longifolia*

MANGROVE & MANGROVE ASSOCIATES

Acrostichum aureum

Acanthus ilicifolius

Phoenix paludosa

Exoecaria agallocha

Brugiera gymnorhiza

Ceriops decandra

Aegiceras corniculatum

Avicinia marina

RET PLANTS

Polyalthia simiarum

Dimorphocalyx glabellus

Schleichera oleosa

Pterocarpus santalinus

Messua ferrea

Anogeissus latifolia

Alphonsea madras-patna

Strychnos nux-vomica

Shorea talura

S

DOMINANT TREE SPECIES OF DIFFERENT ACADEMIC BLOCKS OF THE COLLEGE CAMPUS

Dypsis leutescens

Polyalthia longifolia

Cocos nucifera

Mangifera indica

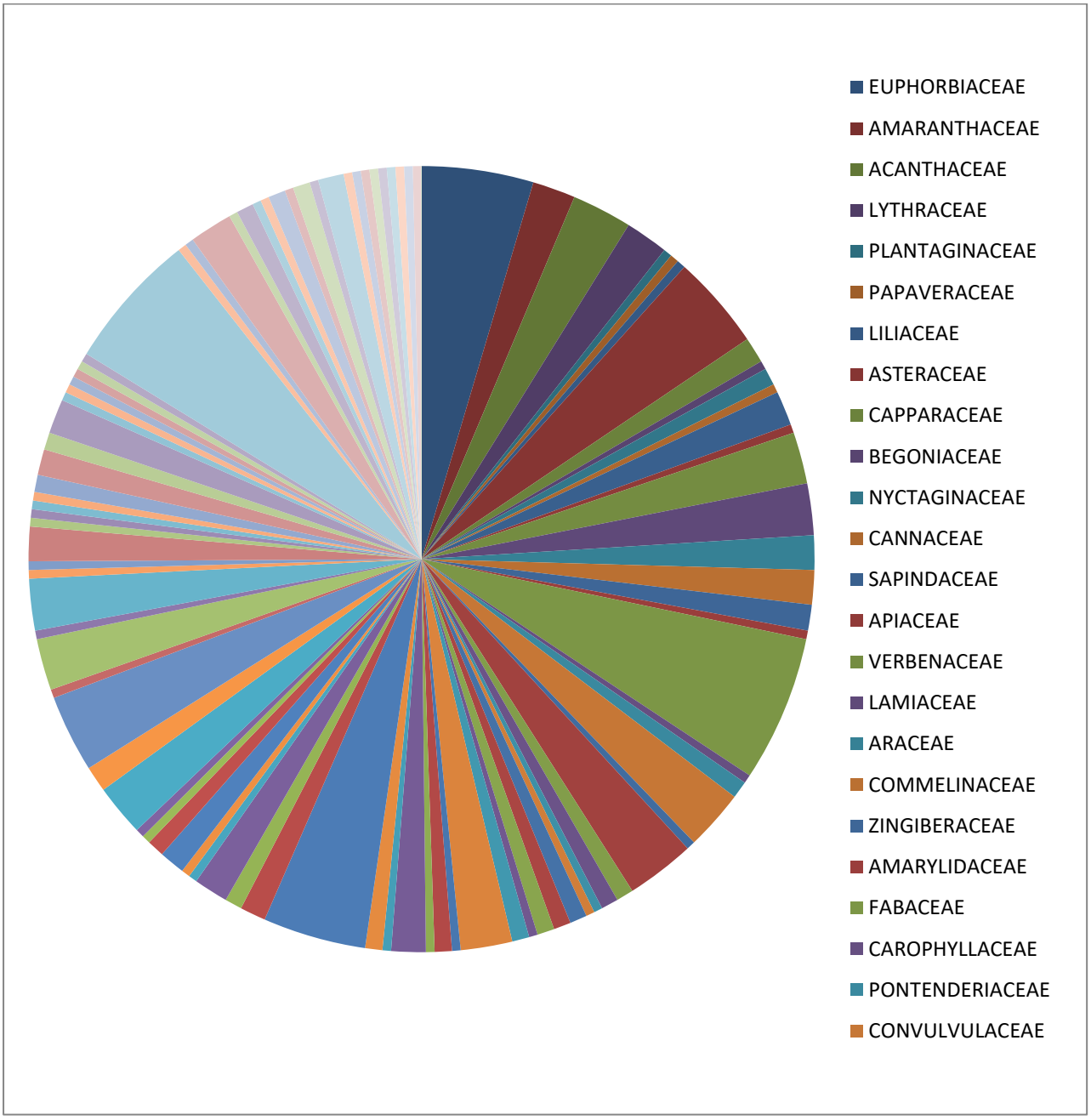
Pongamia pinnata

Mimusops elengi

Terminalia catappa

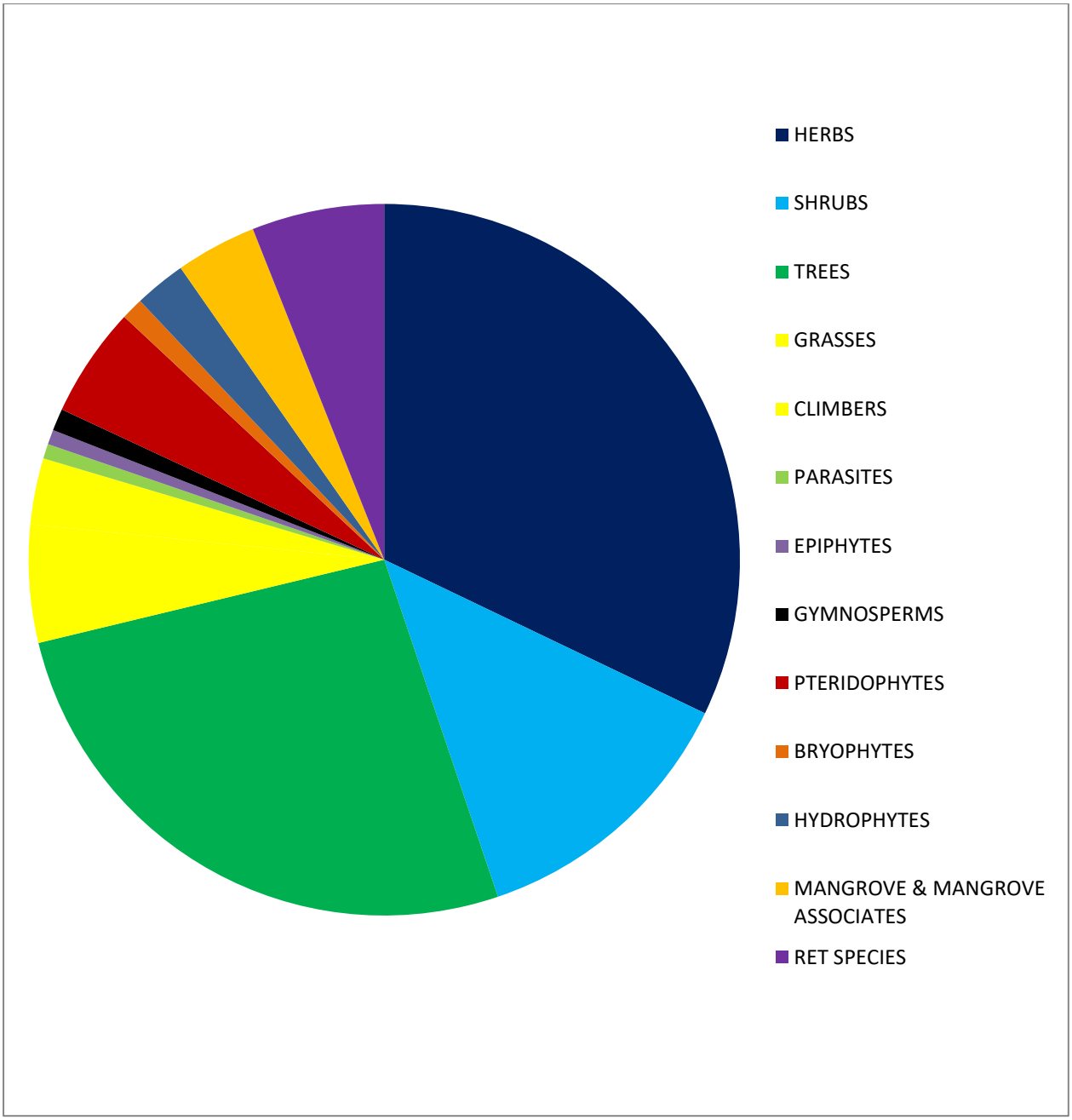
Carica papaya

Azadirachta indica



Family wise distribution of total plant species in UNC Campus, Cuttack

Among the all 99 families reported in the campus, 5 families were found to be dominant over the rest. The dominant families are Euphorbiaceae, Asteraceae, Fabaceae& Apocyanaceae among the dicotyledons whereas in monocotyledons the Poaceae reported as the dominant family.



Category wise distribution of total plant species in UNC Campus, Cuttack

Data collection of floral diversity at UNC Campus

9.2. FAUNAL DIVERSITY OF UNC CAMPUS

The well maintained greenery of the campus attracts many faunal species. A survey was carried out to find out the faunal species involved with the greeneries of the campus. A report has been made to categorize the entire faunal diversity of the campus.

TABLE 13: AVIFAUNAL DIVERSITY

SERIAL NO.	COMMON NAME	SCIENTIFIC NAME
1.	Common kingfisher	*Alcedo atthis*
2.	Bank Myna	*Acridotheres ginginianus*
3.	Common myna	*Acridotheres tristis*
4.	Spotted owl	*Athene brama*
5.	Cattle egret	*Bubu usibis*
6.	Pied kingfisher	*Ceryle rudis*
7.	Greater coucal	*Centropus sinensis*
8.	Blue rock pigeon	*Columba livia*
9.	House crow	*Corvus splendens*
10.	Indian cuckoo	*Cuculus cahorus*
11.	Thick-billed flowercatcher	*Diceum agile*
12.	Black drongo	*Dicrurus macrocerus*
13.	Asian koel	*Eudynamys scolopacea*
14.	Purple sunbird	*Nectarinia asiatica*
15.	House sparrow	*Passer domesticus*
16.	Baya weaver	*Ploceus philippinus*
17.	Red- vented bulbul	*Pycnonotus cafer*
18.	Red- whiskered bulbul	*Pycnonotus jocosus*
19.	Rose ringed parkeet	*Psittacula krameri*
20.	Spotted dove	*Streptopelia chinensis*
21.	Jungle babbler	*Turdoides striata*

TABLE 14: BUTTERFLIES & INSECTS

SERIAL NO.	COMMON NAME	SCIENTIFIC NAME
1.	Plum judy	*Abisara echerius*
2.	American house spider	*Achaearanea tepidariorum*
3.	Tawny coster	*Acraea violae*
4.	Honey bee	*Apis mellifera*
5.	Common sergent	*Athyma perius*
6.	Cockroach	*Blattodea*
7.	Beetle	*Coleoptera*
8.	Bed bug	*Cimex lectularius*
9.	Common house mosquito	*Culex pipiens*
10.	Plain tiger	*Danaus chrysippus*
11.	Striped tiger	*Danaus genutia*
12.	Carolina grasshopper	*Dissosteira carolina*
13.	Common fruit fly	*Drosophila melanogaster*
14.	Common crow	*Euploea core*
15.	Ant	*Formicidae*
16.	Lemon pansy	*Junonia lemonias*
17.	Black widow spider	*Latrodectus tredecimguttatus*
18.	Housefly	*Musca domestica*
19.	Slender Skimmer	*Orthetrum Sabina*
20.	Lime butterfly	*Papilla demoleus*
21.	Common wanderer	*Pareronia valeria*
22.	Pale grass blue	*Pseudozizeeria maha*
23.	Yellow Wasp	*Ropalidia marginata*
24.	Indian skipper	*Spialia galba*
25.	Oleander Moth	*Syntomeidal epilais*

TABLE 15: REPTILES

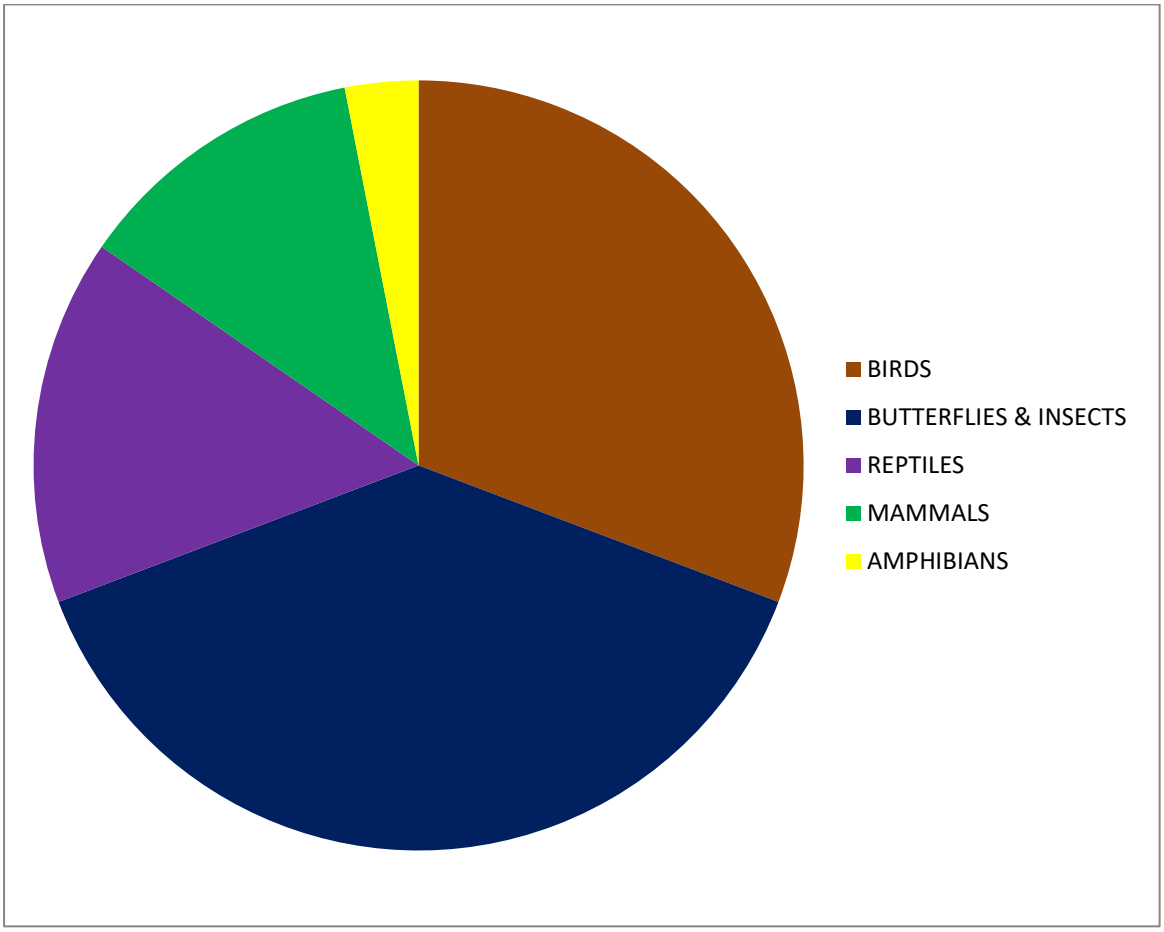
SERIAL NO.	COMMON NAME	SCIENTIFIC NAME
1.	Striped keelback	*Amphiesma stolata*
2.	Common krait	*Bungarus caeruleus*
3.	Indian Garden Lizard	*Calotes versicolor*
4.	Russell's viper	*Daboia russelii*
5.	Keeled Indian Mabuya	*Eutropis carinata*
6.	Checkered keelback	*Fowlea piscator*
7.	House Gecko	*Hemidactylus brookii*
8.	Indian Cobra	*Naja naja*
9.	Rat snake	*Ptyas mucosus*
10.	Monitor lizard	*Varanus varius*

TABLE 16: MAMMALS

SERIAL NO.	COMMON NAME	SCIENTIFIC NAME
1.	Lesser bandicoot rat	*Bandicota bengalensis*
2.	Dog	*Canis lupus familiaris*
3.	Cat	*Felis catus*
4.	Indian palm squirrel	*Funambulus palmarum*
5.	Rhesus monkey	*Macaca mulatta*
6.	House mouse	*Mus musculus*
7.	Common rat	*Rattus rattus*
8.	Mongoose	*Urva edwardsii*

TABLE 17: AMPHIBIANS

SERIAL NO.	COMMON NAME	SCIENTIFIC NAME
1.	Asian Toad	*Duttaphrynus melanostictus*
2.	Indian Bull Frog	*Hoplobatrachus tigerinus*



Faunal diversity of UNC Campus, Adaspur, Cuttack

SUPPORTING PHOTOGRAPHS

Acridotheres tristis

Acridotheres ginginianus

Passer domesticus

Corvus splendens

Naja naja

Danaus genutia

Ropalidia marginata

Cuculus cahorus

Athene brama

Gracupica contra

CHAPTER 10

CARBON FOOTPRINTS FOR HEALTHY ENVIRONMENT

Carbon is an essential element for life on Earth. It is present in all living organisms as a key component of organic compounds. Carbon dioxide (CO_2), a compound of carbon and oxygen, plays a significant role in maintaining the Earth's temperature through the greenhouse effect. This effect helps the planet retain enough heat to support life.However, human activities such as burning fossil fuels, deforestation, and industrial processes have led to a significant increase in carbon dioxide concentrations in the atmosphere. The excess CO_2 traps more heat, leading to global warming and climate change. This alteration in the climate pattern has severe consequences, including rising sea levels, altered weather patterns, and the loss of biodiversity.Carbon compounds also play a crucial role in various environmental processes. For example, carbon is a fundamental component of organic matter in soil. It is vital for soil fertility, as it provides essential nutrients for plant growth and nourishes the microbial ecosystem. Additionally, carbon compounds are used in water treatment processes and as a basis for various industries, including plastics, textiles, and pharmaceuticals.

CARBON FOOTPRINT

Carbon footprints are a measure of the total greenhouse gas emissions produced by an individual, organization, or product. It serves as an indicator of the impact of human activities on climate change. The footprints primarily focus on carbon dioxide (CO_2) emissions, but also consider other greenhouse gases like methane and nitrous oxide.

Carbon footprints measure the amount of greenhouse gas emissions, mainly carbon dioxide, released into the atmosphere as a result of human activities. These footprints are essential for understanding the impact of our actions on climate change. By calculating and analyzing carbon footprints, organizations and individuals can recognize the areas where they contribute to greenhouse gas emissions and take necessary steps to reduce them. It helps in raising awareness, creating benchmarks, implementing strategies, and promoting sustainable development.

The concept of carbon footprints has gained significant importance in recent years due to the growing concern about climate change. It helps individuals and organizations understand their contribution to greenhouse gas emissions and take necessary actions towards reducing them. By calculating carbon footprints, one can identify the major sources of emissions and implement strategies to mitigate their impact on the environment.

EFFORTS FOR CARBON NEUTRALITY

These days many colleges in India are increasingly recognizing the importance of reducing their carbon footprints and striving for carbon neutrality. With their potential to influence and educate the younger generation, colleges can lead by example and inspire sustainable practices. Several initiatives are being undertaken by UNC to achieve carbon neutrality.

- One of the significant efforts is the installation of renewable energy systems. UNC is investing in solar panels to generate clean and sustainable electricity. By shifting to renewable energy sources, it strives to reduce its reliance on fossil fuels and lower its carbon emissions. This step not only contributes to carbon neutrality but also promotes a clean energy transition.

- Another approach adopted by the college is the implementation of energy-efficient technologies. By replacing traditional lighting systems with energy-saving LED lights, optimizing HVAC systems, and encouraging the use of energy-efficient appliances, colleges can significantly reduce their electricity consumption and, consequently, their carbon footprints.

- UNC also promotes sustainable transportation options. By encouraging students and staff to use public transportation, bicycles, or carpooling, it reduces the emissions associated with commuting. Implementation of electric vehicle charging stations on campus also encourages the use of eco-friendly vehicles.

- Furthermore, it raises awareness and conducts educational programs on climate change and sustainability. By organizing seminars, workshops, and campaigns, UNC educates its students and staff about the significance of carbon neutrality. Such initiatives help foster a culture of sustainability and motivate individuals to adopt environmentally friendly practices.

- It also takes steps to reduce paper waste and promotes digitalization. By adopting online documentation and digital communication systems, UNC minimizes paper consumption and decreases its carbon footprint associated with deforestation and paper production.

In conclusion, the college along with all its staff and students work hard and are sincere with their efforts towards achieving a state of sustainable carbon neutrality. By focusing on renewable energy, energy efficiency, sustainable transportation, and raising awareness it significantly reduces its carbon footprints. These efforts not only contribute to mitigating climate change but also inspire students and communities to adopt sustainable practices in their lives. Achieving carbon neutrality is a collective responsibility, and however small it may be, our college always tries to actively contribute towards this global movement.

ELECTRICITY CARBON FOOTPRINT

Electricity generation is a significant contributor to carbon footprints. The college has taken notable steps to reduce its electricity carbon footprint. It has installed solar panels on rooftops to harness clean energy and reduce dependency on fossil fuel-based electricity. Additionally, energy audits have been conducted to identify areas of high energy usage and find energy-saving solutions. Efficient lighting systems and motion sensors have been installed to reduce unnecessary energy consumption.

In the campus, electricity is used for various purposes like residential, office use, and laboratories. The total electricity used in the campus liberates mass kg of CO_2 per year. The laboratory equipment consumes the highest electricity which emits a large amount of carbon CO_2per year. The solar panels are installed on the roof of various buildings produce electricity from solar panels which further saves ample mass of CO_2 per year.

PAPER FOOTPRINT

The paper footprint is another aspect that the college considers in its environmental audit. The usage of paper contributes to deforestation, which in turn contributes to increased carbon dioxide levels. To address this issue, the college has adopted measures such as promoting digital documentation, encouraging double-sided printing, and educating staff and students about the importance of reducing paper consumption. Additionally, recycling initiatives have been implemented to ensure that used paper is reused efficiently.

CARBON SEQUESTRATION

Carbon sequestration can play a crucial role in further reducing our carbon footprint. Our college should explore opportunities to establish green areas and plant trees on the campus. Trees act as carbon sinks, absorbing carbon dioxide during photosynthesis and storing it in their biomass. Additionally, the college can explore partnerships with organizations involved in sustainable forestry and carbon offset programs to contribute to sequestration efforts.

In summary, understanding carbon footprints helps in assessing the impact of our activities on climate change. Our rural Autonomous College acknowledges the significance of reducing carbon footprints and has implemented various measures to achieve carbon neutrality. By addressing electricity consumption, paper usage, and promoting sustainable practices, we can continue to make significant progress towards mitigating climate change and creating a more sustainable future.

CONCLUSION

Understanding and addressing carbon footprints are vital for our college's environmental audit. It allows us to assess our impact on climate change and take necessary measures to reduce emissions. By implementing sustainable practices and promoting renewable energy, our college is making significant efforts towards carbon neutrality. However, more can be done to further reduce our carbon footprint and mitigate climate change impacts.

RECOMMENDATIONS

To improve our carbon footprint, the college should consider implementing the following recommendations:

- Strengthening renewable energy initiatives by investing in additional solar panels or exploring other alternative energy sources.
- Promoting bicycle usage on campus and encouraging carpooling among students and staff to reduce transportation-related emissions.
- Increasing awareness and education on climate change and carbon footprints among students and staff through workshops, seminars, and awareness campaigns.

- ❖ Implementing a comprehensive waste management system that includes proper disposal and recycling of waste materials.
- ❖ Collaborating with local communities and organizations to implement reforestation projects and carbon offsetting initiatives.

CHAPTER 11

CONCLUSION

The environment audit of U. N. Autonomous College highlighted several key findings and recommendations.

Firstly, it was observed that the college has made commendable efforts in implementing sustainable practices such as solar panel and waste segregation. These initiatives have resulted in significant reduction of electricity usage and landfill waste.

However, there were areas requiring immediate attention. The college lacked proper recycling facilities, leading to improper disposal of recyclable waste. It is recommended that the college establish a dedicated recycling center and educate students and staff about the importance of recycling.

Furthermore, it was found that the campus utilizes renewable energy technologies, such as solar panels to reduce the college's carbon footprint and dependence on fossil fuels. Additionally, energy conservation measures like LED lighting and energy-efficient appliances should be implemented to further reduce energy consumption.

This audit records a number of biodiversity conservation initiatives within the college campus which not only shows their concern towards the environment but also reflects sincere efforts in management and maintenance of the campus.

Lastly, transportation was found to be a major contributor to the college's carbon emissions. It is recommended that the college encourage the use of public transport and carpooling among students and staff. Additionally, cycling facilities and infrastructure should be improved to encourage sustainable commuting options.

Overall, the environment audit of U.N. Autonomous College highlights both achievements and areas for improvement. It is crucial for the college management to prioritize sustainability and take immediate actions to mitigate environmental impacts. By implementing the recommended measures, the college can become a role model for other educational institutions in promoting environmental stewardship and fostering a sustainable future.

CHAPTER 12
SUGGESTIONS FOR EFFECTIVE MANAGEMENT SYSTEM

U. N. Autonomous College takes efforts to dispose of majority of wastes by proper methods.

- Green computing i.e. online payment systems, online circulars, and examination procedures are helpful for reducing the use of papers and ultimately reducing carbon footprint.
- Reducing the use of one-time use plastic bottles, cups, folders, pens, bouquets, decorative items will be useful to solve the problem of plastic pollution to some extent.
- Biodegradable waste is used efficiently for composting and vermicomposting.
- Use of LED lamps and Tube Lights is to be encouraged.
- Toilets and bathrooms are consuming more water in the departments. The replacement of old taps can be beneficial for solving this issue The use of electric cars on the campus is a good initiative to save fuel.
- The overall ambient air quality on the campus is good while some air quality issues that may arise due to developmental activities on the campus should be addressed.
- The sound levels on the campus are good. Science departments are following the principles of Green Chemistry to reduce chemical waste.
- An environmental policy document has to be prepared with all the recommendations and current practices carried by the UNC. A frequent visit should be conducted to ensure that the generated waste is measured, monitored and recorded regularly and information should be made available to the administration.
- The UNC should develop internal procedures to ensure its compliance with environmental legislation and responsibility should be fixed to carry out it in practice. The solid waste should be reused or recycled at maximum possible places.
- Installation of sensor-based electrification items like fans, lights, etc. can save electricity Installation of solar panels and rainwater harvesting system to every terrace of the building will be useful in conserving the natural resources.
- Regular checkups and maintenance of pipes, overhead tanks, and plumbing systems should be done by the engineering section to reduce overflow, leakages, and corrosions. Science laboratories large amount of water goes waste during the process of making distilled

water; the system should develop to reuse this water for other purposes. The solar distillation unit is installed at the earliest.

❖ No such processes or activities were observed at institute which can deteriorate the environmental quality.

The college is in continuous efforts to spread the environmental awareness programs among staff and students. It was also observed that the UNC campus is keeping the environmental quality at priority in every developmental stage.

ENERGY AUDIT REPORT 2022-23

U.N. (AUTO.) COLLEGE OF SC. & TECH.,
ADASPUR, CUTTACK

ACKNOWLEDGEMENT

Udayanath Autonomous College (hereinafter called UNC) has been working at the forefront since its inception by conducting environmental campaigns, workshops and other extension activities to bring about social change for national and international development. It is well aware about the needs of the green audit for the maintenance and future development of the campus. In its pursuit of excellence, UNC has recognized itself to improve the environmental quality and maintain its unique pristine ecosystem for the future generation of students and all the inhabitants of the campus. Although we have been taking a number of steps to conserve and protect our environment but this report is the first formal effort to document the results of our investigation and interpret the information of all the required parameters of the Environment audit process. UNC aims to take up the policy and efforts at every level to avert ecological catastrophe on a global scale by supporting the climate neutrality goals committed by the Government of India. As a part of this, efforts are taken to continuously monitor the sustainability of the academic process by constituting this Green Audit Committee consisting of faculty members working in this arena to collect basic data of the environmental parameters within the campus so that the environmental issues are resolved within the campus. The Green Audit Committee has tried to identify the current / emerging environmental issues so as to monitor the environmental management practices adopted in the campus along with subsequent impact of these on its environment. This report is an outcome of efforts of each and every member of the Green Audit Committee who undertook this green audit to gather information on every parameters of the environment, compiled and analyzed the data to recognize the immediate and serious threats within the campus so that opportunities can be explored to bring about continuous improvement in our environmental performance and standards by our suggestions and recommendations put forth. It is hoped that this report will receive adequate attention of all the stake holders for pursuing a bottom-up approach in which we stand to face the challenges in future.

The sincere encouragement and administrative support of Prof. Arun Kumar Nayak, Principal of U. N. (Auto.) College of Science and Technology during the conduct of

the study has been a guiding force and we, the Green Audit Committee express our heartfelt gratitude to him for his kind gesture.

Special thanks are due to Prof. Santilata Sahoo for her tremendous support in Floral Diversity; Prof. Daityari Singh for providing primary data on Environmental Audit; Prof. Krupasindhu Pradhan, Coordinator, IQAC for providing support to conduct the various assessment.

We are indebted to all the HODs, Teachers, officers, all staff members and all the campus dwellers of this Institute for their kind support in collecting data for the report.

We sincerely hope and believe that the untiring efforts in compiling the reports by the present Green Audit Committee will be helpful for this Institute and it becomes a responsibility of all the stakeholders of this campus to follow the proposed management plan suggested in the report to reduce its impact on our environment.

Energy Audit Team

CHAPTER 1

INTRODUCTION

1.1 BRIEF HISTORY OF THE COLLEGE

Nestled in the lap of Eastern Odisha, the Udayanath Autonomous College of Science & Technology, at- Prachi jnanapitha, Po- Adaspur, Dist- Cuttack has taken long strides to reach its destination- a holistic approach to life through meaningful education. The crest of the college truly symbolizes the mission & goals of the institution. The logo of the college is a magnificent blend of the heritage magnified by modernity & technological progress. The charming college emblem comprises five distinct symbols such as: sacred flame, the open book, the river, the greenery & the installed factory. The sacred flame symbolizes the light of knowledge or Jnanaloka fostered by the institution. The open book symbolizes dissemination of knowledge. The holy Prachi River stands for gravity, transparency, solidarity& sanskruti or culture. Also suggests unending flow of knowledge. The greenery symbolizes the agricultural development which is essential for overall development of the country. The installed factory suggests advanced technology & scientific development leading to industrial promotion & generation of employment.

Lastly the sacred line in Devanagari Script "तमसो मा ज्योतिर्गमय" appearing in the box at the base of the crest reveals the Motto of the institution, "Lead Me from Darkness to Light" & glorifies the Jnanapitha. The architectural design & the artistic revelations on the box add beauty carrying the impression of a holistic approach towards education.

Under the dynamic leadership of Sj. Trilochan Kanungo, former Member of Parliament (LS), educationist & social thinker & the generous, Nobel financial contribution made by the Late Udayanath Sahoo of the locality, the college managed to weather the difficulties. Named after the patron as Udayanath College of Science &

Technology, the college was transferred to its own building at Prachi Jnanapitha on 3 December 1986. The other two streams of science & commerce at the H.S. level were introduced & all the three streams were accorded official recognition & affiliation together in 1987. The college stands on the holy river Prachi; close to Kenduli, the birth place of the renowned classical poet Jayadev. The establishment of U.N. College of Sc. & Tech. at Adaspur has not only added a new dimension to the aspirations of the people of the region but it has also facilitated the spread of education to every corner of the state. To fulfill the cherished dream of the people for higher education, undergraduate classes were opened in Arts in 1991; Science in 1992 & Commerce in 1993. The college has had 2NCC units- one for boys & another for girls, 4NSS units, 1Rover unit, 1Ranger unit & 2YRC units engaged in welfare schemes.

1.2 VISION & MISSION OF THE INSTITUTE

MOTTO

तमसो मा ज्योतिर्गमय

"Lead Me from Darkness to Light"

VISION

❖ To flourish as a premier institute of higher learning to cater the learning needs of rural youths for enhancing their quality of life and nurturing an ambience for promotion of innovative ideas and best practices in teaching , learning, research, extension and outreach activities.

MISSION

❖ To provide meaningful education, environment, opportunities & experiences that enable, more particularly, rural students to grow & prosper in their life & career.

❖ To develop Scientific Temper & Critical Thinking with the inculcation of values of discipline, hard work & team spirit.

❖ To inculcate the students a sense of professionalism, humanism & social responsibility through quality education.

❖ To promote leadership among the students.

❖ To strive for quality education in keeping with motto of the institution and prepare young minds more particularly of rural youth for imbibing knowledge, skills & sensitivity.

1.3 ACADEMIC PROGRAMS

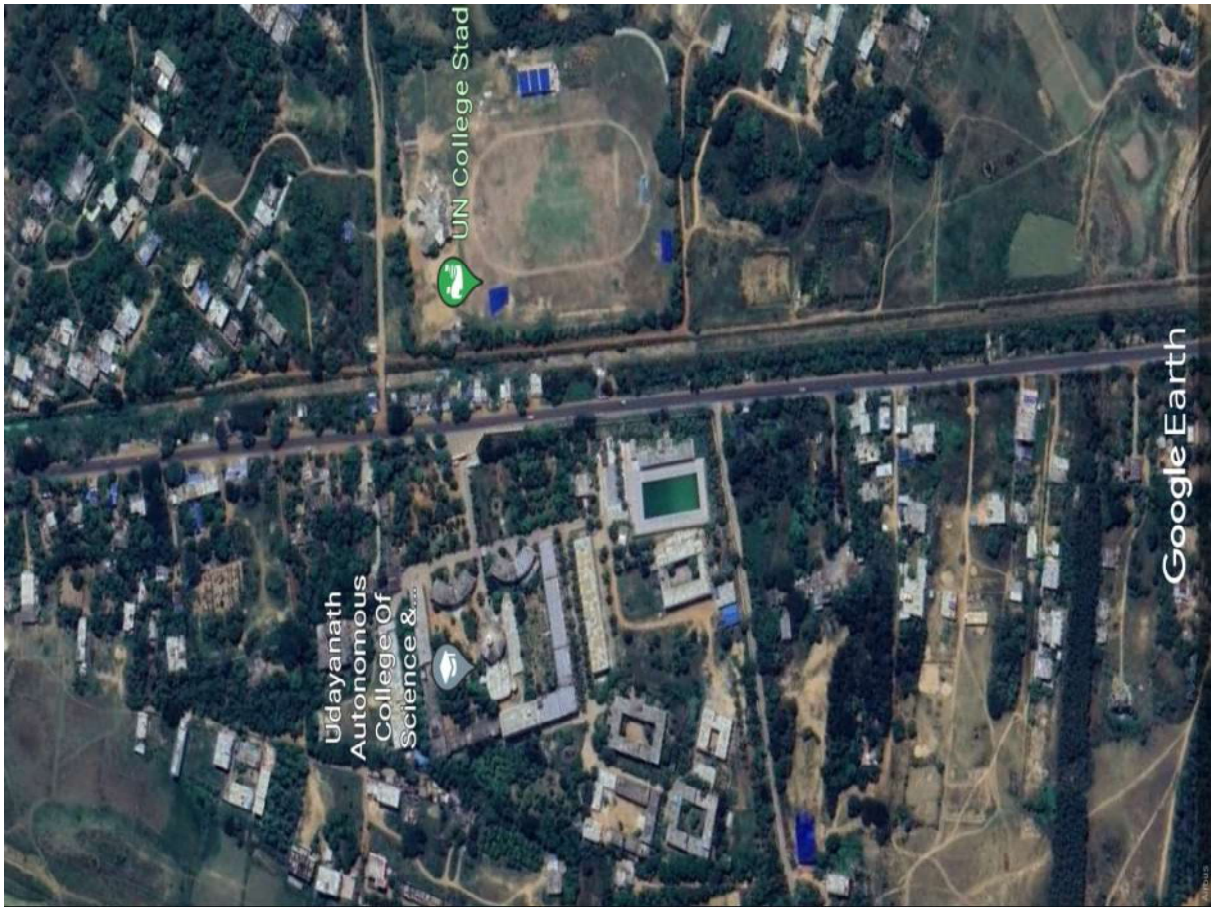
TABLE 1: DETAILS OF ACDEMIC PROGRAMS

ACADEMIC YEAR 2022-23

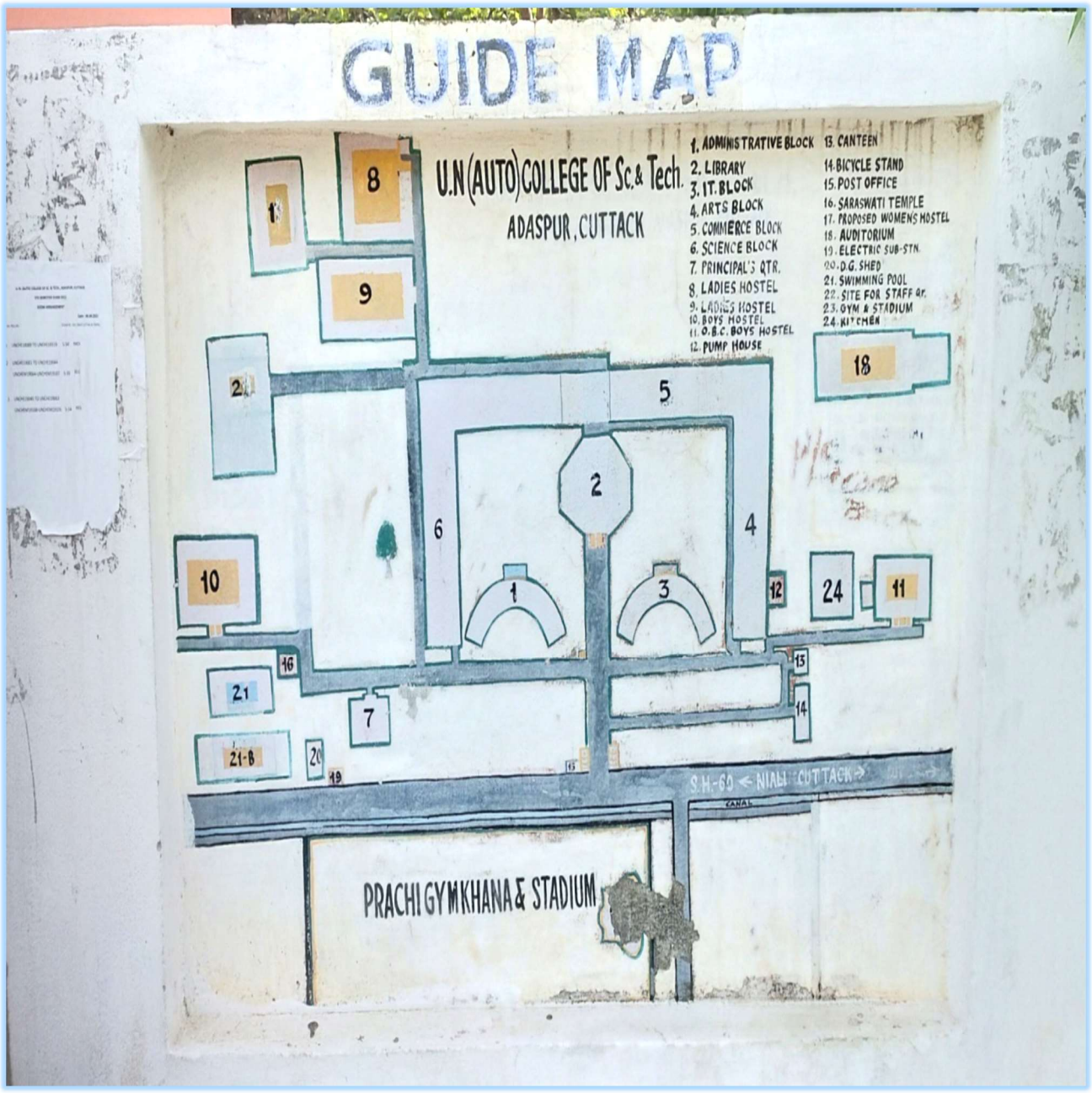
NAME OF THE PROGRAMME	NUMBER OF SANCTIONED SEATS
UG PROGRAM	
Bachelor in Arts	416
Bachelor in Commerce	256
Bachelor in Science & comp sc	PCM-416 +64
	CBZ-224
BBA	30
BCA	30
B.SC. ITM	30
B. Lib (1 year)	64
PG PROGRAM	
Botany	32
Chemistry	32
Commerce	32
Computer Science	32
Analytical and Applied Economics	32
Education	32
English	32
Hindi	32
History	32
Mathematics	32
MFC	30
MSW	30
Odia	64
Philosophy and Critical thinking	32
Physics	32
Pol. Science	32
Clinical Psychology	32
Sanskrit	32
Sociology	32
Zoology	32

1.4 LAYOUT OF THE CAMPUS

The college covers an area of 30acres of land seated at Prachi jnanapitha of Adaspur village by the side of SH-60 near the bank of holy river Prachi under Kantapada block in the district of Cuttack. It lies at North latitude 20.213059º & East longitude 86.014549º. The institute is surrounded by local village, the holy river Prachi & some other educational centers like coaching centers, computer training centers. The college is situated in between the center of the Twin-city (Cuttack & Bhubaneswar). It's equally far from Bhubaneswar and Cuttack (35 K.M.).



Location & Area of the College (Source- Google Earth)



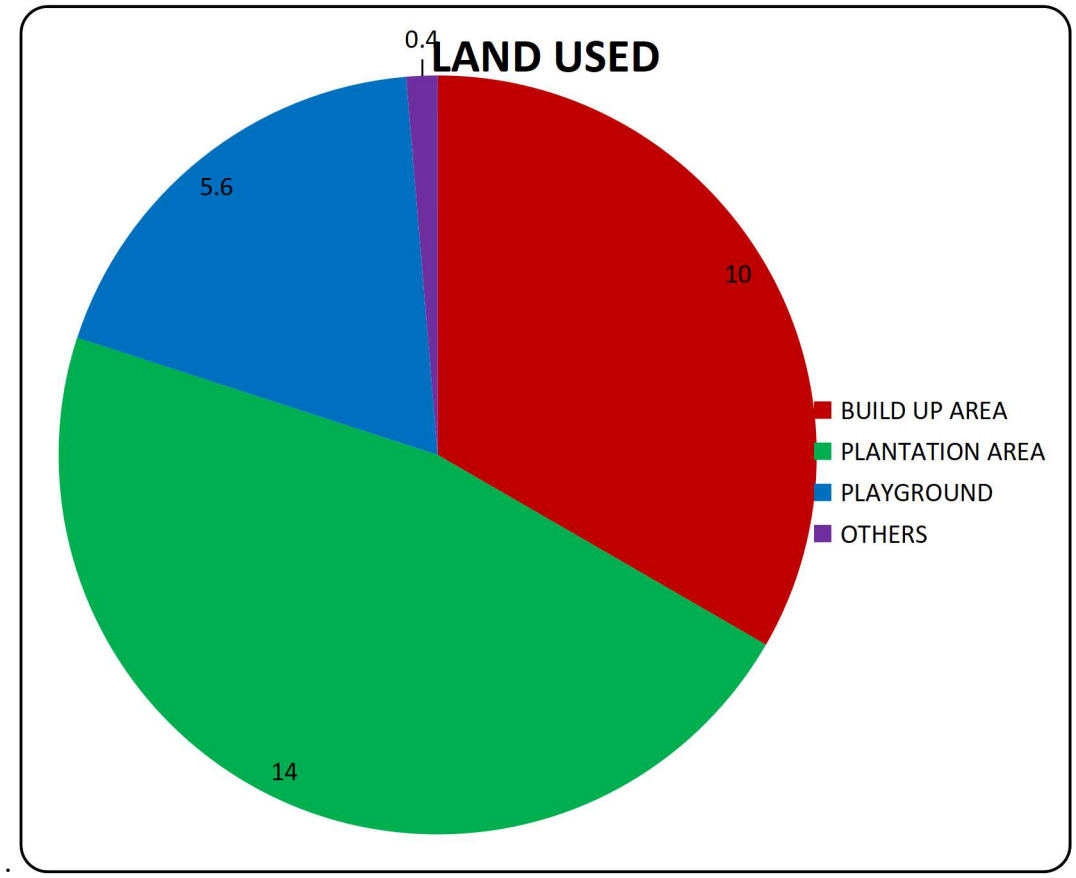
Guide Map of UNC Campus

UNC Main Gate

Aerial View of the College

1.5 LAND USED DATA

The college covers an area of 30acres of land. The plantation area has taken the peak coverage of land. The construction area comes next with a little bit more land than the half of the land coverage remain after the plantation area. The playground area covers a little less than the left half land after plantation and construction area coverage.



Land used data

The whole college area has been divided into two main parts, Stadium site & Main Academic- Administration site. The stadium site constitutes a Gymnasium, Sports Hostel, Playground, Gallery and Canteen for sports hostel. The Academic-Administration site constitutes the Main Administrative building, IT block, Science block, Arts block, Commerce block, P.G. Science block, P.G. Arts block, Central Library, Auditorium, Saraswati temple, Swimming Pool, Guest House, Staff quarters, Principal quarter, Heritage building, College Main gate, Boys Hostels(02), Girls

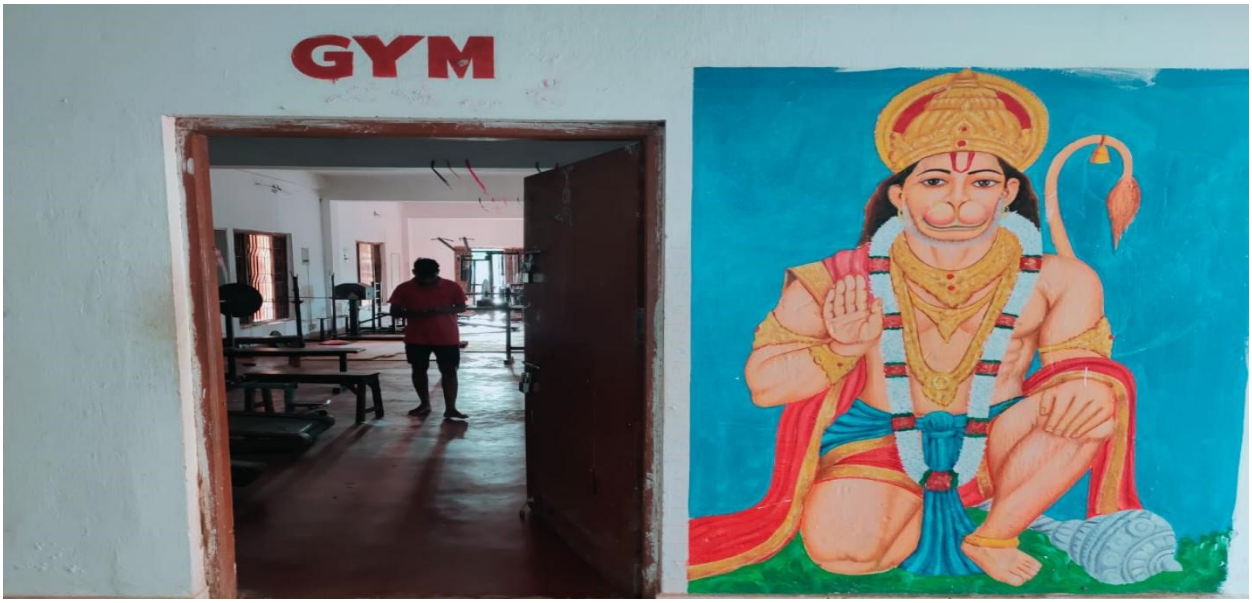
Hostel (03), Botanical Gardens (02), Flower garden (01), Orchards (02), Students 'Cycle & Bike stand, Car parking for staff, Staff two wheelers parking, Cafeteria, Post-office, Security room, D.G. Shed, transformer area & biofertilizer unit.

TABLE 2: LAND USED DATA

SERIAL NO.	**NAME OF THE SITE**	**AREA COVERED (in sqft.)**
STADIUM SITE		
1.	Gymnasium	1200 sqft.
2.	Sports Hostel	7500 sqft.
3.	Playground	507909.6 sqft.
4.	Gallery	4500 sqft.
5.	Canteen for sports hostel	2000 sqft.
	TOTAL	523109.6 sqft. (12.00 acre)
ACADEMIC- ADMINISTRATION SITE		
1.	Main Administrative building	4300 sqft.
2.	IT block	4300 sqft.
3.	Science block	16500 sqft.
4.	Arts block	11100 sqft
5.	Commerce block	4950 sqft
6.	P.G. Science block	11057 sqft
7.	P.G. Arts block	10376 sqft
8.	Central Library	3500 sqft
9.	Auditorium	700 sqft
10.	Saraswati temple	800 sqft
11.	Swimming Pool	12000 sqft
12.	Guest House	4880 sqft
13.	Staff quarters	1296 sqft
14.	Principal quarter	2100 sqft
15.	Heritage building	3476 sqft
16.	College Main gate	150 sqft
17.	Mahodadhi Boys' Hostel	10000 sqft
18.	Meghasan OBC Boys' Hostel	7700 sqft
19.	Mahadevi Girls' Hostel	10542 sqft
20.	Mandakini Girls' Hostel	10300 sqft

21.	P.G. Ladies Hostel	11700 sqft
22.	Botanical garden 1	30000 sqft
23.	Botanical garden 2	25000 sqft
24.	Flower garden	20000 sqft
25.	Orchard 1	30000 sqft
26.	Orchard 2	50000 sqft
27.	Students' Cycle stand	20000 sqft
28.	Students' Bike stand	20000 sqft
29.	Car parking for staff	13800 sqft
30.	Two wheeler parking for Staff	6500 sqft
31.	Cafeteria	1000 sqft
32.	Post-office	300 sqft
33.	Security room	250sqft
34.	D.G. Shed	350 sqft
35.	Transformer area	800 sqft
36.	Road	60000 sqft
37.	Biofertilizer unit	1850 sqft
38.	Vermi compost unit	1156 sqft
39.	Plantation area	6 acres
40.	Others	2.43acres
	TOTAL	789742 sqft (18.13 acres)

Stadium & Sports Hostel



Gymnasium

Central library

Saraswati temple

ENERGY AUDIT REPORT

2.1 Introduction:

Energy is one of the major inputs for the economic development of any country. The fundamental goal of energy management is to produce goods and provide services with the least cost and least environmental effect. Also, it can be said as "the strategy of adjusting and optimizing energy, using system and procedure so as to reduce energy requirements per unit of output while holding constant or reducing total costs producing the output from these systems". The energy audit is key to a systematic approach for decision-making in the area of energy management. It attempts to balance the total energy inputs with its use and serves to identify all the energy streams in a facility. Energy resources utilized by all the departments, support services, and the administrative buildings of the Institute, include Electricity, Solar Roof Top Systems, and Diesel Generators installed on the campus.

2.2 Objectives of Energy Audit

Primary:

- The first objective is to acquire and analyze data and find the necessary consumption pattern of these facilities.
- The second objective will be to calculate the wastage pattern based on the results of the first objective.
- The final objective is to find and implement solutions that are acceptable and feasible.

Secondary:

- This would be our first exposure to this field hence experience gain would be vital.
- This project will precede many follow up projects and hence helps to gain technical and management exposure required for future energy projects.
- It is sure to help create a repertoire of vital contacts hence will develop interaction with alumni, faculty and students.

Source of Energy

UNC draws Energy from the Followings:

- Electricity from TPCODL
- Solar Energy

The Following are the Major consumers of Electricity in the facility

- Lightning
- Air Conditioner
- Fans
- Computers
- Other Lab Equipment

Indirect Benefits of Energy Audit

Every time the Energy Audit is carried out it rekindles the interest in Energy Conservation as an important function. Energy Auditors sharing their experience and knowledge with the Plant Personnel helps in fueling the innovative ideas for further action of reduction in Specific Power consumption (SPC). Any loose connections or heating of cables come to timely vision. For an external agency due to unbiased vision, a few points for Energy Conservation may be visible each time they perform the audit and this would help in achieving further saving. Inform any irregularities in Energy meter HT connections for rectification.

2.3 Energy consumption in the Campus

In conducting an environmental audit of an autonomous college, it is essential to examine the energy consumption and utilization on campus. Energy plays a crucial role in every aspect of campus life, including classrooms, residential halls, laboratories, and administrative buildings. Thus, understanding how energy is consumed and utilized is vital in identifying opportunities for efficiency and sustainability.

One significant aspect to consider is the source of energy in the campus. Analyzing whether the energy predominantly comes from non-renewable sources such as coal or oil, or from renewable sources like solar or wind power, is crucial. Transitioning

towards renewable energy sources can greatly reduce the college's carbon footprint and contribute to environmental sustainability.

The next aspect to assess is the energy consumption patterns within different areas of the campus. Conducting a comprehensive survey of energy consumption in classrooms, laboratories, and residential halls can provide insights into areas where energy efficiency measures can be implemented. For instance, retrofitting buildings with energy-efficient lighting, optimizing heating and cooling systems, and promoting responsible energy usage can result in significant energy savings.

Furthermore, it is crucial to promote and educate the campus community about energy conservation and sustainable practices. Raising awareness through workshops, campaigns, and informational sessions can encourage students, faculty, and staff to adopt energy-saving habits. Additionally, providing incentives for energy-efficient behaviours, such as organizing competitions or offering rewards, can further motivate individuals to actively participate in reducing energy consumption on campus.

In conclusion, assessing energy consumption and utilization in the campus environment audit of U.N. autonomous college is vital for promoting sustainability and reducing the institution's environmental impact. By analyzing energy sources, patterns of consumption, and implementing energy-saving measures, it is possible to create a more sustainable and efficient campus. Furthermore, fostering awareness and behavior change among the campus community can lead to long-lasting energy conservation practices that benefit not only the college but also the larger environment.

It includes energy sources, it’s consumption and monitoring, lighting, appliances and vehicles. Energy sources utilized by all the departments and services of college include electricity, liquid petroleum and LPG. Data for electricity consumption of the college from various buildings were collected and listed as below:

SL.NO	NAME OF APPLIANCE	WATTAGE	QUANTITY	WATTAGE
1	Tube light (LED)	20	520	10,400
2	CFL(LED)	09	310	2,790
3	Fan	80	670	53,600
4	Water Cooler	1500	05	7,500
5	Exhaust Fan	150	20	3,000
6	Aquaguard	500	20	10,000
7	Computer	200	180	36,000
8	Projector	750	10	7,500
9	Printer	500	20	10,000
10	Smart Board	500	03	1,500
11	TV(LED)	150	01	150
12	Motor(water pump)	1000	05	5,000
13	AC	2000	20	40,000
14	Submersible Pump	746	08	5,968

Lighting system

Lighting is an essential service for all industries, institutions, hospitals, malls, etc. Innovation and continuous improvement in the field of lighting, have given rise to tremendous energy-saving opportunities in this area. Lighting is an area, which provides a major scope to achieve energy efficiency at the design stage, by incorporation of modern energy-efficient lamps, luminaries, and gears, apart from good operational practices.

Ceiling Fans

Ceiling Fans constitute a major part of the total energy expended by the institute. However, in places like India, with its hot, tropical climate, it is very common to find ceiling fans in households, institutes, offices, and almost every other building or establishment. Hence, innovations and continuous improvement in the field of fans, have given rise to tremendous energy-saving opportunities in this area The fan is an area, which provides a major scope to achieve energy efficiency at the design stage,

by incorporation of modern energy-efficient Fans, BLDC Fans, smart Fans, apart from good operational practices.

TABLE: DETAILS OF ELECTRICITY BILL

Bill Month	Consumption Unit	Contract Demand	Actual Demand	Bill amount	Power Factor
2022-April	30245	92.0	102.2	3,99,279.00	100.00
2022-May	26234	92.0	102.2	2,46,554.00	97.00
2022-June	27828	92.0	102.2	2,20,203.00	97.90
2022-July	37285	177.78	142.2	3,36,204.00	98.30
2022-Aug	30681	177.78	142.2	2,26,107.00	98.93
2022-Sep	33669	177.78	142.2	2,41,961.00	98.84
2022-Oct	37302	177.78	142.2	2,67,210.00	98.09
2022-Nov	33964	177.78	142.2	1,83,751.00	97.43
2022-Dec	33273	177.78	142.2	2,41,492.00	97.20
2023-Jan	21513	177.78	144.2	1,68,486.00	96.96
2023-Feb	20709	177.78	142.2	1,63,675.00	98.40
2023-Mar	30360	177.78	142.2	4,01,455.00*	98.44

2.3 SOLAR POWER PLANT PERFORMANCE

ANALYSIS OF ELECTRICITY BILL FOR THE PERIOD FROM JUN-22 TO JUN-23

Solar paneling on the academic blocks

2.4 Consumption and utilization of fuel

Fuel is a significant component for various aspects of campus operations, including transportation, powering equipment, and maintaining infrastructure. Understanding the sources of fuel used on campus, such as gasoline, diesel, or propane, allows for an assessment of the college's carbon emissions and environmental impact. By analyzing the consumption patterns of fuel across different departments and facilities, opportunities to improve efficiency and reduce reliance on fossil fuels can be identified. Implementing measures like promotion of carpooling or supporting the use of electric vehicles can contribute to a greener and more sustainable campus, ultimately reducing the college's carbon footprint.

DG Set 250 KVA

2.5 RECOMMENDATIONS:

The institute must conduct energy audits to identify areas where buildings can be retrofitted for better energy efficiency. This may include upgrading insulation, windows, and doors, installing energy-efficient lighting systems, and optimizing heating, ventilation, and air conditioning (HVAC) systems. These measures can reduce energy waste and result in long-term energy and cost savings.

The Institute must implement educational campaigns, workshops, and seminars to highlight the importance of turning off lights when not in use, using energy-efficient appliances, and optimizing computer usage by enabling power-saving settings. Incentives, such as rewards or recognition, can also be introduced to encourage individuals and departments to actively participate in responsible energy usage.

The college must utilize smart technology and automation systems to manage energy consumption more effectively. Installing motion sensors and timers for lighting, HVAC controls, and smart meters for monitoring energy usage can provide real-time data and insights that can drive energy-saving decisions. Additionally, implementing energy management systems can help identify energy inefficiencies and adjust usage patterns accordingly.

The college must incorporate sustainability and energy conservation topics into the college curriculum. This can include offering courses or workshops on renewable energy, energy management, or sustainable architecture and design. By empowering students with knowledge and skills in sustainable practices, the college can create a generation of environmentally conscious individuals who can contribute to a more sustainable future.

The institute must collaborate with local energy agencies, NGOs, or sustainability initiatives to access resources, funding, and expertise in energy conservation. Partnering with energy service companies (ESCOs) can also provide opportunities for comprehensive energy efficiency projects that can yield substantial savings over time.

Overall, the college should adopt a holistic approach towards energy consumption and utilization, encompassing education, technology, and infrastructure upgrades, to

create a more sustainable campus environment. By prioritizing energy efficiency and sustainable practices, the college can actively contribute to mitigating climate change and promoting environmental stewardship.

3. Clean and green campus recognitions/awards

CERTIFICATE OF ACCREDITATION

THIS IS TO CERTIFY THAT

UDAYANATH AUTONOMOUS COLLEGE OF SCIENCE & TECHNOLOGY, ADASPUR, CUTTACK

ccessfully undergone the "Environment Audit" during the period of 2018- 2019. The efforts by the management & faculty towards the Green Campus are highly appreciable.

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Environmental Promotion And Sustainability Activities

7/8/24

Principal

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