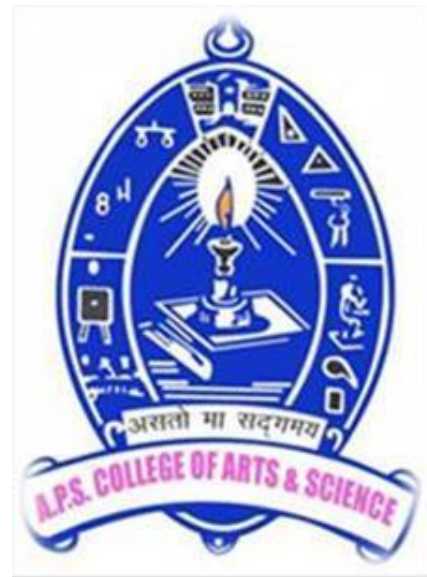
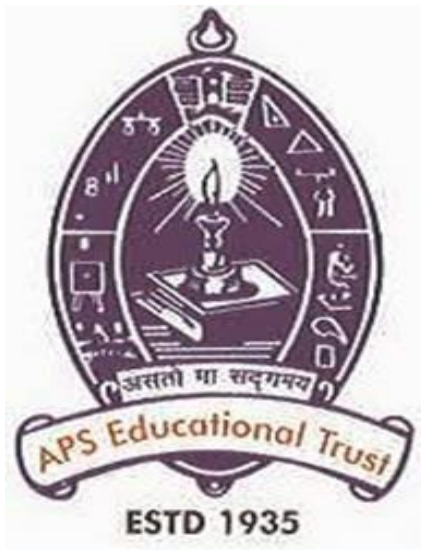


**GREEN AUDIT AND QUALITY AUDITS REPORT**  
**ON**  
**ENERGY, WATER, WASTE, ENVIRONMENT AND**  
**GREEN CAMPUS FOR**  
**ACHARYA PATASHALA COLLEGE OF ARTS AND SCIENCE**  
**NARASIMHA RAJA COLONY, BENGALURU**  
**2020 – 2021**



 **ECO ENERGIME ENGINEERS LLP**

**ENHANCING RESOURCE EFFICIENCY**

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- Sri. A. Muralidhara : Governing Council Chairperson of APS College of Arts and Science
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- Mr. Sajin Mon S M : Software Developer, APS College of Arts and Science

And other Staff personnel who have given full co-operation and support. They took keen interest and gave valuable inputs during the course of study.



## Certificate

This is to certify that M/s. Eco Energime Engineers LLP, Bengaluru has conducted **Green Audit** and **Quality Audit** that comprises of **Green Campus Management Audit, Energy Audit, Water Audit, Waste Management Audit and Environment Audit** of "ACHARYA PATASHALA COLLEGE OF ARTS AND SCIENCE, Narasimha Raja Colony Bengaluru" during the June 2021 to July 2021. The audit involves field visit, measurements and observations, verification of bills, log books, data base, maintenance registers and interview with staffs, and this gives an overview of the existing system. In an opinion and to the best of our information and according to the information given to us, said Quality Audit gives a true and fair view in conformity with auditing principles.

For Eco Energime Engineers LLP

Authorized Signatory

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# 1. INTRODUCTION

Acharya Patashala was founded by Late Prof. N. Ananthachar, a well-known educationist in the year 1956. It is located in Narasimharaja colony, Basavanagudi area, the southern part of Bangalore, which is a prestigious educational institute and elite locality of the city.

Institute has completed 65 years of dedicated service in the field of education providing quality education to all kinds of student's community. This institution is the alma mater for a large number of dignitaries and personalities well known in Karnataka and at national and international levels. They have spacious laboratories which are well equipped in the Science and Computer wings and rare collections of specimens and equipment. A Spacious and fully computerized library equipped with a seminar hall and LCD projector in addition to an impressive collection of books which has provided the right ambience for achieving academic excellence.

The college campus in N R Colony, Bangalore offers Bachelor of Arts (B.A) – HEP HEK, HEM, SEP, SKP; Bachelor of Science (B.Sc.) – PCM, CBZ; Bachelor of Computer Applications (B.C.A) and M.A – Economics. UGC funds are completely utilized for the betterment of the College.

The Students are recipients of many gold medals each year by their dedicated performance at both UG and PG levels. They have many dedicated staff members with Doctorate degrees, training their students every year for B.A, B.Sc. B.C.A and M.A (Economics) courses

## **Vision**

To promote the all-round development of the students potential by providing need-based career-oriented quality education with an emphasis on social concern.

## **Mission**

- To provide quality education to the under privileged sections of the society
- To facilitate students to develop professional and life skills to enhance the employability.
- To impart leadership qualities to brave new challenges.
- To promote the use of advance technology for teaching as well as learning process.
- To encourage the faculty and students to pursue academic excellence
- To include the culture of time and work consciousness.
- To stress the importance of human and ethical values

## **Committee and Cells**

The college has various committees and cells to address various tasks which are as follows:

### ➤ **Internal Quality Assurance Cell**

The Internal Quality Assurance Cell (IQAC) of the college was established to examine the overall performance of the Institution and take up effective measures to improve the quality of education.

The institution has a well-defined quality policy and the same is assured through the inbuilt mechanism of teaching, learning and evaluation. All the stakeholders are made aware of the institution's quality policy and any concerns regarding the quality not met are addressed by the Principal in consultation with the IQAC. Regular meetings with parents' and other stakeholders are held to assure the quality standards. The parents, students and teachers form an integral part of the IQAC in assessing the quality policy.

### ➤ **Disciplinary Committee**

Disciplinary Committee maintains discipline, dignity, decorum of the institution. Direct the students through rules and regulations and channelization their youth energy into positive and creative direction and promotion of the manners, personality, character and civilization

### ➤ **Student Grievance Re-adressal Cell**

Student grievance re-adressal cell of A.P.S College of Arts and Science is comprised of two senior female faculties, two male faculties; which includes one faculty from P.G. department and one member from Physical education department and headed by the Principal of the college.

The objective of the grievance cell is as follows:

- To render a platform for the students to address their complaints, issues and concerns
- To offer a time bound grievance redressal mechanism
- To promote harmonious living among the students

### ➤ **Anti-ragging cell**

Any undisciplined behavior of student/students, either by acts or words spoken, the effect of which is teasing, treating or handling with rudeness any other student. Anti-ragging cell at A.P.S College of Arts and Science is comprised of two senior female faculties, two male faculties; which includes one faculty from PG department and one member from Physical Education department and headed by the Principal of the college.

### ➤ **Anti-Sexual Harassment Committee**

The committee strives towards enabling protection and safety for both students, teaching and non-teaching staff members of APS College of Arts and Science. The committee takes care of harassment of any kind.

Gender sensitization programme were organized to create awareness on gender appropriate behavior. And also to raise awareness of gender equality concerns. Regular vigilance is carried out by the members of committee to monitor the welfare of the students and staff.

Students are encouraged to meet any of the committee members anytime of the day, in case they face any kind of harassment. Due to this there have been no cases till date.

#### ➤ **Mentor Committee**

Parent-Mentor meeting is regularly conducted to bridge the gap between Principal, Teacher, Stakeholder and Students and is to build healthy learning Environment

APS College of Arts and Science conducts meeting for the improvement in certain subjects, to track their attendance record, motivate them to take part in other skilled activities such as curriculum, co-curriculum and extra-curriculum, to solve if any attendance issue, assist them in building career and responsibility, self-confident active and bold.

The mentor meets his/her wards from time to time which improves their attendance performance and also dropout rates, guide them to reach professional & personal goal, which identify their weakness and strength, their hobbies and field of their interest, help them in Psychological needs

#### ➤ **Human Rights Committee**

Human rights are basic, fundamental, universal, inalienable rights which are essential for all human beings. It constitutes the very foundation of the human dignity and worth and is indispensable for the development of individual personality.

The United National charter expressed the resolve to protect human rights and freedom of all on 10<sup>th</sup> December 1948, the adoption of UN Declaration of Human rights herald the process of the securing the right and freedoms of all the people of the world. Thereafter all nations of the world including India has been consistently trying to protect and promote the Human rights of the people and has been a party to all international human rights conventions and treaties.

APS college of Arts and Science started Human rights Protection cell on 21-09-2020 under the Chairmanship of Dr. B Jayashree, Principal, Professor H N Usha, Convener, Prof. Divya, Prof. Sona bai and Dr. Narsimha Parvatikar are the member of the cell.

#### **Objectives / Functions of the cell:**

1. Creating awareness about Human rights among students, staff and faculties.
2. To enjoy Human Rights without infringing the rights of the others
3. To conduct seminars and competitions regarding Human Rights.

4. Awareness about Covid – 19 and free Covid – 19 test were conducted for the students by BBMP doctors
5. Awareness about Covid – 19 and free Covid – 19 tests was organized for the staff and faculties.
6. Celebration of constitution day was on 26<sup>th</sup> November 2020.

The college celebrated Human Rights day on 10<sup>th</sup> December 2020. The theme is “recover better standup for Human Rights”. This national theme was linked to the Covid – 19 pandemic. The focus of the theme was the need of building a better health infrastructure by ensuring Human Rights with emphasis on recovery efforts.

#### ➤ Magazine Committee

Learning and education are a continuous journey. Every institution makes this fruitful and meaningful in various ways and one of them is publishing college Annual Magazine.

**Objective:-** To document the academic and other activities, and to publicize the achievements and awards received by students, faculty and the Institution. To provide a channel through which students are able to showcase their literary and artistic skills and talents.

#### Responsibilities

- ❖ Arrange periodic meetings to plan for collecting information from different sources.
- ❖ Put on record all the events and programmes of the college, including documents and photos.
- ❖ Communicate through circular seeking contribution from students and faculty for the magazine.
- ❖ Edit the received articles to rectify any factual or language errors.
- ❖ Take care of budgeting, printing, publishing and release of the magazine.
- ❖ Distribution of it to all management members, students and faculty.

#### ➤ Time-Table Committee

A structured time-table ensures systematic and smooth functioning of routine academic programme. The committee is entrusted with the responsibility of preparing and publishing it well in time of the commencement of academic sessions.

**Objective: -** Smooth and efficient management of classroom and academic programme.

#### Responsibilities

- ❖ Collecting data from different department pertaining to total number of teaching hours, lab sessions required of practical science departments.
- ❖ Gather information of number of classrooms and their capacity.

- ❖ Prepare day-wise time-table, keeping in mind allotment of minimum and maximum number of teaching hours per day, per teacher. Allotment of rooms as per time table.
- ❖ Ensure break time for students and faculty.
- ❖ Publish and communicate it to students and faculty.
- ❖ Document it for the purpose of submission to educational departments and university bodies.
- ❖ Prepare special time table as and when required.

#### ➤ **Sports Committee**

APS College of arts and science has excellent recreational facilities for sports such as gymnasium, Basketball court, and a spacious ground for sports such as Football, Cricket, Kho-Kho, and Kabaddi. The college teams have participated in many tournaments inside and outside Bangalore and have won many prizes. A well-laid playfield annexed to the college campus provides facilities for games. The students were guided in a batch by Physical Education Teacher.

#### ➤ **SUMANA Counseling Centre**

SUMANA, the counseling Centre run by the Department of Psychology was established in the year 1996. It offers counseling services to students to help them to improve their mental health and emotional well-being. Students with day to day problems of college life, adjustment problems, fears, anxieties, learning difficulties, time management, peer pressure and the like, are helped to resolve them. Counseling sessions are held, on appointment with the faculty of the department who are also trained counselors.

During the pandemic and subsequent lockdown, a month long compulsory online counseling sessions were held every day, class wise for all the students of the college. Students, along with their families made use of this facility.

#### ➤ **Best Practices Followed**

The various best practices followed in the college are:

- Merit Scholarship
- Conducting of regular seminar, conference and workshop for students & faculty to strengthen research culture in the institution
- Mentor – Mentee facility for students
- Value Added Courses

#### **Campus Area and Built up area**

The area of the campus (built up and total) is given in table 1-1.

S. No.	Description	Units	Details
1	Campus total area	Acres	1.05
2	Built up area	Sq Ft	4715.29

**Table 1-1: College Area**

### Previous NAAC Grades

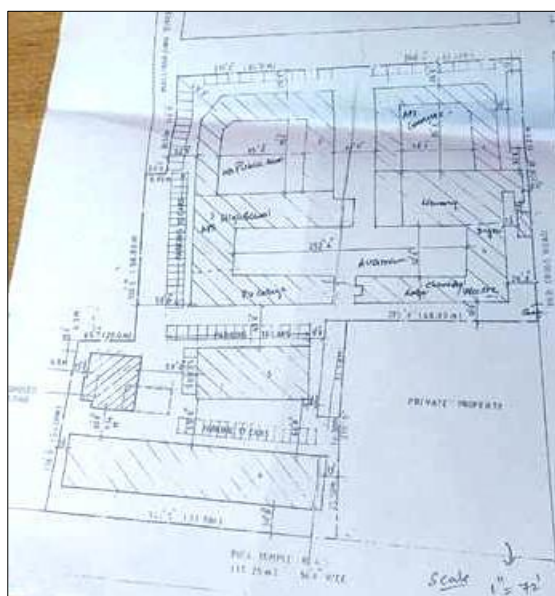
Previous NAAC grading's of the college is given in table 1-2.

S. No.	Phase	Grade	CGPA / %	Year of Acc.	Acc. Period
1	I	B+	75.75	2004	2010
2	II	B	2.54	2016	2021
3	III				

**Table 1-2: NAAC Grading**

### Layout of College Campus:

Schematic representation of the college campus layout is shown in the figure 1-1.



**Figure 1-1: Layout of the college**

### Infrastructure available in campus:

Table 1-3 outlines the infrastructure of the college.

S. No.	Description	Details
1.	Department of Language	Kannada English Sanskrit
2.	Department of Arts	History Economics Political Science



S. No.	Description	Details
		Optional Kannada Music Psychology Sociology
3.	Department of Science	Physics Chemistry Mathematics Botany Zoology Computer Science
4.	Laboratories	Psychology Music Computer Science Physics Chemistry Botany Zoology
5.	Conference Hall	Old Seminar hall and New Seminar hall
6.	Libraries	One Library
7.	Auditorium	Common Auditorium
8.	Cafeteria	Common Cafeteria

**Table 1-3: College Infrastructure Details**

Apart from the above infrastructure, the following facilities are also available in the college campus, to help the learning experience of the students. The facilities include:

- ICT Enabled Classrooms
- Internet Center / Computer lab

#### **Internal Quality Auditing Team – 2020 – 2021**

The college management constitutes the internal Quality Auditing team including students, staff and administrative staff every year. Table 1-4 gives the list of internal Quality Auditing team for the year 2020 – 2021.

S. No.	Name	Designation	Role
01	Prof. A. Prakash	Joint Secretary, APSET	Management Representative
02	Dr. B. Jayashree	Principal	Chairperson
03	N. Sarvamangala	Coordinator IQAC & HOD, Department of Botany	Convener
04	Lt. Dr. Lokesha A	Asst. Coordinator IQAC and, NCC Officer	Member
05	Hareesha M C	NSS Officer and HOD, Department of Kannada	Member
06	Sona Bai	HOD, Department of	Member

S. No.	Name	Designation	Role
		Chemistry	
07	Sathayappa Nayak	Assistant Professor, Department of Botany	Member
08	Ragesh H K	FDA	Member
09	Chandramouleshwar	Student	Member
10	Gunashekar	Student	Member

**Table 1-4: Internal Quality Audit Team**

#### **Details of Student's Activity Units:**

The various Students Activity Units in the college are as follows:

- NSS Unit
- NCC Unit
- YRC Unit
- Eco Club
- Placement Cell

#### ➤ **NSS Unit:**

NSS Unit-1 of APS College of Arts & Science is actively working since 1962. There are 50 student volunteers serving in the unit. The NSS unit organizes various programmes at college and university level like Swachh Bharath, Environment Day, Yoga day, AIDS and Drug awareness programmes, Women's day, Pollution awareness rally, plantation of trees and Blood donation camps etc. The students of NSS assist government agencies and NGO's by taking part in various social service activities and serving for our great nation.

NSS unit of the college has conducted Swachha Bharath Abhiyana in February 2021. Photos taken during the event is shown in figure 1-2.





**Figure 1-2: NSS camp work by students**

‘Anantha Hasiru’ program was organized by NSS Camp to plant the saplings in the campus. A sample photo of the program is shown in figure 1-3.



**Figure 1-3: NSS camp work in Anantha Hasiru Program**

World Environment day was celebrated by NSS unit on 05<sup>th</sup> June 2020 and the photos are as shown in figure 1-4.



**Figure 1-4: World Environment day photos**

Temple cleaning program was arranged by NSS unit under ‘Swatch Bharat Abhiyan’ Scheme in Gavigangadhareshwara swamy Temple Basavanagudi on 15<sup>th</sup> December 2019. Photos are as shown in the figure 1-5.



**Figure 1-5: Temple Cleaning Program**

NSS unit has also celebrated 'World Soil Day' in the college on 5<sup>th</sup> December 2019. Some of the Photos are as shown in figure1-6.



**Figure 1-6: World Soil day**

NSS unit had conducted a campaign and a rally called 'Cauvery Koogu' to create awareness among students, staff and public about save Cauvery River. The rally aims to create mass awareness and garner public support for a government policy to save them. Photo taken during the campaign are as shown in the figure 1-7



**Figure 1-7: Rally for Rivers – Cauvery Koogu**

➤ **NCC unit:**

APS College of Arts & Science holds NCC since 1962. The college level company of NCC designates as 6/6 Coy, working under 7 Karnataka battalion, Bangalore – B group, having a strength of 108 (SD & SW) both for boys and girls. The students are provided with an opportunity to take part in the activities of NCC by registering themselves as dedicated cadets.

The cadets will undergo the directorate made syllabus of Weapon Training, Drill, Leadership, Civil Define, First Aid, Health & Hygiene, community development and also participate in state and national level camps like ATC, CATC, AOC, EBSB, Trekking Camps, Cycling and RD Camps etc.

The certificate of NCC helps students to take reservation in all the higher education courses as well as wide opportunity in Armed forces & Government Job. Their NCC 6/6 Coy mainly helps students to develop character, comradeship, leadership and discipline to become good citizen of the nation

NCC Unit has organized ‘Mega Pollution Awareness Pakhwada’ campaign in 2019 and photos of the rally are shown in figure 1-8.



### Figure 1-8: Mega Pollution Awareness Pakhwada

Swachh Bharath & Statue cleaning at Bugle Rock was done by NCC unit in 2019, the photos are as shown in figure 1-9.



Figure 1-9: Swachh Bharath & Statue cleaning at Bugle Rock

NCC unit has also conducted 'Jal Shakti abhiyan' rally in the college to create awareness about water conservation among the students staff and public. Figure 1-9 depicts the rally photos.



Figure 1-10: Jal Shakti Abhiyan rally

Apart from the student's activity units, there are cells to support students in helping them to address various challenges, which are mentioned as below:

- Student Council Cell
- Discipline Cell
- Life Skills
- Yoga and Meditation

## **2. PRE – AUDIT PHASE**

A pre-audit meeting is a prerequisite for the audit, it helps to meet and discuss about the schedule and documents required during the audit. The pre-audit meeting was conducted at Acharya Patashala College of Arts and Science, N R Colony in June 2021. During the meeting, introduction of team members, scope and objectives of the audit were discussed.

### **Management Commitment**

The Management of the college has shown great commitment towards Quality Auditing during the pre-audit meeting. They were ready to encourage all green activities. It is decided to promote all activities that are environment friendly such as awareness programmes on the environment, campus farming, planting more trees on the campus etc., after the Quality Auditing.

College administration is vital to the process of realizing campus sustainability, and college policy is an essential instrument for any substantial change in the campus environment.

### **Scope and goals of Quality Auditing**

A clean and healthy environment aids effective learning and provides a conducive learning environment. There are various efforts around the world to address environmental education issues. Quality Auditing is one among them for educational institutions.

Once a baseline is established, the data can serve as a point of departure for further action in campus greening. Existing data will allow the college to compare its programs and operations with those of peer institutions, identify areas in need of improvement, and prioritize the implementation of future projects.

This data will also provide a basis for calculating the economic benefits of resource conservation projects, by establishing the current rates of resource use and their associated costs. This audit initiative focused initially on educating colleges and universities through workshops, guidebooks, fact sheets and ensuring compliance through inspections and self-audits.

## 2.1. Audit Schedule

Quality Audit schedule includes the pre audit phase, on-site / audit phase and post audit phase. Table 2-1 details the complete Quality Audit schedule.

S. No	Description	Timeline
1.	Pre-audit Phase	17 Jun 21 to 18 Jun 21
2.	Onsite-audit Phase	21 Jun 21 to 25 Jun 21
3.	Post-audit Phase	28 Jun 21 to 02 Jul 21
4.	Presentation	06 Jul 21

**Table 2-1: Audit Schedule**



### **3. ON-SITE AUDIT PHASE**

#### **3.1. Scope / Target Areas of Quality Auditing**

##### **3.1.1. Water Audit**

Water management addresses water consumption, water sources, appliances and fixtures. Aquifer depletion and water contamination are taking place at unprecedented rates. It is therefore essential that any environmentally responsible institution should examine its water use practices.

##### **3.1.2. Energy Audit**

Energy management addresses energy consumption, energy sources, energy monitoring, lighting, appliances, and vehicles. Energy use is clearly an important aspect of campus sustainability.

##### **3.1.3. Waste Management Audit**

Waste management addresses waste production and disposal, plastic waste, paper waste, food waste, and recycling. Municipal solid waste has a number of adverse environmental impacts, most of which are well known and not in need of elaboration.

##### **3.1.4. Green Campus Audit**

Green campus initiatives are becoming integral part of modern day's university systems. Green campus management helps in maintaining the air and water clean. It regulates the climatic conditions and provides healthy and comfortable environment for living.

##### **3.1.5. Environment Audit**

Carbon footprint management addresses the usage of fossil fuels (coal, diesel, petrol and gas). The mode of commute to and from college each day has an impact on the environment through the emission of greenhouse gases into the atmosphere by the burning of fossil fuels.

#### **3.2. Audit Methodology and Approach**

The methodology and approach adopted for the study involves various steps that include:

- Review of Document and records
- Review of Policies
- Review of MoU
- Review of various measures implemented

- Site Walk through
- Inventory Collection
- Interviews
- Measurements and Analysis

### **3.2.1. Review of Document and Records**

Electricity bills, Water bills, equipment register, list of appliances, office registers, internal Quality Audit document, purchase document, were reviewed and relevant data and inputs required for analysis have been collected.

### **3.2.2. Review of Policies**

College has various policies that include safety policy, environment policy, anti-ragging policy and attendance policy.

#### **A. Environmental Policy:**

College has taken some of the measures to conserve natural resources and is listed below.

- Use of plastic is banned inside the campus.
- Use of single side papers for internal purposes
- Planting of tree saplings

#### **B. Attendance policy:**

For every student regular attendance and punctuality is essential for the successful completion of the course. To pass relevant coursework with a successful grade, students are recommended to maintain satisfactory attendance (75%). The institute does not entertain the student's shortage of attendance during the academic year. Attendance will be taken during such programs like talents day, special lectures, seminars, exhibitions, sports day, and cultural program. 50 marks are allocated for this.

#### **C. Anti-Ragging policy:**

Ragging in all its forms shall be totally banned in the entire institution, including its departments, all its premises whether located within the campus or outside and in all means of transportation of students whether public or private. Anti-Ragging Posters has been posted as shown in the figure 3-1 to create awareness in the students about ill effects of ragging, in all the floors of the campus.



Figure 3-1: Anti-ragging policy

### 3.2.3. Site walk through

Site walk though was conducted with staff members, students and audit team members. Staff and students have shown very keen interest in data collection process and methods to be followed in field data collection. The staff and students have given inputs and suggestions for resource conservation as well.

#### 3.2.3.1. College Infrastructure

Acharya Patashala College of Arts and Science campus has two blocks and different departments. The building have 3 floors with well sophisticated class rooms, staff rooms, laboratories and many more which are detailed in table 3-1.

S. No.	Description	Details
1	Physics Block	<p><b>Basement:-</b> Physics lab, Botany lab, Zoology lab, gents toilet and women’s toilet</p> <p><b>Ground Floor:-</b> Department of Chemistry staff room, Chemistry lab, Science Faculty room, Post-Graduation Study in Economics staff room, Sports room, NSS room, Gents faculty room, ladies faculty room, P1 to P5 class rooms and Women toilet.</p> <p><b>First Floor:-</b> P6 to P13 Classroom, Music lab, NCC room, Boys washroom, Girls washroom and Girls restroom</p> <p><b>Second Floor:-</b> New Seminar Hall, Narmada- A unit for differently abled persons</p>
2	Office	Principal Chamber, Administrative office, Office-2, IQAC Chamber

3	NAMCC Block	<b>Ground Floor:</b> - Library, Old seminar hall, Boys toilet and Girls toilet. <b>First Floor:-</b> Psychology Staff room, Psychology lab, BCA Staff room, BCA lab, Sumana Counseling Centre and 2 classroom
---	-------------	--

**Table 3-1: Detail infrastructure of the College**

Total number of departments, laboratories, library, auditorium, and cafeteria are given in the table 3-2.

S. No.	Description	Details
1	Department	15
2	Laboratories	06
3	Library	01
4	Auditorium	01
5	Seminar Hall	02

**Table 3-2: List of facilities**

All the class rooms are well ventilated and integration of day light is well utilized. This has helped in optimized usage of electricity for lights and fans during day time. Sample classroom picture is shown in the figure 3-2. Auditorium has built with stage and colorful lights.



**Figure 3-2: Well ventilated classroom**

#### 3.2.4. Interviews

To collect the various data, information and operating patterns, interviews were conducted with college staff (President, Secretary, Principal, teaching staff, non-teaching staff) and students. The consolidated information from the interviews is given in the following sub-sections.

### 3.2.4.1. Tentative Schedule of College:

#### 1. The tentative schedule of the college is as given below:

- 8.00 AM to 8.30 AM Staff Arrival Time
- 1<sup>st</sup> Hour – 8.30 AM to 9.30 AM
- 2<sup>nd</sup> Hour – 9.30 AM to 10.30 AM
- 3<sup>rd</sup> Hour – 10.30 AM to 11.30 AM
- Lunch break – 11.30 AM to 12.00 PM
- 4<sup>th</sup> Hour – 12.00 PM to 1.00 PM
- 5<sup>th</sup> Hour – 1.00 PM to 2.00 PM
- 2.00 PM to 3.00 PM Value added Class/ Elective /Revision/Yoga/ Extra class
- 3:30 PM to 4.30 PM College Closure

#### 2. List of holidays :

List of holidays for the year 2021 is collected during the study and the same is given in the table 3-3.

S. No	Date	Day	Holiday
1	January 1, 2021	Friday	New Year's Day
2	January 14, 2021	Thursday	Makara Sankranti
3	January 26, 2021	Tuesday	Republic Day
4	March 11, 2021	Thursday	Maha Shivaratri
5	April 2, 2021	Friday	Good Friday
6	April 13, 2021	Tuesday	Ugadi
7	April 14, 2021	Wednesday	Dr Ambedkar Jayanti
8	April 25, 2021	Sunday	Mahavir Jayanti
9	May 1, 2021	Saturday	May Day
10	May 13, 2021	Thursday	Idul Fitr
11	May 14, 2021	Friday	Basava Jayanti
12	July 20, 2021	Tuesday	Bakrid / Eid al Adha
13	August 15, 2021	Sunday	Independence Day
14	August 20, 2021	Thursday	Muharram
15	September 10, 2021	Friday	Ganesh Chaturthi
16	October 2, 2021	Saturday	Gandhi Jayanti
17	October 6, 2021	Wednesday	Mahalaya Amavasye
18	October 14, 2021	Thursday	Maha Navami

S. No	Date	Day	Holiday
19	October 15, 2021	Friday	Vijaya Dashami
20	October 19, 2021	Tuesday	Eid e Milad
21	October 20, 2021	Wednesday	Maharishi Valmiki Jayanti
22	November 1, 2021	Monday	Kannada Rajyothsava
23	November 5, 2021	Friday	Deepavali Holiday
24	November 22, 2021	Monday	Kanakadasa Jayanthi
25	December 25, 2021	Saturday	Christmas

**Table 3-3: List of holidays**

### 3.2.4.2. Staff and students of College

#### 1. Number of staff members

Number of teaching staff, non-teaching staff, and support staff with male and female breakup is given in the table 3-4.

S. No.	Teaching Staff		Non-teaching Staff		Support Staff (Security, House Keeping)	
	Male	Female	Male	Female	Male	Female
<b>1</b>	10	25	06	04	04	11

**Table 3-4: Number of staff members**

#### 2. Number of students (boys & girls)

Total number of boys and girls in both degree and PU College are given in the table 3-5.

S. No.	Boys	Girls
<b>1</b>	203	305

**Table 3-5: Number of students**

## 4. WATER AUDIT

### 4.1. Facility Description

The study involved carrying out various measurements and analysis, to realistically assess usage of water, water wastage and potential for water conservation. The sources of water for facilitating the water supply to the college campus are BWSSB (Bangalore Water Supply and Sewerage Board), and borewell.

One number of borewell with 600ft depth is available in the campus (near commerce college gate) to meet the additional water requirement. Tanker water (standby source of water purchase) is purchased very rarely (Only when water from BWSSB and borewell are not available).

Eleven numbers of overhead tanks have been installed in the terrace of various buildings. Three numbers of underground tanks (sump) with different storage capacities is available. The list of overhead tanks in the campus, capacity of each tank, quantity of tanks installed and the sources of water for these overhead tanks are given in table 4-1. The list of sumps, installed location, quantity of sump and the sources of water for these sumps are given in table 4.2.

S. No.	Location	Capacity, Litres	Quantity, Nos.	Source of water
1	Public School	2000	5	Public School Sump
2	Arts & Science – Library building	1000	1	Public School Overhead tanks
3	Arts & Science – building	2000	2	Public School Overhead tanks
4	Commerce College	2500	2	Commerce College Sump
5	Trust Office	1000	1	Public School Overhead tanks

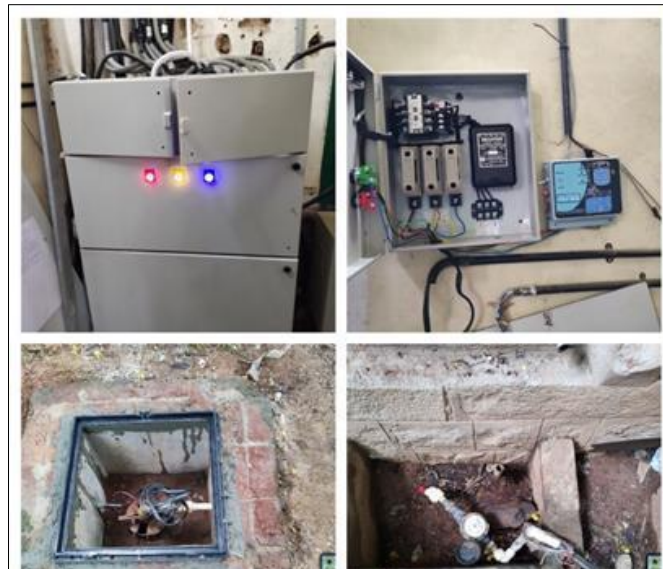
**Table 4-1: Details of overhead tanks**

S. No.	Location	Quantity, Nos.	Source of water
1	Public School	1	BBMP, Borewell
2	Commerce College	1	Borewell
3	Trust Office	1	Public School – Overhead Tanks

**Table 4-2: Details of sumps (underground tanks)**

Four numbers of pumps have been installed in the pump room. Water pump system photos are as shown in the figure 4-1. The application of each pump is as follows:

- One number of submersible water pump to pump water from the borewell to underground tank (sump) in commerce college and public school sump (from the same pipe, valve provision is available to control the flow of water for these two sumps).
- The borewell pump has automatic overhead water level controller system installed for water flow control. The average operating hours of borewell pump per day is  $\sim 4$  hours/day.
- The borewell pump has three phase electrical motor; the measured load of the borewell pump during the study is  $\sim 8.3$  amps.



**Figure 4-1: Water System Pictures**

- Two numbers of water pumps are available in public school campus to pump water from public school sump to overhead tanks in the public school. Majority of the water distribution of the entire campus is catered from the overhead water tanks installed in the public school campus.
- Automatic water level controllers have been installed for water flow control. The average operating hours of the water pumps (to pump water from sump to overhead tanks) is  $\sim 8$  hours/day.
- The sump pump motor used is of single phase type. The measured load of sump pump motor #1 is 8.1A and measured load of sump pump motor #2 is 7.9A.

Different types of water in the college campus are as follows:

- Raw Water
- Drinking Water
- Laboratory Waste water
- Sewage Water

The domestic water is consumed in the following areas:



- Drinking
- Laboratory
- Cleaning
- Washrooms
- Toilets

Waste water sources are

- Washrooms
- Toilets

Drinking water for students is facilitated by two RO water plants and storage units. The images of the RO Plants installed inside the college are shown in figure 4-2.



**Figure 4-2: RO Water Plants**

Waste water from the labs, wash rooms and toilets are connected to the corporation chamber.

Rain water harvesting system is available in the college. Ground water recharging is done with rainwater collected from the roof and open space. There are four percolation pits / rain water recharging pits in the campus as shown in the figure 4-3.



**Figure 4-3: Percolation pit for ground water recharge**

Management is aware of scarcity of water and in creating awareness of water conservation. They are adopting Aerator filters for the taps in order to reduce the water consumption.

During the walk through and site survey almost all the taps were fit and clear without any major leakages observed. BWSSB has installed one water flow meter (inside public school compound); monthly billing is done based on the readings from this water flow meter.

Month wise water (from BWSSB) bill for last 2 years was collected and as tabulated as shown in table 4-3.

S. No	MONTH/ YEAR	Cost in Rs.
		2019 – 2020
1	April	66699
2	May	70831
3	June	71266
4	July	-
5	August	83026
6	September	84099
7	October	78226
8	November	73550
9	December	-
10	January	17534
11	February	9061
12	March	21459

**Table 4-3: BWSSB monthly water bill**

## 4.2. Measures Implemented for Water Savings

- Testing of drinking water by third party agencies on regular basis
- Posters for water conservation
- Aerators for taps to reduce water consumption
- Rain water harvesting system to save water
- Water conservation awareness campaigns are organized, dedicated staff members have been deputed for this activity and support of trust members is also extended
- Regular checking and maintenance of pipelines are done to control water wastage.
- Water filter with RO at the strategic locations in the college for the students. All are under AMC (Annual Maintenance Contract).

### **4.3. Recommendations**

- Display boards indicating slogans for water conservation shall be installed
- Conduct seminars, workshops and exhibitions on water conservation.

## 5. ENERGY AUDIT

### 5.1. Facility Description

Acharya Patashala Educational Trust, Basavanagudi campus receives power supply from the state electricity board (BESCOM – Bangalore Electricity Supply Company Limited) at HT 11 kV. APSET has availed power supply, with connection – RR. No 2811331517 (W2HT144).

Incoming power supply from BESCOM is received at the transformer yard inside the college premises. The 11 kV rated HT power supply is stepped down to LT 433V, by one number of 160 kVA rated transformer. Transformer unit installed inside college premises is as shown in the figure 5-1.



**Figure 5-1: Transformer unit Installed in the campus**

The name plate details of transformer are given in table 5-1.

S. No.	Description	Units	Details
1	Rated Capacity	kVA	160
2	Rated Voltage Prim/Sec	kV	11/0.433
3	Rated Current Prim/Sec	A	8.40/213.00
4	Type of Cooling	-	ONAN
5	Frequency	Hz	50
6	Impedance	-	4.48%
7	Phase	-	3

**Table 5-1: Name plate details of transformer**

The LT supply from the transformer is taken to the main distribution panel located inside the Electrical panel room near the transformer yard. Electrical panel room is as shown in the figure 5-2.



**Figure 5-2: Electrical panel Room**

Two numbers of 25 kVAr rated each capacitor bank have been installed at the main incomer panel for power factor improvement. Power supply cables from the electrical panel room is distributed to the various control panels placed inside the colleges.

Two numbers of DG set is used for backup power supply, during power failure from BESCOM. DG set # 1 caters power supply to Arts & Science College, PU College, Public School and Trust Office. DG set #2 caters power supply to Commerce College, and Evening College. DG set installed at the college premises is shown in the figure 5-3. The name plate specification rating of the DG set is shown in the table 5-2.



**Figure 5-3: Diesel Generator (DG) set #1 and #2**

S. No.	Description	Unit	DG # 1	DG # 2
1	Model number	-	P1144E1	-
2	Rated voltage	Volts	415	415
3	Rated current	Ampere	34.8	34.8
4	Frequency	Hz	50	50
5	Power factor	-	0.80	0.80

S. No.	Description	Unit	DG # 1	DG # 2
6	Rated Demand	kVA	25	25
7	Rated Power	kW	20	20
8	Make	-	Stamford AC Generator	Stamford AC Generator

**Table 5-2: DG set specifications**

### 5.1.1. Tariff Structure

The sanctioned contract demand of the campus is 85 kVA at specified voltage of 11 kV. Electricity supply from BESCOM is billed under 1HT2C1 schedule of tariffs. The tariff includes demand charges of Rs. 240 per kVA, and energy charges of Rs.7.20 per kWh.

The kVA demand charges @ Rs. 240/kVA of maximum demand recorded during the month or 85% of the contract demand, whichever is higher

#### 5.1.1.1. Electricity Consumption Data

Details of electricity consumption for the last two years have been collected and Salient features of electrical energy details are given in table 5-3.

S. No.	Description	Unit	Details
1	Contract Demand	kVA	85
2	Demand Charges	Rs./kVA	240
3	Maximum Demand Recorded during last six months	kVA	55
4	Average Monthly Energy Consumption during last six months	kWh	7720
5	Average System Power Factor		0.99
6	Average Energy Charges considered for savings calculations	Rs./ kWh	9.7

**Table 5-3: Electricity Bill Parameters**

#### 5.1.1.2. Measurements

The study made use of various portable instruments, for carrying out various measurements and analysis. The specialized instruments that were used during the performance analysis study include power analyzer and plug load manager.

#### A. Main LT incomer

Electricity power measurements were carried out at the LT side incomers to monitor all the electrical power parameters. Instantaneous power measurements were carried out at various distribution panels using portable sophisticated power, harmonic analysers and clamp on meters.

The power parameters were measured at main LT incoming panel. The parameters such as incoming voltage, variation in load current, kW, kVA, kVAR, power factor and frequency were measured. Summary of measured power parameters at the main LT incoming supply panel and distribution panels during typical working day is given in table 5-4.

S. No.	Description	Phase	Voltage, V	Current, Amps	kW	kVA	PF	kVAR	Hz
1	Main Incomer	3Ø	433	49.0	35.6	36.7	0.97	8.9	50.1
2	Commerce and Evening College	R	249	18.3	3.7	4.6	0.81	2.7	49.9
		Y	247	17.8	3.5	4.4	0.80	2.6	49.8
		B	236	25.1	5.2	5.9	0.87	2.9	50.0
3	Arts & Science and PU College	R	246	12.5	2.4	3.1	0.78	1.9	49.9
		Y	249	3.9	0.6	1.0	0.62	0.8	49.8
		B	241	10.7	1.9	2.6	0.73	1.8	50.0
4	School & Trust Office	R	246	12.7	2.7	3.1	0.88	1.5	49.9
		Y	246	11.9	2.5	2.9	0.87	1.4	49.8
		B	243	14.2	3.2	3.5	0.92	1.4	50.0
5	Sump Pump motor # 1 (Public School)	1Ø	239	8.1	1.4	1.9	0.72	1.3	49.9
6	Sump Pump motor # 12(Public School)	1Ø	244	7.9	1.4	1.9	0.73	1.3	50.1
7	Borewell Pump motor (Commerce College)	3Ø	426	8.3	5.0	6.1	0.81	3.6	50.1

**Table 5-4: Measured Power Parameters in electrical panel room**

### B. Plug Load manager

Plug load manager has been used to measure the power consumption of the electrical equipment which is used regularly. The details of the measured electrical parameters are given in the table 5-5.

S. No.	Description	W	PF	V	mA
1	CPU	41	0.62	249	245 to 290
2	Idle Monitor	14	0.59	244	60 to 138
3	Working Monitor	28	0.68	247	160 - 175
4	1x36W FTL	42	0.62	248	248 to 296
5	2x36W FTL	73	0.78	242	385 to 390
6	Fan 65W	72	0.88	244	330 - 345
7	2x18W LED	38	0.86	243	169 to 196
8	1x18W LED	21	0.98	238	88-96
9	Wall mount fan	52	0.85	240	240-265

**Table 5-5: Plug load measurements for various loads**

### 5.1.1.3. Conservation methods used

Whether the Institution has facilities for alternate sources of energy and energy conservation measures like

- a. Solar energy – The management is in the process of evaluating the scope for integration of solar energy in the campus.
- b. Biogas plant – considering the size of the campus, viability of biogas is not feasible
- c. Wheeling to the Grid – once the solar energy is integrated, the wheeling options shall be explored
- d. Sensor-based energy conservation – In the new building projects, the less occupant level areas are being identified, and the options for installation of motion/ occupancy sensors will be explored.
- e. Use of LED bulbs/ power efficient equipment – Replacement of existing / conventional fixtures to LED fixtures is being practiced.

During the study, observations were carried out on the usage of the inventories in the college building premises. Computers are used only during the class hours, after completion of class hours fans, lights and computers are turned OFF. This is practice followed across the college premises (class rooms, lab, staff rooms and office rooms).

In order to save the electricity various measures have been adopted in the college. Replacement of FTL with LED lamps has been started as shown in figure 5-4.



**Figure 5-4: LED lamps used in the class rooms**

Sign boards to switch off the lights and fans as shown in the figure 5-5, are observed near switch boards in the class rooms and staff rooms.





**Figure 5-5: Sign board to turn off the lights and fans**

#### 5.1.1.4. Inventory Collection

To understand the types of appliances used, inventory collection was carried out by the audit team members. The various types of appliances used are lights, fans, computers, printers, water coolers etc. The consolidated list of inventory is given in table 5-6.

S. No	Inventory Type	Wattage	Quantity
1	Fluorescent Tube lights (FTL)	1x40W	106
2	Mirror Optic Reflector FTL	2x40W	28
3	LED	1x18W TL	136
		1x8W	10
4	LED	1x150W	12
5	Ceiling fan	1x75W	79
6	Exhaust Fans	90W	15
7	RO Water Purifier		3
8	Oven	800W	4
9	Desktop computers	20W	53
10	Printers	100W	10
11	Scanners	100W	1
12	Xerox Machine		2
13	OHP		8

**Table 5-6: Consolidated list of Inventories**

## **5.2. Measures Implemented for Energy Savings**

- LED Lighting Fixtures installed
- Switching OFF lights and fans whenever not in use to save electricity
- Posters to create awareness on energy conservation
- Energy saving campaigns are organized, dedicated staff members have been deputed for this activity and support of trust members is also extended
- Electrical wirings are neat
- Periodic electrical maintenance is carried out, dedicated electrician is available to take care of the electrical system
- Replacing old and inefficient appliances with energy efficient appliances as a regular maintenance practice

## **5.3. Recommendations**

- Replacement of conventional fans with energy efficient fans in phased manner, as part of procurement practice.
- Conduct seminars, workshops and exhibitions on energy conservation

## 6. WASTE MANAGEMENT AUDIT

### 6.1. Facility Description

The study involved carrying out various analyses to realistically assess waste generation. The study focused on waste management. There are different types of waste generated in the college is tabulated in table 6-1.

S. No.	Description	Yes / No
1	E-Waste	Yes
2	Chemical Waste	Yes
3	Solid Waste	Yes
4	Dry Leaves	Yes
5	Food Waste	Yes
6	Waste Water	Yes
7	Glass Waste	No
8	Unused Materials	Yes
9	Sanitary Napkins	No
10	Plastic Waste	No

**Table 6-1: Types of Waste Generated in the college**

Methods of waste disposal by the college are as tabulated in the table 6-2.

S. No.	Description	Disposal Method	Frequency of Disposal
1	E-Waste	Buyback	Based on quantity
2	Chemical Waste	Corporation Chamber	Intermittent (When chemistry lab is conducted)
3	Solid Waste	BBMP	Daily basis
4	Dry Leaves	BBMP	Daily basis
5	Food Waste	BBMP	Daily basis
6	Waste Water	Corporation Chamber	Daily basis

**Table 6-2: Methods of waste disposal**

At each room there is separate waste collection bin and the waste / garbage collected is given to BBMP municipal agencies on daily basis in order to maintain the college premise clean & hygiene.

Sign boards are pasted inside the campus to create awareness about cleanliness among the students and staff. Fig 6-1 depicts sign boards for waste management in the college.



**Figure 6-1: Sign boards for waste management**

1. Describe the facilities in the Institution for the management of the following types of degradable and non-degradable waste
    - a. Solid waste management – The solid waste generated in the college is used / shredded papers and tree leaves. This solid waste is disposed to BBMP on a regular basis.
    - b. Liquid waste management – The liquid waste generated in the college is from toilets and washrooms. At present, this liquid waste water is directly connected to corporation chambers.
    - c. Biomedical waste management – Not applicable
    - d. E-waste management – Used computers and batteries are the e-waste generated from the facility. These items are given in buy-back purchase schemes.
    - e. Waste recycling system – Not applicable
    - f. Hazardous chemicals and radioactive waste management – Not applicable
- Provide web link to
- g. Relevant documents like agreements/MoUs with Government and other approved agencies – Not applicable
  - h. Geo-tagged photographs of the facilities – included above.

## 6.2. Measures Implemented for Waste Management

- Cleaning the class rooms, common areas and campus on daily basis
- Dust bins are placed in each room, corridors, office and staff rooms
- Segregation of waste into degradable and non-degradable by housekeeping staff
- Disposing waste to BBMP waste collection team only
- Used computers and accessories are segregated and stored in a separate room
- Old batteries are exchanged with new ones in buy back model

## 6.3. Recommendations

- Conducting training and awareness programs for new joining students and staff on Waste Management

## 7. GREEN CAMPUS AUDIT

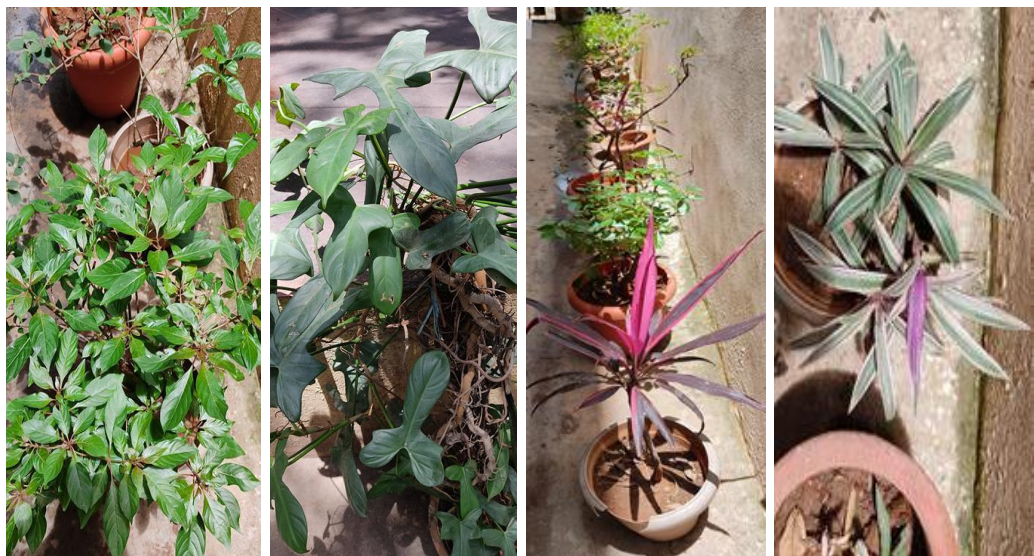
### 7.1. Facility Description

Green campus initiatives include:

The institutional initiatives for greening the campus are as follows:

- a. Restricted entry of automobiles – as a green initiative measure, vehicles are not permitted inside the college campus.
- b. Battery-powered vehicles – Management is planning to procure battery powered vehicles.
- c. Pedestrian-friendly pathways – The pathways are clean and neat, and pedestrian friendly.
- d. Ban on the use of Plastics – Usage of plastic in any forms is restricted inside the college campus.
- e. Landscaping with trees and plants – Landscaping with plants, sapling and trees are being practiced and well maintained by the staffs and students.

This section includes the plants and greenery of the campus. There are more than **120** pot plantations inside the campus. New Garden is being developed near the botany lab area inside the college. Sample photos of plantations and trees are shown in the figure 7-1 and figure 7-2. There are many trees and plantations in the playground also; some of them are shown in the figure 7-3.



**Figure 7-1: Plantations and trees in the campus**



Figure 7-2: Pot plantations in the campus



**Figure 7-3: New plantations in the botanical garden**

List of Plants/trees inside the college has been tabulated in table 7-1.

S. No	Common Name	Scientific Name	No. of Plants or trees
1	Palm tree	Dypsis ambositrae	9
2	Moses In the Cradle	Tradescantia spathacea	13
3	Star Jasmine	Jasminum Multiflorum	3
4	bell fruit/ Rose apple tree	Syzygium aqueum	2
5	Mango tree	Mangifera indica	2
6	Balfour Aralia	Polyscias scutellaria	6
7	Chinese Evergreen	Aglaonema commutatum	5
8	Bonsai Banyan	ficus microcarpa	3
9	weeping Fig	Ficus benjamina	3
10	Rampe Pandan	Pandanus amaryllifolius	2
11	Madagascar Dragon	Dracaena angustifolia	1
12	Dwarf Umbrella Tree	Schefflera arboricola	3
13	Hawaiian Ti plant	Cordyline fruticosa	11
14	Spiral flag / Insulin plant	chamaecostus cuspidatus	1
15	Arrow head plant	Syngonium podophyllum	1
16	Para rubber tree	Hevea brasiliensis	1
17	Spiny pod tree	Sindora siamensis	1
18	Camphor tree	Cinnamomum camphora	1
19	Horse head Plant	Philodendron Bipennifolium	1



S. No	Common Name	Scientific Name	No. of Plants or trees
20	Hibiscus plant	Hibiscus rosa-sinensis	3
21	Puka plant	Meryta sinclairii	1
22	Croton plant	croton hojas arrugadas	2
23	Fire bush plant	Hamelia patens	3
24	Crossandra	Crossandra infundibuliformis	1
25	Crepe jasmine	Tabernaemontana divaricata	1
26	Blushing Philodendron	Philodendron Erubescens	1
27	Crinum lily	Crinum asiaticum	1
28	Brown Cordyline	Cordyline cointreau	1
29	Holy Basil (Tulsi)	Ocimum tenuiflorum	1
30	Corn Palm	Dracaena fragrans	1
31	Pomegranate tree	Punica granatum	1
32	Ribbon/Spider plant	Chlorophytum comosum	3
33	Shrub Vinca	kopsia fruticosa	1
34	Canna Lily	Canna indica	2
35	Trefle Gros	Tadehagi Triquetrum	1
36	pink periwinkle	Catharanthus roseus	1
37	Hydrangea	Hydrangea macrophylla	1
38	Umbrella tree	Heptapleurum actinophyllum	1
39	Silver Wattle	Acacia dealbata	1
40	Pencil cactus	Euphorbia tirucalli	3
41	Sea Onion	Albuca bracteata	1
42	Wax mallow	Malvaviscus	1
43	Song of India	Dracaena reflexa	3
44	Varnish Tree	Ailanthus altissima	2
45	Earpod Tree	enterolobium contortisiliquum	1
46	May flower tree	Delonix regia	1
47	Fern Tree	Jacaranda mimosifolia	1
48	Banana plant	Musaceae	1
49	Rose Plants	Rosaceae	2
50	Jasmine	Jasminum	2
51	Guava Tree	Psidium guajava	2
52	Basil	Ocimum basilicum	1
53	Drumstick	Moringa oleifera	1
54	fringed rue	Ruta chalepensis	1
55	Indian Almond	Terminalia catappa	7
56	red robin tree	Photinia serratifolia	1
57	Elephant Ear Plant	Alocasia macrorrhizos	1

**Table 7-1: List of Plants and Trees inside the campus**



**Figure 7-4: Plantation in the Playground**

List of trees /plants in playground are as shown in table 7-2.

<b>List of plants/ Trees</b>			
<b>S. No</b>	<b>Common Name</b>	<b>Scientific Name</b>	<b>No. of Plants or trees</b>
1	Oleander Flower Plant	Nerium Oleander	1
2	Castor Oil plant	Ricinus Communis	1
3	Cocobolo Tree	Dalbergia retusa	1
4	Aloma / Badi Tree	Nauclea diderrichii	2
5	Copperwood Tree	Buriseria Simaruba	1
6	white ash Tree	Fraxinus Americana	4
7	mahogany Tree	Swietenia Macrophylla	3
8	Hammel tree	Garcinia Madruno	1
9	Bridalveil Tree	Caesalpinia Granadillo	1
10	Banyan Tree	Ficus benghalensis	3
11	Rainbow Eucalyptus	Eucalyptus Deglupta	1
12	Native Poplar	Homalanthus Populifolius	2
13	Bay laurel	Laurus Nobilis	1
14	woodland waterberry	Syzygium Guineeze	1
15	Jackfruit	Artocarpus Heterophyllus	1
16	English walnut	Juglans Regia	1
17	Paw Paw Tree	Asimina Triloba	1
18	Zebrawood Tree	Brachystegia spiciformis	1
19	sea poison tree	Barringtonia ariatica	1
20	Cotton Tree	Ceiba pentandra	1
21	Black dammar tree	Canarium Strictum	1

List of plants/ Trees			
S. No	Common Name	Scientific Name	No. of Plants or trees
22	Champak Tree	Magnolia champaca	1
23	Honey vine tree	Cynanchum leave	1
24	Marvel of Peru	Mirabilis jalapa	3
25	Pongame Oil Tree	Millettia pinnata	14
26	Southern Silky Oak	Grevillea robusta	9
27	Portia Tree	Thespesia populnea	5
28	queen sago Tree	Cycas Circinalis	1
29	Eucalyptus Tree	Eucalyptus Grandis	1
30	trumpet Tree	Tabebuia Rosea	1
31	blackberry	Syzygium Cumini	3
32	Neem Plant	Azadirachta indica	3
33	pink mahogany	Guarea Meliaceae	1
34	False Ashoka tree	Monoon Longifolium	1

**Table 7-2: List of Plants/Trees in the playground**

## 7.2. Measures Implemented for Green Campus Management

- Planting saplings on regular basis during environment day, and other event days as well
- Botanical Garden in-front of Botany Lab
- Dedicated staff members have been deputed for this activity and support of trust members is also extended
- The college campus has well maintained garden / plantations

## 7.3. Recommendations

- Encouraging students to recommend creative ideas for making campus green
- Conducting competition among departments to promote students ideas in sustainability initiatives

## 8. ENVIRONMENT AUDIT

### 8.1. Facility Description

#### 8.1.1. Carbon footprint Analysis

To analysis the carbon footprint, transportation details of students and staff are collected as below:

- Percentage of staff using transport services provided by college: Transport service facility not available
- Percentage of students using transport services provided by college: Transport service facility not available
- Percentage of Staff using public transport: 30%
- Percentage of Staff using Bike: 65%
- Percentage of Staff using Car: 5%
- Percentage of students using Public transport: 80%
- Percentage of students using Car: 0%
- Percentage of students using Bike: 15%
- Percentage of students using Bicycles: 5%

Average Diesel consumption per month for DG set is approximated as 20 liters / per month. Sometimes diesel consumption may go up to 100 liters /month when there are more power cuts (depends on electricity supply). Due to pandemic the cafeteria is in closed for past one and half year.

In order to reduce the usage of fuel, college has taken initiative to create awareness among students and staff, the same is shown in the figure 8-1.



Figure 8-1: Save fuel sign board

## 8.1.2. Air Quality Index

Air Quality Forecasting - also referred as 'Atmospheric Dispersion Modeling' is the art of simulating how air pollutants (ex: PM2.5 or Ozone) disperse in the ambient atmosphere. The result of the simulation gives the ambient concentration for each air pollutants, from which the Air Quality Index (AQI) can be calculated.

AQI levels and its impact on the environment and the people's health can be observed from the figure 8-2 (aqicn.org). AQI near the campus is as shown in the figure 8-3. (National Air Quality Index – CPCB (<https://app.cpcbcr.com>))

AQI	Air Pollution Level	Health Implications	Cautionary Statement (for PM2.5)
0 - 50	Good	Air quality is considered satisfactory, and air pollution poses little or no risk	None
51 -100	Moderate	Air quality is acceptable; however, for some pollutants there may be a moderate health concern for a very small number of people who are unusually sensitive to air pollution.	Active children and adults, and people with respiratory disease, such as asthma, should limit prolonged outdoor exertion.
101-150	Unhealthy for Sensitive Groups	Members of sensitive groups may experience health effects. The general public is not likely to be affected.	Active children and adults, and people with respiratory disease, such as asthma, should limit prolonged outdoor exertion.
151-200	Unhealthy	Everyone may begin to experience health effects; members of sensitive groups may experience more serious health effects	Active children and adults, and people with respiratory disease, such as asthma, should avoid prolonged outdoor exertion; everyone else, especially children, should limit prolonged outdoor exertion
201-300	Very Unhealthy	Health warnings of emergency conditions. The entire population is more likely to be affected.	Active children and adults, and people with respiratory disease, such as asthma, should avoid all outdoor exertion; everyone else, especially children, should limit outdoor exertion.
300+	Hazardous	Health alert: everyone may experience more serious health effects	Everyone should avoid all outdoor exertion

Figure 8-2: AQI levels

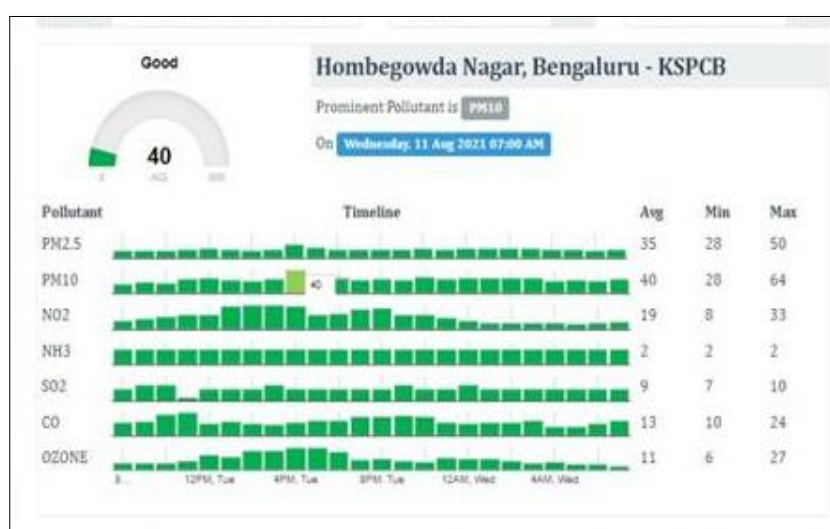


Figure 8-3: AQI near the campus

During the study, there was continuous interaction between the audit team, college engineers and staff members to ensure that the suggestions made are realistic, practical and implementable.

## **8.2. Measures Implemented for Environment Management**

- Restriction of movement of vehicles inside the campus
- Creating awareness campaigns on Environment Conservation
- Conducting seminars on pollution and its impact to environment
- Awareness campaigns on avoiding use of plastics

## **8.3. Recommendations**

- Provision of charging stations for electric vehicles
- Create awareness among students and staffs about electric vehicles



## **EEELLP ACKNOWLEDGEMENT**

EEELLP Team thanks the Management of **Acharya Patashala Educational Trust and Acharya Patashala College of Arts and Science, Narasimha Raja Colony, Bengaluru** for assigning this interesting work to us. We appreciate the cooperation extended to our team during the entire process.

Our special thanks are due to Principal – Dr. B Jayashree & Team of colleagues for giving us necessary inputs to carry out this very vital exercise.

We are also thankful to Lt. Dr. Loksha. A. Assistant Professor, Department of Economics for his continuous support during the entire exercise. We would like to thank the Head of Department and staff members who were actively involved while collecting the data and conducting field measurements.

For Eco Energime Engineers LLP

  
Authorized Signatory



## DISCLAIMER

The audit team has prepared this report for **Acharya Patashala College of Arts and Science, Narasimha Raja Colony Bengaluru** based on input data submitted by the representatives of College complemented with the best judgment capacity of the expert team.

While all reasonable care has been taken in its preparation, details contained in this report have been compiled in good faith based on information gathered.

It is further informed that the recommendations are arrived following best judgments and no representation, warranty or undertaking, express or implied is made and no responsibility is accepted by Audit Team in this report or for any direct or consequential loss arising from any use of the information, statements or forecasts in the report.

For Eco Energime Engineers LLP

  
Authorized Signatory



## 9. ANNEXURES

### 9.1. Data Collection Questionnaire

Questionnaire is a checklist used as the primary tool for collection of data / information in a systematic manner that enables to perform the audit.

#### A. General information of the college:

General information of the college includes address of college and head office, contact person details, year of establishment etc., as given in table 9-1.

S. No.	Description	Details
1.	Name of the College and address:	
1.a	Head office address :	
2.	Telephone/Fax No	
3.	Co-ordinating officer:	Name: Mob: Email:
4.	Year of Establishment:	
5.	Hostel (Available/Not Available)	
6.	No. of Working days/year	
7.	Brief description of Campus	

**Table 9-1: General information of the college- Questionnaire**

## B. Energy consumption details

The energy consumption details required for the audit is collected, brief format of the same is given in table 9-2.

S. No.	Type	Units	Value	Cost, Rs.
1	Electricity	kWh	2020	
			2021	
2	LPG	Cylinders		
3	Diesel	Litres		
4	Others (Please specify)			
5	Total connected load	kW		
6	Contract demand	kVA		
7	Maximum demand recorded	kVA		
8	Average power factor			
9	Energy charges	Rs./kWh		
10	Demand charges	Rs./kVA		

**Table 9-2: Energy consumption details - Questionnaire**

## C. Electrical Equipment details:

Table 9-3 indicates the electrical equipment details required for the analysis.

S. No.	Description	Details	
1.	Number of Transformers Installed	Nos.	
2.	Number of Electrical Panels / Electrical Panel Rooms	Nos.	
3.	Whether Diesel Generator Set Backup Power is Available	Yes / No	
4..	How many number of DG Sets available in the campus (If S.No.9 is Yes)	Nos.	
5.	Whether UPS is available for labs, computers and/or any equipment	Yes / No	
6.	Number of UPS installed with location and capacity (If S.No.11 is Yes)	Nos.	
7.	Whether Capacitor Banks is installed in the electrical panel rooms	Yes / No	
14.	Whether Air Conditioning Units have been installed in the campus	Yes / No	
15.	Type of AC units (split, cassette or packaged) available, capacity and installed location (If S.No.14 is Yes)	Nos.	
16.	Total number of computers available in the campus	Nos.	
17.	Type of computer monitors available (CRT, LCD, LED)	Nos.	

18.	Whether water coolers are installed in the academic blocks	Yes/No	
19.	Type of lamps (Fluorescent Tube Light, CFL, LED, Incandescent, Sodium / Mercury lamps, etc.) installed in the campus	Nos.	
20.	Type of fans (ceiling, wall mount, standing, exhaust, etc.) installed in the campus	Nos.	
21.	Whether exhaust fans are installed in hostel / kitchen.(If Yes, share the quantity and installed location)	Yes /No	
22.	Any other electrical equipment's in college buildings.		

**Table 9-3: List of Electrical equipment - Questionnaire**

**D. Additional infrastructure details:**

Availability of hostel, lift, solar PV based power generation; laundry, and gym etc., details are collected as per the format given in table 9-4.

S. No.	Description	Details	
1.	Number of blocks available for boys hostel	Nos.	
2.	Number of rooms available for boys hostel	Nos.	
3.	Number of blocks available for girls hostel	Nos.	
4.	Number of rooms available for girls hostel	Nos.	
5.	Whether Laundry is available in the hostel	Yes / No	
6.	Whether gym/ indoor sports hall is available in hostel	Yes / No	
7.	Whether Solar PV based Power Generation is available in campus (academic or hostel block)	Yes / No	
8.	Whether lifts available in academic block	Yes / No	
9.	Whether Kitchen is available in the academic block	Yes / No	
10.	Whether any food counter (outside caterers) available in academic block	Yes / No	
11.	Whether any commercial shops available in academic block	Yes / No	
12.	Any more information or additional details of academic block you would like to share – kindly elaborate here		

**Table 9-4: Additional infrastructure details - Questionnaire**

### E. Water management details:

Water conservation and management analysis requires the details of water usage inside the campus. Table 9-5 indicates the required information that includes total water pumps used, underground tanks, STP systems, etc.

S. No.	Description	Details	
1.	How many numbers of pumps available (water pumps and bore-well pumps)	Nos.	
2.	How many number of underground tanks are available		
3.	How many number of overhead tanks are available		
4.	Whether Sewage Treatment Plant (STP) is available	Yes / No	
5.	List of equipment installed in STP (If S.No.12 is Yes)		
6.	Whether Solar Hot Water System is available in the campus (academic or hostel block)	Yes / No	
7.	Whether Rain Water Harvesting System is available in the campus (academic or hostel block)	Yes / No	
8.	Whether RO water treatment plant is available in the campus (academic or hostel block)	Yes / No	
9.	Whether water coolers are installed in the hostel blocks	Yes/No	

**Table 9-5: Water management details - Questionnaire**

#### F. Waste management details:

Waste management includes the activities and actions required to manage waste from its inception to its final disposal. The various data/ information required for assessment of waste management is as tabulated in table 9-6, table 9-7, and table 9-8 respectively.

<b>Types of waste generated :</b>			
<b>S. No.</b>	<b>Description</b>	<b>Yes / No</b>	<b>Remarks</b>
1	E-Waste (Computers, electrical and electronic parts)		
2	Hazardous / Chemical Waste		
3	Solid Waste (Damaged furniture, paper waste, paper plates)		
4	Dry Leaves		
5	Food Waste		
6	Waste Water (Washing, toilets, bathrooms)		
7	Glass Waste (Broken glass wares from the labs)		
8	Unused Materials		
9	Plastic Waste (Pen, Refill, Plastic water bottles and other plastic containers, wrappers etc)		

**Table 9-6: Types of waste generated - Questionnaire**

<b>Segregation of waste generated :</b>					
<b>S. No.</b>	<b>Location</b>	<b>Bio-degradable</b>	<b>Non-Biodegradable</b>	<b>E-waste</b>	<b>Quantity, kgs</b>
1	Office				
2	Labs				
3	Cafeteria / Kitchen				
4	College				

**Table 9-7: Segregation of waste - Questionnaire**

<b>Waste disposal methods:</b>			
<b>S. No.</b>	<b>Description</b>	<b>Yes / No</b>	<b>Remarks</b>
1	Composting / Vermicomposting		
2	Recycling		
3	Reusing		
4	Other ways		

**Table 9-8: Waste Disposal methods - Questionnaire**

### G. Green campus management details:

The green cover of the campus is evaluated during the study. The data required for the green cover evaluation is collected as per the format given in table 9-9.

S. No.	Common/Local Name	Scientific name	No. of Trees/Plants

**Table 9-9: List of plants/trees in campus - Questionnaire**

### H. Environment (Carbon footprint) management details:

The carbon emission from various activities such as transport, diesel generator usage, LPG consumption and electricity consumption were collected, as per the details given below.

1. Whether college provides transport facility for staff and students ( Yes/No)
2. Number (or Percentage) of staff using transport services provided by college
3. Number (or Percentage) of students using transport services provided by college
4. Number (or Percentage) of Staff using public transport
5. Number (or Percentage) of Staff using Bike
6. Number (or Percentage) of Staff using Car
7. Number (or Percentage) of students using Public transport
8. Number (or Percentage) of students using Car
9. Number (or Percentage) of students using Bike
10. Number (or Percentage) of students using Bicycles
11. Average consumption of diesel per month
12. Average electricity consumption per month
13. Average LPG consumption per month

### I. Criterion VII of NAAC accreditation process – 7.1.2 Section: Environmental Consciousness and Sustainability

1. Whether the Institution has facilities for alternate sources of energy and energy conservation measures like
  - a. Solar energy
  - b. Biogas plant
  - c. Wheeling to the Grid
  - d. Sensor-based energy conservation
  - e. Use of LED bulbs/ power efficient equipment
2. Describe the facilities in the Institution for the management of the following types of degradable and non-degradable waste (within 500 words)

- a. Solid waste management
- b. Liquid waste management
- c. Biomedical waste management
- d. E-waste management
- e. Waste recycling system
- f. Hazardous chemicals and radioactive waste management

Provide web link to

- g. Relevant documents like agreements/MoUs with Government and other approved agencies
- h. Geo-tagged photographs of the facilities
- i. Any other relevant information

3. Describe the water conservation facilities available in the Institution

- a. Rain water harvesting
- b. Borewell /Open well recharge
- c. Construction of tanks and bunds
- d. Waste water recycling
- e. Maintenance of water bodies and distribution system in the campus

4. Whether Green campus initiatives include:

The institutional initiatives for greening the campus are as follows:

- a. Restricted entry of automobiles
- b. Battery-powered vehicles
- c. Pedestrian-friendly pathways
- d. Ban on the use of Plastics
- e. Landscaping with trees and plants

5. Whether Quality audits on environment and energy regularly undertaken by the Institution;

The institutional environment and energy initiatives are confirmed through the following

- a. Quality Audit
- b. Energy audit
- c. Environment audit
- d. Clean and green campus recognitions / awards
- e. Beyond the campus environmental promotion activities

6. Whether the Institution has disabled-friendly, barrier free environment

- a. Built environment with ramps/lifts for easy access to classrooms.
- b. Disabled-friendly washrooms
- c. Signage including tactile path, lights, display boards and signposts