URJA 2024

e - Magazine

Year 2023-24

IPS Academy
Institute of Engineering & Science
(A UGC Autonomous Institute, Affiliated to RGPV)

Editorial Board

Student Co-Ordinator
Ashi Sharma, 3rd year
Hardik Joshi, 3rd year

Faculty Co-Ordinator
Hemant Mehar, Asst Prof, EEE

Department of Electrical & Electronics Engineering

Department Vision

The vision of the Electrical and Electronics Engineering is to prepare students to compete globally in their profession, in order to reach the highest level of intellectual attainment and making significant contribution to society.

Department Mission

1. To become an internationally leading Electrical and Electronics Engineering department for higher learning and be self-reliant.

2. To build upon the culture and values of universal science and contemporary education through understanding of Electrical and Electronics Engineering.

3. To be a centre of research and education generating knowledge and technologies, this lay groundwork in shaping the future in the fields of Electrical and Electronics Engineering.

4. To develop partnership with industrial, R&D and government agencies and actively participate in conferences, technical and community activities.

About Department

Electrical Engineers are the backbone of any country. They provide power for industrial & domestic needs. The department of Electrical & Electronics Engineering was established in the year 2003. B.E. (Electrical & Electronics Engineering) is focus on Electrical Machines, Control System, Power System, and Network Analysis. Recently the rapid advance in Semiconductors technology and its application in electrical industry, the branch has introduced adequate number electronics subject like Micro Controller & its Interfacing, Power Semiconductor devices, Power Semiconductor drives, DSP, Advance Communication, Analog and Digital Communication etc. With the emphasis on above areas, the student will acquire analytic and practical skills and hence can serve better in industrial, services and research organizational set ups. The Various laboratories in the department are Basic Electrical Engineering, Electrical Instrumentation, Network Analysis, Electrical Machine, Power System & Protection, Power / Industrial Electronics, Control System, Electronic Devices & Circuits, Microcontroller & Interfacing, Software & Simulation Digital Electronics & Logic Design.

Courses Offered

1. B. Tech. (UG Program) in Electrical & Electronics Engineering

2. M. Tech (PG Program) with specialization in Power Electronics

Department Program Education Objective

PEO 1 *Education in the fundamental sciences and mathematics that underlie Electrical and electronics engineering with a general breadth and depth in Electrical and electronics engineering analysis and design.*

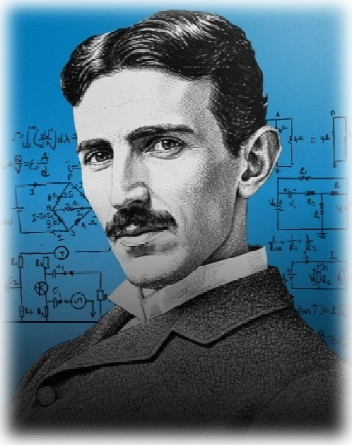
PEO 2 *Awareness of current technology and the fundamental background to be able to stay informed and adept at new technologies in Electrical and electronics engineering and to pursue higher studies*

PEO 3 *The ability to put ideas into practice through effective analysis & problem solving for various Electrical and electronics engineering applications*

PEO 4 *A broad awareness of the world around them through general education so they are prepared to achieve their potential and make contributions in their Electrical and electronics engineering fields.*

PEO 5 *The foundation of communications and teamwork skills and professional attitudes and ethics Scientist of the Quarter*

Nikola Tesla: The Visionary Inventor Ahead of His Time



Nikola Tesla, born in 1856 in Croatia (then part of the Austro-Hungarian Empire) and later naturalized as an American citizen, is celebrated as one of the greatest inventors and visionaries in history. His experiments and inventions in electricity and electromagnetism not only revolutionized technology but also paved the way for many modern innovations.

Early Life and Passion for Invention

From a young age, Tesla showed a remarkable ability to visualize and understand complex ideas. He studied engineering in Austria and later worked for telegraph and telephone companies, where he honed his skills in electrical engineering.

Key Experiments and Inventions

Alternating Current (AC) System: Tesla's most significant contribution was the development and promotion of alternating current (AC) electricity. He invented the AC induction motor and transformer, which allowed electricity to be transmitted over long distances efficiently. This AC system became the basis for modern electrical power distribution.

Tesla Coil: In his experiments with high-frequency currents, Tesla invented the Tesla coil. This device is still used today in radio technology and wireless transmission.

Wireless Transmission of Power: Tesla envisioned a world where electricity could be transmitted wirelessly. He conducted experiments with wireless power transmission and demonstrated the concept of resonant inductive coupling.

Radio and Remote Control: Tesla made pioneering contributions to the development of radio technology. His work laid the foundation for wireless communication and remote-control systems.

Legacy and Impact

Despite facing challenges and financial difficulties throughout his career, Tesla's ideas and inventions profoundly influenced the fields of electrical engineering, physics, and technology. His contributions to AC power systems, electromagnetism, and wireless communication continue to shape our modern world.

Visionary and Innovator

Tesla was not only an inventor but also a visionary. He imagined technologies far ahead of his time, such as wireless communication, renewable energy sources, and robotics. His futuristic ideas continue to inspire scientists, engineers, and inventors to explore new frontiers in technology.

Nikola Tesla's life story is a testament to creativity, perseverance, and the power of imagination. His relentless pursuit of innovative solutions to complex problems has left an enduring legacy in science and technology. Tesla's vision for a world powered by clean energy and connected through wireless communication remains relevant today, reminding us of the endless possibilities that lie ahead through innovation and exploration.

Students placed On Campus in Session 2023-24

Priyanshi Pal
Greens Power Equipment India Pvt. Limited
4.2 Lac

Mahima Choudhary
Capgemini Technology Services India Limited
4 Lac

Aashutosh Walke
Adani Enterprises Limited
6.5 Lac
Techture Structures Pvt.Limited
4 Lac

Shivank Tiwari
Techture Structures Pvt.Limited
4 Lac

Bharat Padiyar
Techture Structures Pvt.Limited
4 Lac

Result of the Department

2020-24 Batch				
Top 5 Students				
S. No	**Roll No.**	**Name of student**	**SGPA**	**CGPA**
1	0808EX201011	Priyanshi Pal	9.06	9.37
2	0808EX201008	Mahima Choudhary	9.06	9.04
3	0808EX213D01	Aashutosh Walke	8.63	8.85
4	0808EX201006	Jai Singh	8.63	8.78
5	0808EX201012	Shivank Tiwari	8.25	8.57

Unlocking Photovoltaics: Harnessing Solar Energy for a Sustainable Future

Introduction

In the quest for renewable energy sources to combat climate change and reduce dependence on fossil fuels, photovoltaic (PV) technology has emerged as a game-changer. Photovoltaics, commonly known as solar panels, convert sunlight directly into electricity, offering a clean and sustainable energy solution. As advancements in PV technology continue to accelerate, the potential for unlocking its full capabilities grows brighter than ever before.Solar energy has experienced remarkable growth in recent decades, driven by declining costs, technological advancements, and environmental concerns. PV installations have proliferated globally, from residential rooftops to massive utility-scale solar farms. This surge in solar capacity has been instrumental in diversifying the energy mix and reducing carbon emissions.

Technological Innovations

Efficiency Improvements: Researchers and engineers are constantly enhancing PV cell efficiency, maximizing the conversion of sunlight into electricity. Innovations in materials, such as perovskite solar cells, promise even higher efficiencies and lower manufacturing costs.

Energy Storage Solutions: Integrating energy storage systems with PV installations enables solar energy to be stored and used during periods of low sunlight or high demand. Batteries and other storage technologies are key to enhancing the reliability and stability of solar power.

Flexible and Transparent PV: Advancements in flexible and transparent PV technologies open up new possibilities for integrating solar cells into everyday materials, such as windows, clothing, and even mobile devices. This innovation expands the potential applications of solar energy beyond traditional PV modules.

Overcoming Challenges

Although the cost of solar power has decreased significantly, achieving grid parity (where solar electricity costs are equal to or lower than conventional sources) remains a goal in many regions.Efficiently managing the variability of solar energy and integrating it into existing electrical grids require advanced grid infrastructure and energy management systems.Despite being a clean energy source, the manufacturing and disposal of PV panels involve environmental considerations, such as resource extraction and recycling.

Global Impact and Sustainability

The adoption of photovoltaic technology has profound implications for global sustainability and energy security:Solar energy plays a crucial role in reducing greenhouse gas emissions and mitigating climate change impacts by displacing fossil fuels.PV systems provide access to electricity in remote and off-grid areas, promoting economic development and improving quality of life.

Future Directions

Investing in next-generation PV technologies, energy storage solutions, and grid integration strategies will drive further efficiency improvements and cost reductions.Implementing supportive policies, such as incentives for solar deployment and carbon pricing mechanisms, can accelerate the transition to renewable energy.International collaboration and knowledge exchange are essential for scaling up solar deployment and addressing global energy challenges.

Article by
Jay Singh (0808EX201006)
4th Year, EEE

Students Articles

Next-Gen Battery Technologies: Revolutionizing Energy Storage Systems

Introduction

In the pursuit of sustainable energy solutions, the development of next-generation battery technologies holds immense promise for transforming energy storage systems. From enhancing the efficiency of renewable energy sources to powering electric vehicles and improving grid stability, these advanced batteries are paving the way towards a cleaner and more resilient energy future.Traditional battery technologies, such as lithium-ion batteries, have made significant strides in energy storage capabilities. However, they still face challenges related to cost, energy density, lifespan, and environmental impact. As the demand for energy storage grows with the increasing penetration of renewable energy sources like solar and wind, there is a critical need for batteries that can store more energy, charge faster, last longer, and be manufactured sustainably.

Emerging Technologies and Innovations

Solid-State Batteries: Solid-state batteries replace the liquid electrolyte found in conventional lithium-ion batteries with a solid electrolyte. This technology promises higher energy density, improved safety, longer lifespan, and faster charging rates. Companies and research institutions worldwide are actively developing solid-state batteries for applications ranging from consumer electronics to electric vehicles (EVs) and grid-scale energy storage.

Lithium-Sulphur Batteries: Lithium-sulphur batteries offer higher theoretical energy densities compared to lithium-ion batteries. They use sulphur as the cathode material and can potentially store more energy per unit weight. Research efforts focus on overcoming challenges related to cycle life, rate capability, and the dissolution of polysulfides in the electrolyte.

Flow Batteries: Flow batteries store energy in liquid electrolytes contained in external tanks. They offer scalability and flexibility, making them suitable for large-scale energy storage applications. Recent advancements include improvements in electrolyte chemistry and membrane materials to enhance efficiency and reduce costs.

Metal-Air Batteries: Metal-air batteries use oxygen from the air as one of the battery's reactants, allowing for higher energy densities. Zinc-air and lithium-air batteries are prominent examples being researched for their potential in electric vehicles and grid storage. Challenges include the stability of the electrolyte and the rechargeability of the battery.

Applications and Benefits

Improved energy storage capabilities enable better integration of intermittent renewable energy sources, such as solar and wind power, into the electrical grid. This enhances grid stability and reliability.Higher energy density and faster charging times of advanced batteries contribute to the widespread adoption of electric vehicles, reducing greenhouse gas emissions and dependence on fossil fuels.Flow batteries and other advanced technologies provide cost-effective solutions for storing excess electricity generated during off-peak hours and discharging it during times of high demand, thus supporting a more efficient and resilient grid infrastructure.

Future Outlook and Challenges

Achieving cost parity with conventional technologies is crucial for widespread adoption across different applications.Ensuring the safety and reliability of advanced battery systems under various operating conditions is essential for consumer acceptance and commercial viability.Addressing environmental concerns related to battery manufacturing, resource extraction, and end-of-life recycling is imperative for achieving sustainable energy solutions.

Article by
Shri Ram Pandey (0808EX201013)
4th Year, EEE

Memorable Moments

Industrial Visit

Shree Singaji Thermal Power Plant, Mundi, Dis - Khandwa, Madhya Pradesh

Friday, 27th October 2023

e-Awartan Tech Fest – 2024

e-Awartan is an annual tech- fest organized by department of Electrical & Electronics Engineering, IPS Academy, Institute of Engineering & Science, Indore every year. This event is for one day, in which different competitions like Poster competition, technical quiz and Science Exhibition organized for the students. The main aim behind to conduct this event is to provide a platform to students, to enhance their skills and knowledge. Such type of events is very helpful for students to show their learning in an academic year. Every year, in month of march-April department conduct this event.

e–Awartan 2024

Department of Electrical & Electronics Engineering, IPS Academy, Institute of Engineering & Science, Indore, organized Tech-Fest event e-Awartan 2024.The tech fest was held for one days from 30th April 2024.

Competition under e- Awartan 2024

- *Technical Quiz Competition*

To develop and enhance technical knowledge of students, Department, every year organizes Project Competition in Techfest "e-Awartan". This event provides the student a best platform to showcase their technical knowledge. We always motivate students to participate in these technical activities and provide them platform to express their knowledge related to engineering field.
In the academic Year 2024, event Technical Quiz Competition was held on 30th April 2024
Timing 1:00 – 1:30pm.
Faculty Coordinators: Ms. NamrataNebhnani/Ms.Priya Pal
The event was conducted in online mode via google forms.
Event Duration: 30 minutes.

- *Poster Competition*

To develop and enhance technical knowledge of students, Department, organizes Poster Competition in Techfest "e-Awartan". This event provides the student a best platform to showcase their technical knowledge. We always motivate students to participate in these technical activities and provide them platform to express their knowledge related to engineering field.

In the academic Year 2024, event Poster Competition was held on 30th April 2024
Timing 1:30 – 2:00pm.
Faculty Coordinators: Mohd. Firoz/Mr. Deepesh Bhati
The event was conducted in room No.409, EEE Department IPSA, IES
Event Duration: 30 minutes.

Science Exhibition

The main motive of Science Exhibition is to provide a competitive atmosphere and encourage students to prepare some good projects that will be helpful for the society as well as give an additional support to their education.

Science Exhibition was held on 30th April 2024.Event was started at 02:30 PM.

There was total 21 Models exhibited in this event.

All projects are good and enough technical sound, number of audiences are 91.

The coordinator of Science Exhibition is Dr. Sanjay jain&Dr. Kavita Soni

Abstract of Student Paper Presented at E - Awartan

CHEMICAL EARTHING

Raj Geru, Nikunj Bisani (1st Year/ 2nd Sem)
EEE, IPS Academy, Institute of Engineering and Science, Indore (M.P.)

Abstract

Chemical earthing is maintenance free. The process of transferring the immediate discharge of the electrical energy directly to the earth by the help of the low resistance wire is known as the electrical earthing.. A protective conductor (PE) avoids electric shock hazard by keeping the exposed-conductive surface of connected devices close to earth potential in fault conditions. In the event of a fault, a current is allowed to flow to earth by the earthing system. The earthing system properly installed under the guidance of manufacturers can safely vouch for minimum ten years.

HUMAN FOLLOWING ROBOT

Hemanshu Bhande[1, 3], Sahil Sharma[2], Lokesh Barskar[3] (1st Year/ 2nd Sem)
1. CSE AIML, 2.CSE
IPS Academy, Institute of Engineering and Science, Indore (M.P.)

Abstract

Human following is a technique used by robot and autonomous vehicles to follow a human within a specific range. In this case, communication between the human and the robot is the most significant factor where sensor is needed to ensure its successfulness. This paper discussed a human following robot system that utilized ultrasonic sensor. The data which have been collected from the ultrasonic sensor will then be interfaced with Arduino software. Thus, this paper outlines a set of benchmarks for human following and briefly evaluates its performances.

AN INTRODUCTION TO DC GENERATOR

Shivank tiwari, Kartik patel, Shri ram pandey, Chanchelsh yadhuwanshi (3rd Year/ 6th Sem)
EEE, IPS Academy, Institute of Engineering and Science, Indore (M.P.)

Abstract

This paper presents the modeling and analysis of a dc generator in two different ways. First method is keeping field flux constant and by varying the shaft torque of the generator and second method is keeping shaft torque constant and by varying the field flux of the same generator.

HIGH VOLTAGE DIRECT CURRENT TRANMISSION SYSTEM

Pulkit Gupta, Khushi Nikam, Priyanka Jaiswal (1st Year/ 2nd Sem)
EEE, IPS Academy, Institute of Engineering and Science, Indore (M.P.)

Abstract

Starting with a brief historical perspective on the development of High Voltage Direct Current (HVDC) transmission systems. The underlying technology of HVDC systems, and discusses the HVDC systems from a design, construction, operation and maintenance points of view. The paper then discusses the recent developments in HVDC technologies. The paper also presents an economic and financial comparison of HVDC system with those of an AC system; and provides a brief review of reference installations of HVDC systems. The paper concludes with a brief set of guidelines for choosing HVDC systems in today's electricity system development. Today era electricity industry, in view of the liberalisation and increased effects to conserve the environment, HVDC solutions have become more desirable for the following reasons:

- *Environmental advantages*
- *Economical (cheapest solution)*
- *Asynchronous interconnections*
- *Power flow control*

The initial electricity transmission systems were also direct current systems. were, DC power at low voltage could not be transmitted over long distances, thus giving rise to high voltage alternating current (AC) electrical systems.

INDOOR 3 D NAVIGATION

Lokeshwari Pandya, Bhumika Chouhan (1st Year/ 2nd Sem)
EEE, IPS Academy, Institute of Engineering and Science, Indore (M.P.)

Abstract

This paper is to describe the working of the Indoor 3D Navigation System. This system uses the same trilateration principle as used by modern GPS. Here towers are installed on building imitating satellites around the globe, they provide the position on a 2D plane. There is wi-fi routers with unique IDs installed on every floor. Whichever router detects the strongest signal is used to locate the floor of the building. The data from towers and router is fed to a data processing server which then uses this information to calculate the exact location of the object in the premises. This system allows a visitor to navigate the office premises as well as to locate an employee of the office. This system also allows the employer to track activities of the employees at every instant of time and thus track their productivity.

A REVIEW PAPER ON NETWORKING TOPOLOGIES

Priyanshi Pal, Mahima Choudhary, Aman Masih (3rd Year/ 6th Sem)
EEE, IPS Academy, Institute of Engineering and Science, Indore (M.P.)

Abstract

Topology refers to the process of ordering, arranging, or linking things in a certain way. As a result, network topology refers to the process of organising, arranging, or connecting several devices in a network. The many ways in which devices can be connected to one another are referred to as network topology. These network topologies have been divided into sections depending on how devices are connected and how data flows between them. The topologies of star, ring, hybrid, mesh, tree, and bus are some of the topologies that are utilised in various industries for system layout. The merits and disadvantages of these topologies based on connections and data flow have been explored in this study. This article discusses the importance of network topology. This article discusses the growing demand for these topologies in numerous start-ups and global corporations. It highlights how the future of topologies is bright since every organisation needs to set up a network that must be properly organised, resulting in increased use of network topologies.

STUDY AND ANALYSIS OF PHOTO VOLTAIC ENERGY ECONOMICS FOR A SPECIFIC INDUSTRY

Jai singh, Vishal choudhary, Imran sheikh (3rd Year/ 6th Sem)
EEE, IPS Academy, Institute of Engineering and Science, Indore (M.P.)

Abstract

This Project has the vision to make Universal Transformer, Indore vitality productive. Industries utilize a tremendous measure of electrical vitality. Widespread Universal Transformer's electrical vitality charge keeps up around INR 12-13 lakh for every year. This sum is tremendous and therefore normally draws in consideration when we comprehend that a considerable amount of electrical vitality is being squandered, which thusly would imply that enormous measure of money related assets are being squandered. Making the industry territory vitality effective won't just enable the industry to lessen its costs yet additionally causes us satisfy our ethical obligation of not squandering this valuable asset, which is barely accessible to rest of the general population of the nation. This would go about as a model task, the exercises learnt here can be put to rehearse later on as we advancement and move to different parts of the business. Industries have been picked in light of the fact that they are very well-known to us, are truly available and have prominent vitality wastage that can be decreased. We are sure that the outcomes that will leave this activity will undoubtedly bear some significance with everybody and can be the initial step to make Universal Transformer vivaciously the most productive industry in India.

CONVERSION OF SOUND TO ELECTRIC ENERGY

Vinay Kumar Sahu, Taha Abbas Ali (3rd Year/ 6th Sem)
EEE, IPS Academy, Institute of Engineering and Science, Indore (M.P.)

Abstract

This paper presents the work done on the conversion techniques and methodologies of converting sound energy to its electrical counterpart. It focuses on the feasibility and the ground zero application of the same. The prediction of the future development of these kind of sources of energy is emphasized other than commonly known ones such as solar energy, biogas, wind energy and so on. So one can imagine if we were able to convert the sound energy to electricity then we can charge our mobile phone just by talking to our friends on mobile itself.

Department Events during 2023-24

S No.	Date		Type	Topic
1	10-07-2023	14-07-2023	Refresher Course	Refresher course on MATLAB Programming
2	07-10-2023	07-10-2023	BoS	BoS Meeting
3	14-10-2023	14-10-2023	Expert Lecture	Carrier Opportunity in Department of Atomic Energy Dr. Piyush Saxena, Senior Scientist, R. R. CAT Indore
4	27-10-2023	27-10-2023	Industry Visit	Shree Shingaji Thermal Power Plant
5	07-11-2023	07-11-2023	Advisory Board Meeting	Advisory Board Meeting
6	18-11-2023	18-11-2023	Industry Visit	Shakti Pumps (India) Limited, Pithampur
7	20-11-2023	25-11-2023	Workshop	Workshop on PLC & SCADA
8	28-11-2023	28-11-2023	Advisory Board Meeting	Joint Advisory Board Meeting
9	16-01-2024	20-01-2024	Refresher Course	Refresher course on PLC Application to Electrical Engineering
10	03-02-2024	03-02-2024	Industry Visit	Shakti Pumps (India) Limited, Pithampur
11	25-02-2024	25-02-2024	Visit	RR Cat
12	04-03-2024	04-03-2024	Science Quiz	Science Quiz completion
13	27-04-2024	27-04-2024	Expert Lecture	Advancement in Power Electronics & Power Supply
14	30-05-2024	30-05-2024	E-Awartan 2024	Technical Quiz/ Poster Competition
15	30-05-2024	30-05-2024	Science Exhibition	Model/ Project making Competition

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