



Bapuji Educational Association®

BAPUJI INSTITUTE OF ENGINEERING AND TECHNOLOGY, DAVANGERE-577 004

Department of Electronics & Communication Engineering

Bapuji Educational Association ®

Bapuji Institute of Engineering and Technology Davangere-577004

Department of Electronics & Communication Engineering



Green & Eco-Friendly Campus Initiatives

March 2024 to March 2025

Staff Coordinator

Dr. Leela G H

Professor & Dean Admission

Smt. Bhagya Shanthakumar

Asst. Professor

Dr. G S Sunitha

Program Coordinator

Student Coordinators

Akshatha C S	4BD23EC006
Mallikarjun C V	4BD23EC055
Krutika S K	4BD22EC050
Lakshmi V Karade	4BD22EC053
Darshan R M	4BD21EC025
Deeksha V Nyamthi	4BD21EC0028



Department of Electronics & Communication Engineering
Certificate

This is to certify that the Green & Eco-Friendly Campus initiatives documented in this report have been genuinely undertaken by the Department of Electronics & Communication Engineering during the academic year 2024-25 and are submitted for AICTE compliance.

for 
Dr. G S Sunitha
Program Coordinator

We hereby declare that the information provided in this report is true, accurate, and supported by verifiable documentary evidence.

Dr. Leela G H

Professor & Dean Admission

Dept. of E&CE



Smt. Bhagya Shanthakumar

Asst. Professor

Dept. of E&CE



INTRODUCTION

The Department of Electronics & Communication Engineering at Bapuji Institute of Engineering & Technology, Davangere, is dedicated to providing quality technical education while fostering professional ethics and sustainable development. With experienced faculty, well-equipped laboratories, and active student involvement, the department integrates core chemical engineering education with environmental awareness and social responsibility. Sustainability and green practices are actively promoted through initiatives such as tree plantation drives, awareness on organic farming, and adoption of eco-friendly practices, which help inculcate environmental consciousness among students and staff. These initiatives align closely with the AICTE Green Campus objectives, emphasizing resource conservation, biodiversity enhancement, and the creation of an environmentally responsible academic environment, thereby reinforcing the department's commitment to sustainable development and AICTE compliance



Green Campus Initiatives

"**Going green**" means to pursue knowledge and practices that can lead to more environmental friendly and ecologically responsible decisions and lifestyles, which can help to protect the environment and sustain its natural resources for current and future generations. **Going green** saves us from toxic products and environmental pollution. This helps us to live a healthier lifestyle which eventually increases our productivity both at the workplace and at home.

Green Campus is something that merely means a "campus with low environmental impact". It is all about sweeping away wasteful inefficiencies and using conventional sources of energies for its daily power needs, correct disposal handling, purchase of environment friendly supplies and effective recycling program.

Initiatives taken in the Department

- Students are motivated to
 1. Take part in paper presentation on green practices.
 2. Select the projects on waste management and utilization of natural resources.
- Department is adhered to the following
 1. Send documents and invitations electronically.
 2. Edit, spell, and grammar check on screen.
 3. Design document/shrink images to minimize paper consumption (e.g. set default margins to .75" on all sides (or less!)).
 4. Think before printing, "is it really necessary?"
 5. Always print double - sided.
 6. Save one - sided leftovers for scrap, or to print drafts on.
 7. Turn off monitors when away from the computer.
 8. Always turn off lights and fans when not in use.
 9. Turn off unnecessary lights and use daylight instead.
 10. Take the stairs instead of an elevator.
 11. Usage of dust bins in classrooms and laboratories to keep department clean.



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Department of Electronics & Communication Engineering

Plantation

In view of Hon. Secretary Dr. Shamanur Shivashankarappa's 94th Birthday celebration, the Plantation has been arranged on 14-06-2024 in BIET Campus for all the teaching and nonteaching staff members.



Plantation at BIET campus by EC staff

Keeping the spirit of Vanamahotsava drive with the on going tree plantation drive all across the country, a tree plantation program was held by 3rd Semester Students in BIET college on 27-11-2024.



Plantation at BIET campus by EC students



Adoption of tree

3rd Semester students gained knowledge about different trees such as mango, Neem, Gul Mohar, Fern tree etc., around the campus on 30-08-2024



Adoption of tree by 3rd Semester students



Department of Electronics & Communication Engineering

Heritage Walk and Crafts Corner

Heritage tour, knowing the history and culture of the city, maintaining the environment clean, connecting to people around through their history, knowing the city and its craftsman, photo blog and documentary on evolution and practice of various craft forms. On 06th December 2024, students of 3rd semester visited Harihareshwara temple in Harihara and Santebennur Pushkarni as part of the SCR activity for heritage .



Santebennur Pushkarni



Harihareshwara Temple, Harihar



Water Conservation

During the visit to Shanthi Sagara (Sulekere) in Davangere district, Students of 3rd semester learned about the importance of large water bodies in maintaining ecological balance and supporting nearby communities. The lake plays a major role in irrigation, drinking water supply, and groundwater recharge. Local experts explained various water conservation practices such as desilting, afforestation around the lake, and controlled water usage for agriculture. Students also understood how to maintain such tanks helps to prevent droughts, supports biodiversity, and ensures sustainable water management for future generations. This visit gave the valuable insights into the traditional methods of water storage and their relevance in today's world of increasing water scarcity.



Visit to Shanthi Sagara



5G TECHNOLOGY IN PRECISION AGRICULTURE

Guide: Mrs. SUMAN B.S

SIDDESH B.C 4BD20EC069

ABSTRACT: The rapid advancement of technology has transformed traditional agriculture into a modern, data-driven industry known as smart farming or precision agriculture. One of the key enablers of this transformation is the fifth-generation (5G) wireless network technology. Agriculture is the main source of survival for all living beings on Earth. The contributions of 5G technology to smart farming, emphasizing high-speed connectivity in rural areas, low latency for real-time data processing, and extensive coverage for IOT devices. The challenges facing the agriculture sector, including the need to meet the growing global food demand, resource scarcity, climate change, and labor shortages. It explores how smart farming technologies, driven by 5G, can mitigate these challenges by optimizing resource usage, reducing waste, and enhancing productivity.

FROM INDUSTRY 4.0 TO AGRICULTURE 4.0

Guide: Dr. Pavan Kumar D

ARUN KULKARNI 4BD20EC012

ABSTRACT: The increasing interest in smart agriculture is fueled by the convergence of affordable IoT based wireless sensors, the recent rise in Artificial Intelligence (AI), blockchain, and machine learning. This powerful combination enables for precise resource management, curbing water usage, reducing reliance on harmful pesticides, and enhancing overall agricultural efficiency. Despite the promises of Agriculture 4.0, the Fourth Industrial Revolution faces technical challenges such as the implementation of distributed ledger technologies in blockchain for secure data sharing, optimizing machine learning algorithms for real-time decision-making in dynamic agricultural environments, and ensuring the interoperability of diverse IoT devices, creating a complex ecosystem. This technical seminar report delves into the details of recent technologies, exposing their collaborative potential to revolutionize agriculture. It investigates the fusion of IoT-based wireless sensors, AI, and machine learning, unveiling

a transformative landscape. The exploration extends to the pivotal role of big data in precision agriculture, highlighting its analytical prowess in facilitating precise decision-making. Amid the emergence of Agriculture 4.0, the report scrutinizes the gradual transformation, identifying key technical challenges and proposing solutions. It elucidates how the intercommunication of recent technologies enhances agricultural efficiency, providing insights to overcome these technical hurdles in this progressive paradigm shift.

SOLAR AND WIND POWERED ELECTRIC VEHICLE

Guide: Dr. Prakash K M

Student Name : Navya S USN : 4BD21EC423

ABSTRACT: This paper discusses about the usage of solar energy and wind energy to power up the vehicle. In order to achieve the required voltage, the Photo Voltaic (PV) Module may be connected either in parallel or series, but its costlier. Thus to make it cost effective, power converters and batteries are been used. The electrical charge is consolidated from the PV panel and wind turbine and directed to the output terminals to produce low voltage (Direct Current). An electric vehicle 2/5 pollution free and is efficient at low speed conditions mainly in high traffic areas. But battery charging is time consuming. The charge controllers direct this power acquired from the solar panel and wind turbines to the batteries. According to the state of the battery, the batteries. Accor charging is done, so as to avoid overcharging and deep discharge. The voltage is then boosted up using the boost power converter, ultimately running the BLDC motor which is used as the drive motor for our vehicle application. In the course work, the charact 2/5 features of the components: solar panel, wind turbine, charge controller, battery, interleaved converter, arduino processor and BLDC motor required for the vehicle application were studied in real time and also. were modelled individually and the complete hardware integration of the system into meet up the application's requirement.

NANOTECHNOLOGY IN RENEWABLE ENERGY

Guide: Nirmala S O

Student Name: Sindhu B H USN : 4BD21EC430

ABSTRACT: Nanotechnology ranges from the study of the fundamental physics, biology, chemistry, and other technology of nanometer- scale matters. Recently, nanotechnology has been extended to the renewable energy field. Renewable energy has been defined as energy produced through natural sources that renew more quickly than it is consumed, such as solar energy, wind power, and other renewable energy resources. The growing human population and advances in technology in today's world have resulted in a greater need for energy usage. Nanotechnology applications in renewable energy are expected to solve the energy demand shortage problem. This article intends to introduce some key applications of nanotechnology in renewable energy systems. The main focus has been given to the utilization of nanoparticles in the context of hydrogen production, fabrication of solar cells, Nano composites for energy storage and nanotechnology

for biotechnology. Additionally, the article also discusses the opportunities and problems of nanotechnology applications in the field of renewable energy. With this, the application of nanotechnology in the energy sector is expected to provide efficient and sustainable energy solutions in order to create a low-carbon economy with reduced greenhouse gas emissions

SOLAR POWER TREE

Guide: Nirmala S O

Student Name : Vydurya USN : 4BD20EC089

ABSTRACT: Developing energy efficiencies solutions from sunlight to electricity is a crucial solution for the world's energy shortage and reducing greenhouse gas emissions. However, the typical photovoltaic (PV) flat module has a poor sunlight energy collection capability without a solar tracking system. Despite its advantages, solar PV technology has difficulties with land demand, capturing effectiveness and public image, especially in metropolitan areas due to the lack of pleasant aesthetics. This article presents an overview about the recently modified solar tree technology that can address these challenges efficiently. The main technology configurations, operational aspects and types are deeply presented and discussed. Many innovations and technologies of solar trees are analyzed and several commercial prototypes are discussed. Moreover, the main challenges and limitations that restrict the technology commercialization also highlighted in comparison with the traditional PV systems along with some remarks for future incomers. Analyzed studies show that solar tree technology is a good energy conversion method as it need only 1% land compared with traditional PV systems to produce power as more as 10%. Besides, this technology could efficiently collect off-peak sunshine and reflect light, and thus, create greater solar fraction.

Projects carried out by Students

Lora Based Hybrid Power Generation System

Project Guide : Mrs. Swetha B

Name	USN
K A Lakshmi	4BD20EC042
Kavya I K	4BD20EC047
Ramya D I	4BD20EC077
Mallikarjun H	4BD21EC408

Abstract: This project involves the design, installation, and commissioning of a Hybrid Power Generation System that integrates solar energy and wind energy to provide a sustainable and reliable power solution. The system is designed to deliver energy through a combination of solar panels, a wind turbine, and battery storage. The system uses a 12V battery bank for efficient energy storage and is equipped with an energy management system (EMS) to optimize the use of available renewable resources. Key components include solar panels, a wind turbine, MPPT charge controllers, a DC to AC inverter, and real-time monitoring equipment for voltage, current, and load. The hybrid system ensures that power is continuously available, even when one energy source (solar or wind) is unavailable, by storing excess energy for later use. The EMS prioritizes energy storage and discharging based on available power from the solar and wind sources, ensuring the battery is charged efficiently. Additionally, the system features overvoltage protection to safeguard components and prevent damage from power surges. The project also includes the integration of monitoring tools that allow users to track real-time energy generation, storage, and consumption. The system provides an environmentally friendly solution to energy needs, with the capability to supply power for residential or small commercial applications. The hybrid approach offers increased reliability and efficiency, combining solar and wind energy for uninterrupted power supply. With the inclusion of monitoring and protection systems, the project delivers a comprehensive solution to sustainable energy management, promoting both energy independence and environmental sustainability.

Air Quality Monitoring and Billing System for Industries

Project Guide : Mrs. Swetha B

Name	USN
Abdul Khadar Jilani	4BD20EC03
Nikita s suryawanshi	4BD20EC60
Ankita R	4BD20EC10
Aaliya khan	4BD21EC02

Abstract: Industries are major contributors to air pollution, emitting hazardous gases and particulate matter that significantly impact environmental and public health. Traditional air quality monitoring systems are often manual, reactive, and lack transparency in enforcing emission norms. To address this issue, our project proposes an IoT-based Air Quality Monitoring and Billing System tailored specifically

for industrial applications. The system utilizes a network of sensors to continuously monitor key air pollutants such as CO₂, CO, NO_x, SO₂, PM_{2.5}, and PM₁₀ in real-time. The collected data is processed using a microcontroller and transmitted to a cloud-based platform for storage, analysis, and visualization. The innovation lies in integrating a billing mechanism based on pollutant thresholds defined by environmental standards. If the emissions exceed permissible limits, industries are automatically billed based on the severity and duration of the violation. The system ensures regulatory compliance by providing authorities with live monitoring access and historical data reports for auditing purposes. This approach not only encourages industries to control emissions but also promotes accountability and sustainability through transparent data logging and penalty-based incentives.

Solar Powered Smart Grass Cutter

Project Guide: Dr. Prakash K M

Name	USN
Nisarga B. K	4BD20EC061
Pavithra S. A	4BD20EC067
Adifa Hussain	4BD20EC401

Abstract: The solar-powered smart grass cutter is an eco-friendly and efficient solution for automated lawn maintenance. It utilizes solar energy as a primary power source, eliminating the need for conventional electricity or fuel, thereby reducing carbon emissions. Equipped with sensors and microcontrollers, the system can detect obstacles, navigate autonomously, and adjust its cutting mechanism for optimal performance. This smart cutter is designed to operate independently, requiring minimal human intervention, and is ideal for residential and small-scale agricultural use. Its integration of renewable energy and automation ensures sustainability, cost-effectiveness, and convenience.

Smart Aquaphonic Fish Tank using IoT

Project Guide: Dr. Nirmala S O

Name	USN
Vishal S B	4BD20EC114
Vikas H H	4BD20EC113
Tejashwini T	4BD20EC107
Yasha M	4BD21EC116

Abstract: This project focuses on designing and developing a Smart Aquaponic Fish Tank system utilizing ESP32-WROOM and a variety of sensors for real-time monitoring and automation. The system integrates pH, temperature, turbidity, and water level sensors to ensure optimal water quality for fish and plant growth. A servo motor is employed for automatic fish feeding, and an oxygen machine is controlled via the ESP32 for dissolved oxygen management. Sensor data is displayed on

an LCD screen cycling every 5 seconds and sent to ThingSpeak for remote monitoring. Additionally, water level alerts are sent to the owner to ensure timely maintenance. This automated aquaponic system combines sustainability with smart farming through embedded IoT technology.

Development of Dynamo-Solar Powered E-Bicycle

Project Guide: Dr . Leela G H

Name	USN
Deekshitha G A	4BD21EC029
Salma Faiza	4BD21EC087
Smitha K M	4BD21EC101
Soujanya Patil	4BD21EC103

Abstract: In present scenario a solar and dynamo power driven hybrid bicycle will help to solve the major problems of fuel prices, especially the petrol is rising steadily day by day. Again, the pollution due to vehicles in metro cities and urban areas is increasing continuously. To overcome these problems, an effort is being made to research some other alternative sources of energy to drive the Bicycle. Again, it is also not affordable to purchase vehicles (mopeds, scooters or motorcycles) for all the class of society. Keeping this in mind, a search for some way to cater these economically poor people as well as to provide a solution for the environmental pollution was in progress. The solar and dynamo assisted hybrid bicycle is driven by direct current motor fitted in the front axle housing and run on electrical energy. The solar panels mounted on the carriage will charge the battery and which in turn drive the hub motor. When the bicycle is idle or stationary in parking, the solar panel will charge the battery and a pair of 48-volt dynamo fixed on the rear wheel of the bicycle will charge the battery when the bicycle is running on the road. This arrangement will replace the petrol engine, the gear box and the fuel tank in case of a two- wheeler or a gear shifting arrangement of a bicycle.

Outcome & Impact

The green initiatives implemented by the Department of Electronics & Communication Engineering have resulted in significant environmental, educational, and social benefits. Regular tree plantation activities have contributed to increased green cover on the campus, improving air quality, and creating a healthier and more sustainable learning environment. These initiatives have also played an important educational role by actively engaging students and faculty in eco-friendly practices, thereby enhancing environmental awareness and reinforcing the importance of sustainability in engineering education. Participation in activities such as plantation drives and exposure to sustainable agricultural practices has fostered a strong sense of social responsibility and environmental stewardship among students. Measurable outcomes of the initiative include successful organization of multiple green activities with broad participation from students of different academic years and faculty members, along with the visible growth and maintenance of planted saplings within the campus, demonstrating effective implementation and alignment with AICTE Green Campus objectives.

Summary of Green Initiatives

Sl. No	Initiative	Date	Theme	Name of Participants (Students and faculties)	Key Outcome
1	Plantation	14-06-2024 & 27-11-2024	Green Earth, Clean Future	3 rd Semester students and staff	Enhancement of green cover in the campus
2	Adoption of tree	30-08-2024	Nurturing Nature Through Adoption	3 rd Semester students and staff	Awareness about sustainable environmental practices
3	Heritage Walk and Crafts Corner	06-12-2024	Celebrating Cultural Heritage and Indigenous Crafts	3 rd Semester students and staff	responsibility towards nature and sustainable development
4	Water Conservation	06-12-2024	Conserve Water, Preserve the Future	3 rd Semester students and staff	awareness about the importance of water conservation and sustainable usage.
5	Seminars	2024_25	Eco-Innovation for Environmental Protection	Final year students	Enhanced awareness of environmental issues and sustainable development practices.
6	Projects	2024_25	Eco-Innovation for Environmental Protection	Final year students	Enhanced awareness of environmental issues and sustainable development practices.