

Department of Electrical Engineering

Indian Institute of Technology (Indian School of Mines) Dhanbad



VIBHAV



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February, 2025

Monthly Newsletter

MESSAGE FROM HoD's DESK

By PROF. SUKANTA DAS



Dear All,

Hope you are doing well!

With a great pleasure, I hereby introduce a new edition of the Monthly Newsletter of the Department of Electrical Engineering: "VIBHAV".

This edition of the newsletter focuses primarily on reporting the department's achievements for the month of February-2025. The key highlight of this version is the Inauguration of the *1st IEEE International Conference on Smart and Sustainable Developments in Electrical Engineering (SSDEE-2025)* organized by the department during the period *February 28 - March 2, 2025*.

I invite you to go through this edition of our Monthly Newsletter. I also ask our students to actively participate in the improvement of the Monthly Newsletter. You are requested to forward your constructive comments to ee@iitism.ac.in for the betterment of the forthcoming editions of "VIBHAV".

Thank you all.

Best wishes.

ABOUT THE DEPARTMENT

The Electrical Engineering department was established in the year 2005. The four-year B.Tech. program in Electrical Engineering was started in the academic session 2006-07. Although the Department of Electrical Engineering is one of the latest of the existing departments of the Institute, the Electrical Engineering Section existed as a part of earlier Mining Machinery Engineering department from 1975. Apart from different B.Tech. programs, the department at present also offers M.Tech programs in Power System Engineering and Power Electronics & Electrical Drives. Through funded projects, consultancies, Doctoral, and postdoctoral programs, most of the research activities are being carried out in the department.

INDIVIDUAL ACHIEVEMENT

Prof. Sethupathy S has received the technical approval for Prime Minister Early Career Research Grant.

Hearty Congratulations for his achievement!



Prof. Dushyant Sharma was a part of the winning team in the "Solar Project Game" organized during the in-service training program on "Pioneering a Sustainable Energy Transition"

Hearty Congratulations for his achievement!



Prof. Sukanta Halder received a consultancy: "Proof Checking for Design and Drawings for Major Upgradation and Redevelopment of Asansol Railway Station," M/s Auro Infra Pvt. Ltd., Hyderabad, (Rs 29.5 L) as Co-Cl.

Hearty Congratulations for his achievement!



PUBLICATIONS

Journals

- S. Saha, **S. Mandal**, “High contrast grating embedded multi-bus micro-optical triple ring-resonated temperature sensor design and simulation,” *Optik*, vol. 327, pp. 172276, 2025.
- A. Mishra, **S. Mandal**, “Non-Linear Control of Interleaved Boost Converter Using Disturbance Observer Based Approach approach,” *IEEE ACCESS*, vol. 13, pp. 23833-23840, 2025. .
- Amit Rai, Ashish Shrivastava, **Kartick C. Jana**, Jay Liu, Kulwant Singh, N. S. Jayalakshmi, and Amit Agrawal, “Meta-machine learning framework for robust short-term solar power prediction across different climatic zones,” *Engineering Applications of Artificial Intelligence*, vol. 147, pp. 110295, 2025.
- S. Suraj, Narayan S Manjarekar, **Soumyabrata Barik**, S. Swain, “A delayed charging enabled station for electric vehicles”, *Computers and Electrical Engineering*, vol. 123, pp. 110166, 2025. [Accepted]

Conferences

- Priya Kumari and **Somnath Pan**, “Analysis of ADRC with complex pole and design of ESO based SMC,” *IEEE 1st International Conference on Smart and Sustainable Developments in Electrical Engineering (SSDEE-2025)*, IIT(ISM), Dhanbad, 2025.
- U. Sudheer, **S. Halder** and B.Sethi, “Comprehensive Review of Cybersecurity Vulnerabilities and Safety Concerns in Autonomous Vehicles,” *IEEE International Conference on Smart and Sustainable Developments in Electrical Engineering (SSDEE- 2025)*, pp 1-6, 2025.

FDP/EDP PROGRAM

- A FDP program named “Innovation & Entrepreneurship” funded by AICTE, MoE, GoI, has been approved with the funding of 3.5 lakhs.
PI: **Prof. Sukanta Halder**
Co-PI: **Prof. Pradip K. Sadhu, Prof. Nitai Pal, Prof. Anirban Ghosal, Prof. Soumyabrata Barik.**

OUTREACH ACTIVITIES

- **Prof. Sukanta Halder** delivered expert Lecture on “Autonomous Vehicle: The Future Transportation,” at the MSME-sponsored Five-Day Advanced-ESDP Programme on *Renewable Energy Sources in Electric Vehicle and Distributed Generation Systems*, at NIT Sikkim.
- **Prof. Devara Vijaya Bhaskar** chaired a technical session in the “Oral Session-1 Power Systems” at the IEEE SSDEE-2025 conference at IIT (ISM) Dhanbad.
- **Prof. K. C. Jana** chaired a technical session in the “Oral Session-2 Smart Grid” at the IEEE SSDEE-2025 conference at IIT (ISM) Dhanbad.
- **Prof. Anirban Ghoshal** chaired a technical session in the “Oral Session-3 Power Electronics & Applications” at the IEEE SSDEE-2025 conference at IIT (ISM) Dhanbad.
- **Prof. Sonam Acharya** chaired a technical session in the “Oral Session-5 Special Session-2” at the IEEE SSDEE-2025 conference at IIT (ISM) Dhanbad.

STUDENTS' CORNER

The Role of IoT in Electrical Devices: A Smart Revolution **Samiksha Biswas – (24JE0164)**

Understanding IoT:

The Internet of Things (IoT) is revolutionizing how devices interact with each other and with users. It essentially gives everyday objects a “brain,” allowing them to connect to the internet and be controlled remotely. From smart fridges to fitness trackers and home automation systems, IoT is making life more convenient, efficient, and interconnected.

IoT in Electrical Engineering:

In the realm of electrical engineering, IoT is transforming the way devices function by enhancing automation, improving energy efficiency, and enabling seamless communication. Whether in households, industries, or smart cities, IoT plays a crucial role in real-time monitoring, re-

mote control, and predictive maintenance. These advancements not only optimize energy usage but also improve safety and convenience. With technological progress, integrating IoT into electrical systems is no longer an option—it's a necessity for a more sustainable and intelligent future.

Key Applications of IoT in Electrical Devices

i) ESP32: A Powerful IoT Microcontroller: The ESP32 is a cost-effective, low-power system-on-chip (SoC) with built-in Wi-Fi and Bluetooth capabilities. It is widely used in IoT applications, such as smart plugs, home automation, and energy monitoring. The ESP32 allows for wireless communication between devices,

enabling efficient control and automation in electrical systems.

ii) Shelly's Z-Wave Long-Range Smart Plug: European smart device manufacturer Shelly has introduced 11 automation devices based on Z-Wave Long Range (Z-Wave LR) technology. This innovation allows smart devices to communicate over a distance of up to 1.5 miles while supporting up to 4,000 devices on a single network. Such advancements improve home automation by enabling seamless remote control of electrical appliances and systems.

iii) Ting: Proactive Voltage Monitoring: Ting is a cutting-edge domestic voltage monitor that helps detect poten-

tial electrical hazards before they become critical issues. This device continuously monitors a home's electrical system for anomalies such as micro-arcs, degrading insulation, short circuits, transformer issues, and power fluctuations. By identifying these risks early, Ting helps prevent electrical fires and improves overall power reliability. Additionally, it can detect failing HVAC capacitors and distribution grid faults, making it valuable for both homeowners and utility companies.

iv) Insteon: Smart Home Automation Insteon is a sophisticated home automation system that integrates various electrical devices, including light switches, sensors, and motion detectors. Utilizing both power line communication and radio frequency (RF) networking, Insteon ensures that smart home devices operate efficiently and reliably. Its dual-mesh networking technology enhances communication between devices, reducing lag and improving response times.

v) Homey's Advanced Energy Management System Smart home company Homey has enhanced its app with an energy management tab that provides real-time insights into electricity, gas, and water consumption. This feature allows homeowners to track energy usage, identify high-consuming devices, and optimize energy efficiency. With support for smart appliances, thermostats, and electric vehicle (EV) chargers, Homey's system contributes to reducing energy waste and promoting sustainable living.

India's Advancements in Semiconductor Technology India is taking significant steps towards becoming self-reliant in semiconductor manufacturing as part of its Atmanirbhar Bharat initiative. In collaboration with IIT Madras and ISRO, the country has developed "IRIS" (Indigenous RISC-V Controller for Space Applications), its first fully indigenous aerospace microprocessor. Built on the SHAKTI processor baseline, the IRIS chip is designed for strategic

applications, including IoT and command-control systems. This milestone signifies India's transition from being a semiconductor consumer to a producer, reinforcing its capabilities in space technology and beyond. The development of indigenous semiconductor technology is crucial for India's technological independence and future advancements in IoT-driven electrical devices.

Conclusion The integration of IoT into electrical devices is ushering in a new era of smart automation, energy efficiency, and predictive maintenance. Whether through intelligent microcontrollers, advanced home automation, or energy management solutions, IoT is reshaping how electrical systems operate. As India strengthens its semiconductor ecosystem, the country is poised to play a significant role in the global IoT revolution. Embracing these innovations will lead to smarter homes, safer electrical systems, and a more sustainable future.

INAUGURAL SESSION OF 1ST IEEE INTERNATIONAL CONFERENCE SSDEE-2025



2025 IEEE 1st International Conference on Smart and Sustainable Developments in Electrical Engineering (SSDEE - 2025) was inaugurated by the Department of Electrical Engineering on 28th February 2025 with Prof. Sukanta Das as General Chair, Prof. Gauri Shankar as Program Chair and Prof. Paresh Kumar Nayak and Prof. Bhukya Krishna Naick as Program Co-Chairs. The event was graced by Shri Rakesh Ranjan, Additional Secretary DVC, Prof. Sukumar Mishra, Director IIT (ISM) Dhanbad, Prof. Biplab Sikdar from NUS Singapore, Prof. Vinod Khadkikar from Khalifa University, Abu Dhabi, UAE, Prof. Akshay Kumar Rathore from SIT Singapore, Prof. Anamitra Pal from Arizona State University, USA, Prof. S. C. Srivastava, Ex-Professor IIT Kanpur and Dr. Tapan Sahoo from Maruti Suzuki India Limited as Keynote Speakers.

GLIMPSES OF KEYNOTE SESSIONS



Prof. Anamitra Pal from the Arizona State University has given a keynote lecture on “Big Data Analytics for the Electric Power Grid of the 21st Century”



Prof. Akshay Kumar Rathore from the Singapore University of Technology has given a keynote lecture on “Next Generation Wide Bandgap Power Electronics: Merits, Challenges, and Opportunity”



Prof. Biplab Sikdar from the National University of Singapore has given a keynote lecture on “Security Challenges in AI-Driven 6G Networks”

MEDIA COVERAGE

The Jharkhand Story

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1st IEEE International Conference on sustainable development begins at IIT ISM Dhanbad

by Jharkhand Story — 28 February 2025 in Breaking, Education, Science & Tech

🔗 Click here to read the full article.

UPCOMING EVENTS

Faculty Development Program on Innovation & Entrepreneurship funded by AICTE, MoE, Govt. of India from 24th March to 28th March 2025.

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