# URJA 2021

## e - Magazine

**Year 2020-21**


IPS Academy

Institute of Engineering & Science

(A UGC Autonomous Institute, Affiliated to RGPV)


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Kunjal Parate, 4th year

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**Department of Electrical & Electronics Engineering**

## Department Vision & Mission

### *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.***

### *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, 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.***

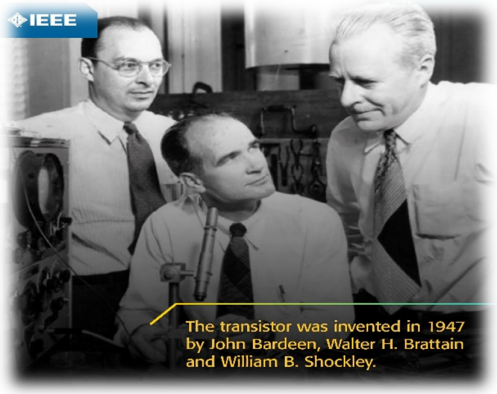
***PEO 2*** ***Awareness of current technology and the fundamental background to be able to stay informed and adept at new technologies in Electrical and electronics engineering and to pursue higher studies***

***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***

## *Shockley, Bardeen, and Brattain: Pioneers of the Transistor Revolution*




***The invention of the transistor stands as one of the most transformative milestones in the history of electronics, revolutionizing technology and paving the way for the digital age. This article pays homage to the brilliant minds behind this groundbreaking invention: William Shockley, John Bardeen, and Walter Brattain.***

***The Birth of the Transistor***

***In the early 20th century, vacuum tubes were the primary electronic components used for amplifying and switching signals in radios, televisions, and early computers. However, these tubes were bulky, fragile, and consumed significant power, limiting their application. The quest for a smaller, more efficient alternative led to the development of the transistor in 1947 at Bell Laboratories in Murray Hill, New Jersey, USA. William Shockley, John Bardeen, and Walter Brattain, working under the direction of physicist and Bell Labs director Mervin Kelly, collaborated on a project to replace the vacuum tube with a solid-state device.***

***<u>The Role of William Shockley</u>***

***William Shockley was a theoretical physicist with a keen interest in semiconductor physics. He played a pivotal role in formulating the theoretical framework for the transistor's operation, particularly the principles of electron flow and semiconductor behavior. Shockley's understanding of solid-state physics was instrumental in guiding the research direction at Bell Labs.***

## *John Bardeen: The Theoretical Genius*

*John Bardeen, a theoretical physicist and mathematician, brought deep insights into quantum mechanics and solid-state physics to the project. His theoretical work on semiconductor behavior and electron movement provided the foundation for understanding how electrons could be controlled and manipulated within a semiconductor material.*

## *Walter Brattain: The Experimentalist*

*Walter Brattain, an experimental physicist and engineer, focused on translating theoretical concepts into practical experiments. It was Brattain who, in December 1947, successfully demonstrated the first point-contact transistor. This device, based on the principle of semiconductor junctions and electron injection, marked a significant breakthrough in electronic miniaturization and efficiency.*

### *The Invention of the Point-Contact Transistor*

*On December 23, 1947, Bardeen and Brattain, under Shockley's guidance, successfully created the first transistor. This device, known as the point-contact transistor, consisted of a small piece of germanium with two closely spaced gold contacts. By applying a small voltage to one contact (the emitter), they were able to control the flow of current through the device, effectively amplifying signals.*

### *The Impact and Legacy*

*The invention of the transistor revolutionized electronics in several profound ways:*

*Miniaturization: Transistors were much smaller and more robust than vacuum tubes, enabling the development of smaller and more portable electronic devices.*

*Reliability: Transistors had no moving parts and were less prone to mechanical failure, improving the reliability and longevity of electronic equipment.*

*Energy Efficiency: Transistors consumed far less power than vacuum tubes, leading to significant energy savings and enabling the development of battery-operated devices.*

*Digital Revolution: Transistors formed the basis of integrated circuits and microprocessors, laying the foundation for the digital revolution and the modern computing era.*

*Honoring Their Achievements*

***William Shockley, John Bardeen, and Walter Brattain's invention of the transistor earned them the Nobel Prize in Physics in 1956, recognizing their groundbreaking contributions to science and technology. Their collaborative effort at Bell Labs exemplifies the power of interdisciplinary research and the synergy between theory and experimentation in driving innovation.***

***The transistor remains a testament to human ingenuity and the relentless pursuit of knowledge. Its invention by Shockley, Bardeen, and Brattain not only transformed the field of electronics but also sparked a technological revolution that continues to shape our world today. As we celebrate their legacy, we are reminded of the profound impact that visionary thinkers and collaborative research can have on advancing human progress.***

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***Students placed On Campus in Session 2020-21***

Aman Chadokar
UpGrad Education

Paarth Chaturvedi
UpGrad Education

Kunjal Parate
TCS

Sumit Gochre
Chegg India

Ujjval Tailor
Chegg India

Anchal Hirve
Walkover Web Solutions

Utsav Rathod
HCL

Nilesh Mandloi
Motherson Sumi Electric Wire

## *Result of the Department*

Top 5 Students

| S.No | Roll No. | Name of student | SGPA | CGPA |
|---|---|---|---|---|
| **1** | 0808EX171001 | Aman Chadokar | 10 | 8.69 |
| **2** | 0808EX171003 | Aakash Kumrawat | 9.44 | 8.48 |
| **3** | 0808EX171010 | Kunjal Parate | 10 | 8.41 |
| **4** | 0808EX171018 | Ujjval Tailor | 9.83 | 8.3 |
| **5** | 0808EX171023 | Priyanka Patel | 9.61 | 8.23 |

## *Energy Storage Systems: Powering the Future with Innovation*

### *Introduction*

***In the quest for sustainable energy solutions, energy storage systems (ESS) have emerged as indispensable technologies, bridging the gap between intermittent renewable energy sources and reliable power supply. This article delves into the significance, advancements, and transformative potential of energy storage systems in shaping the future of global energy landscapes. Energy storage systems play a critical role in enhancing grid stability, optimizing energy utilization, and supporting the integration of renewable energy sources such as solar and wind. By storing surplus energy during periods of low demand or high generation and releasing it during peak demand or low generation, ESS contribute to a more balanced and efficient electricity grid.***

### *Types of Energy Storage Technologies*

***Battery Storage: Battery technologies, notably lithium-ion batteries, dominate the energy storage market due to their high energy density, efficiency, and scalability. They are widely used in grid-scale applications, electric vehicles (EVs), and residential energy storage systems (RESS).***

***Pumped Hydro Storage: Pumped hydroelectric storage facilities store energy by pumping water from a lower reservoir to a higher reservoir during off-peak hours using excess electricity. When electricity demand rises, water is released downhill through turbines to generate electricity.***

***Thermal Energy Storage: Thermal storage systems store heat or cold using materials like molten salts or phase-change materials. They are used in conjunction with renewable energy sources such as solar thermal power plants to provide dispatchable and reliable electricity generation.***

*Flywheel Energy Storage: Flywheels store kinetic energy in a rotating mass and convert it back into electricity when needed. They are valued for their rapid response times, high efficiency, and ability to provide short-duration energy storage solutions.*

*Hydrogen Storage: Hydrogen can be produced from renewable sources through electrolysis and stored for use in fuel cells or as a chemical energy carrier. Hydrogen storage systems have potential applications in transportation, industrial processes, and grid-scale energy storage.*

*Advantages of Energy Storage Systems*

*Grid Stability: ESS help maintain grid stability by smoothing out fluctuations in renewable energy generation and managing peak demand periods.*

*Enhanced Renewable Integration: By storing excess renewable energy, ESS enable a higher penetration of variable renewable sources like solar and wind into the grid.*

*Reliability and Resilience: Energy storage enhances grid reliability by providing backup power during outages and improving resilience against natural disasters or grid disturbances.*

*Cost Savings: ESS can reduce overall energy costs by optimizing energy use, avoiding expensive peak electricity prices, and deferring investments in grid infrastructure.*

*Conclusion*

*Energy storage systems are catalysts for a sustainable energy transition, enabling greater flexibility, reliability, and efficiency in energy management. As global demand for clean energy solutions grows, ESS will play an increasingly vital role in unlocking the full potential of renewable energy sources while ensuring a resilient and secure energy future for communities worldwide. Embracing innovation and collaboration across industries and governments will be key to realizing the transformative impact of energy storage systems in powering the future.*

**Article by**

**Aman Chadokar (0808EX171001), 4th Year, EEE**

## *Integrating Renewable Energy: Paving the Way to a Sustainable Future*

### *Introduction*

***In an era defined by climate change awareness and the global pursuit of sustainable energy solutions, the integration of renewable energy sources has emerged as a pivotal strategy. This article explores the significance, challenges, and advancements in renewable energy integration, highlighting its transformative impact on global energy systems. Renewable energy, derived from natural resources such as sunlight, wind, water, and geothermal heat, offers a clean and abundant alternative to fossil fuels. Unlike coal, oil, and natural gas, which contribute significantly to greenhouse gas emissions and environmental degradation, renewable energy sources are inexhaustible and environmentally benign.***

### *Importance of Integration*

***While the potential of renewable energy is vast, its intermittent nature poses challenges to grid stability and energy reliability. Integrating renewable energy effectively into existing power grids requires innovative technologies, strategic planning, and policy support to optimize generation, transmission, and consumption. Upgrading and modernizing grid infrastructure is essential to accommodate variable renewable energy outputs. Smart grid technologies enable real-time monitoring, demand response, and efficient energy management, enhancing grid flexibility and reliability. Energy storage systems (ESS) play a critical role in balancing supply and demand mismatches caused by fluctuating renewable energy generation. Technologies such as batteries, pumped hydro storage, and thermal energy storage store excess energy for use during periods of low generation, ensuring grid stability. Combining different renewable energy sources with complementary generation profiles (e.g., solar and wind) can mitigate intermittency issues. Hybrid systems optimize energy production and enhance grid integration by providing a more consistent and reliable power supply.***

***Policy and Regulatory Support: Governments play a crucial role in promoting renewable energy integration through supportive policies, incentives, and regulatory frameworks.***

*Measures such as feed-in tariffs, renewable portfolio standards, and carbon pricing mechanisms encourage investments in clean energy infrastructure and facilitate market uptake.*

*Technological Advancements*

*Advancements in renewable energy technologies, such as improved solar panels, more efficient wind turbines, and enhanced grid integration capabilities, continue to drive down costs and increase reliability. Innovations in energy forecasting, predictive analytics, and energy management systems optimize renewable energy utilization and enhance operational efficiency.*

*Global Impact and Benefits*

*The integration of renewable energy offers numerous benefits: By displacing fossil fuels, renewable energy integration contributes to mitigating climate change and improving air quality. Diversifying the energy mix with renewable sources enhances energy security by reducing dependence on imported fuels and volatile energy markets. The renewable energy sector stimulates economic growth through job creation, investment opportunities, and technological innovation. Localized renewable energy projects, such as community solar installations and microgrids, enhance energy resilience and empower communities to become self-sufficient.*

*Conclusion*

*The integration of renewable energy into global energy systems represents a paradigm shift towards a sustainable and resilient future. By leveraging technological advancements, innovative solutions, and collaborative efforts, we can accelerate the transition to a low-carbon economy and ensure a secure energy future for generations to come. Embracing renewable energy integration is not just an option—it's a pathway to sustainable development and a cleaner, healthier planet.*

**Article by**

**Ujjval Tailor (0808EX171018), 4th Year, EEE**

## *e-Awartan Tech Fest – 2021*

***Department Massage***

***e-Awartan is an annual tech- fest organized by department of Electrical & Electronics Engineering, IPS Academy, IES, Indore Every year. This event is for two days, in which different competitions like paper presentation, project competition, technical quiz and expert lecture 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 at IES Auditorium Hall, but unfortunately this year, due to lockdown (COVID 19), not possibility to organized event physically.***

***"Department never compromise with benefits of students and therefore decided to organized event on online platform."***

***About e – Awartan 2021***

***Department of Electrical & Electronics Engineering, IPS Academy, IES, Indore have organized two days Tech-Fest event "e-Awartan 2021" online.***

***The tech fest was held for two days from 7th May 2021- 8th May 2021.***

***On 7th May 2021, the first day of event starts with the project competition coordinated by faculty coordinator***

***The project competition event was commenced at 12:30 PM sharp for two hours. There were number of teams who participated in the event with their innovative ideas. This competition was held online on Microsoft Teem platform.***

***After this event, there was a short break of 15 minutes to prepare for the next event.On the same day, Sharp at 3:00 PM, technical quiz competition was started.***

***In this event, different technical questions were asked by students. Students tried their best to score maximum marks in this event. This competition was held online on google form.***

***At the end of the first day of event, results were declared by judges for the two events.***

*On 8th May 2021, the second day of event starts with Expert talk and then paper presentation competition which started at 11:00 AM sharp.*

*At the end, result of this event was declared by the judges.*

*Project Competition*

*Result of project competition - Held on 7th May 2021, 12.30PM-02.15PM*

*(Online - via Microsoft team)*

*Under e-Awartan 2021*

***1. Smart car parking system (4th yr)***

***Akash, Aman, Kunjal, kushagra***

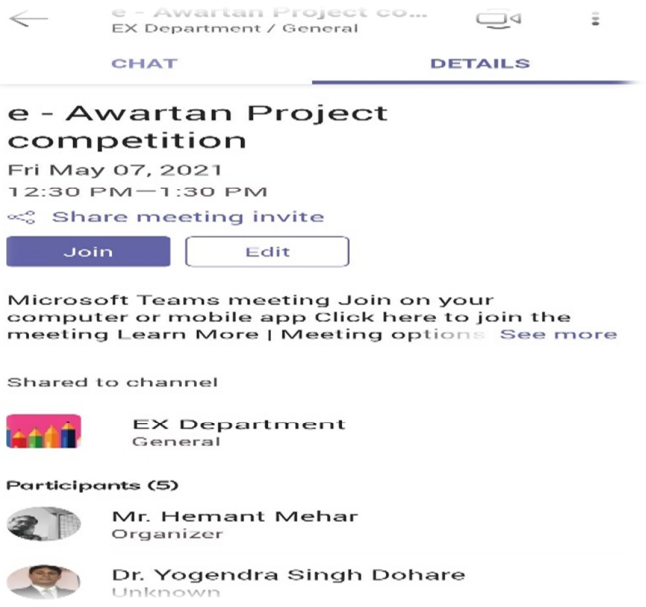
***2. Three Phase Brushless DC comtroller(3rd yr)***

***Ritika jain, sandeep kumar singh ,saurabh mishra, Gaurav yadav, manish verma***

***3. Speed control of DC motor (3rd yr)***

***Bhavishya , Priyanshu, Vividh yadav, Aman, Sagar vidhyarti***

*Screen Shot of Microsoft team during event*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IPS Academy
INSTITUTE OF ENGINEERING & SCIENCE
(A UGC Autonomous Institute, Affiliated to RGPV)
Knowledge, skills & values
ELECTRICAL AND ELECTRONICS ENGINEERING DEPARTMENT
MAJOR PROJECT
SENSIBLE HYBRID SMART PARKING SYSTEM
Guided by–
Prof. Deepesh Bhati
Submitted by–
Akash Singh (0808EX171002)
Aman Chadokar (0808EX171003)
Kunjal Parate (0808EX171010)
Kushagra Sahay (0821EX171009)
SENSIBLE HYBRID SMART PARKING SYSTEM

*Paper Presentation Competition*

*To develop and enhance professional communication, presentation skill and technical knowledge of students, IPSA-IES, Dept. of Electrical and Electronics Engineering, every year organizes technical paper presentation competition in Techfest "e-Awartan under ISTE student chapter". This event provides the student a best platform to showcase their research ideas in front of an esteemed panel of judges. In this academic year 2021, Dept. of Electrical and Electronics Engineering, conducted paper presentation event online to keep students and other staff members safe from COVID-19 pandemic. We always motivate students to write and present the paper and provide them platform to express their knowledge related to engineering field.*

## Department Events During 2020-21

| S No. | Date | | Type | Topic |
|---|---|---|---|---|
| 1 | 07-08-2020 | 14/07/2020 | Refresher Course | Experiments for Electrical & Electronics Engineering in Virtual Lab |
| 2 | 25/07/2020 | 25/07/2020 | Expert Talk | Machine Learning & Artificial Intelligence<br>Mr. Rohan Singh Rajput (Alumni)<br>Senior Data Scientist, Ticketmaster, California (U.S.) |
| 3 | 29/07/2020 | 29/07/2020 | National Webinar | Solar and Green Energy Systems<br>Mr. Ravindra Sharma, Director, AutoSys Indore |
| 4 | 08-08-2020 | 08-08-2020 | Expert Talk | Internet of Things (IOT)<br>Mr. Ritesh Dhakad (Alumni)<br>Business Intelligence Developer, Ramboll, New York (U.S.) |
| 5 | 09-05-2020 | 09-05-2020 | Expert Talk | Aviation Engineering |
| 6 | 09-08-2020 | 09-08-2020 | Expert Talk | IoT & it's Application in Airport Industry |
| 7 | 27/11/2020 | 27/11/2020 | virtual industry visit | Virtual _Exposure & Field Visit for Problem Identification ABB Manufacturers |
| 8 | 28/8/2020 | 28/8/2020 | National Webinar | Energy Audit Mr. ANKIT VYAS<br>Director, Vibha Power, Indore |
| 9 | 11-02-2020 | 11-07-2020 | AICTE Sponsored STTP | Smart Grid and Big Data Analysis -Phase- I |
| 10 | 14/12/2020 | 21/12/2020 | AICTE Sponsored STTP | Smart Grid and Big Data Analysis Phase- II |
| 11 | 07/05/2021 | 08/05/2021 | e-Awartan | e-Awartan |


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*Knowledge Village, Rajendra Nagar A.B. Road, Indore-452012*

# Department of Electrical & Electronics Engineering