

Department of Electrical Engineering

Indian Institute of Technology (Indian School of Mines) Dhanbad



VIBHAV



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Monthly Newsletter

MESSAGE FROM HoD's DESK

By PROF. KARTICK CHANDRA JANA



Dear All,

Greetings from IIT (ISM) Dhanbad!

I am pleased to share with you the "July 2026" edition of the Department of Electrical Engineering's monthly newsletter, "VIBHAV".

The month of "July 2026" has been marked by some remarkable individual achievements that highlight the dedication, perseverance, and collaborative ethos of our faculty members. These milestones not only celebrate personal success but also contribute to strengthening the collective identity and reputation of our department.

As we move forward, we warmly invite our students to play an active role in enriching the quality, diversity, and reach of "VIBHAV". Your thoughtful feedback and creative suggestions are always welcome and may be shared at ee@iitism.ac.in. Together, let us continue to make every edition of "VIBHAV" more engaging, inspiring, and impactful.

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 Intelligent Control and Instrumentation, 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. Dushyant Sharma (Co-PI) received a project titled "Power Management and Quality Enhancement of Traction Substation in Indian Railways: A Power Conditioning and Energy Storage Approach", from Anusandhan National Research Foundation (ANRF) with valuation of 75.81 Lakhs.

PI: Prof. Shambhu Sau, IIT Kharagpur
IIT (ISM) Dhanbad's contribution: Rs. 35.42 Lakhs
Hearty Congratulations for his achievement !



PUBLICATIONS

Journals

- Md. A. Hussain and **A. S. Hati**, "Model Free Reference Adaptive System for Speed Sensorless Induction Motor Drives," *IEEE Transactions on Industry Applications*, DOI: 10.1109/TIA.2026.3701652.
- P. Kumar, Prince, H. S. Kim and **A. S. Hati**, "Hybrid convolutional neural network-transformer-long short-term memory framework for health estimation of electric mobility battery," *Journal of Energy Storage* (2026), vol. 176, DOI: 10.1016/j.est.2026.123322.
- S. Paul, P. Kumar and **K. Chatterjee**, "A Hybrid Kalman-Machine Learning Approach for Detecting Replay Attacks and Ensuring Secure Control of DFIG Wind Energy Systems," in

IEEE Transactions on Smart Grid, DOI: 10.1109/TSG.2026.3710604.

- S. B. Mitikiri, V. L. Srinivas, M. Pal and S. Mishra, "Game Theoretic Neural Consensus Controller for FDIA Resilient DC Microgrids," *IEEE Journal of Emerging and Selected Topics in Power Electronics*, Early Access, DOI:10.1109/JESTPE.2026.3693111.

OUTREACH ACTIVITIES

- **Prof. Ananda Shankar Hati** (Convener) and **Prof. Ashok Kumar** (Co-Convener) organised an IEEE PELS sponsored PhD. Summer School 2026 on "Power Converter Design, Digital Control and Battery Management Sys-

tems", IIT (ISM) Dhanbad, 13–17 July 2026.

INTERNATIONAL ACADEMIC VISITS

- Prof. Akshay Kumar Rathore, National University of Singapore, Singapore, IEEE PELS Distinguished Lecturer, delivered an invited lecture on "Design of Soft-Switching DC/DC Converters" at the IEEE PELS-sponsored PhD Summer School 2026, 14 July 2026.
- Dr. Sreenivasa S. Jaldanki, Oak Ridge National Laboratory, Tennessee, USA, delivered an invited lecture on "HVDC Technology: History, Today and Future" at the IEEE PELS-sponsored PhD Summer School 2026, 13 July 2026.

- Dr. Anirudh Acharya, Senior R&D Engineer, Yaskawa (The Switch), delivered an invited lecture on "Electrification of Ships" at the IEEE PELS-sponsored PhD Summer School 2026, 13 July 2026.

- **Prof. Bhawana Singh** presented two papers at 18th International Workshop on Variable Structure Systems (VSS 2026), 27-30 July 2026, Exeter, UK.

1. Bhawana Singh et.al., "Contraction Metrics based Finite and Fixed-Time Convergence".
2. Yashwant Dhote and Bhawana Singh, "Design of Safety incorporated Sliding Mode Control via Barrier States for 2-DOF Aero System".



EEEIC 2026. From 29th June to 02 July 2026 held at Instituto Superior Tecnico, University of Lisboa, Lisbon, Portugal. Paper title: Exact mutation rate determination of differential evolution technique for the optimal solution of Reactive Power Planning Problem. Single author: Biplab Bhattacharyya

PH.D. SUMMER SCHOOL 2026: POWERING IDEAS, SHAPING THE FUTURE

As IIT (ISM) Dhanbad celebrated its centenary year, the Department of Electrical Engineering contributed to the celebrations by hosting the **IEEE Power Electronics Society (PELS)-sponsored PhD Summer School 2026**, held from 13–17 July 2026 on the theme "Power Converter Design, Digital Control and Battery Management Systems". The five-day program brought together doctoral scholars, eminent academicians, international experts and industry professionals, transforming the campus into a vibrant forum for the exchange of ideas in power electronics and its rapidly evolving applications. A major attraction was **Prof. Akshay Kumar Rathore, IEEE PELS Distinguished Lecturer and Professor at the National University of Singapore**, whose international expertise enriched the program with advanced perspectives on power converters, EV charging, and renewable energy systems. Distinguished lectures, hands-on sessions on converter hardware, digital control and reliable feedback circuits, and research presentations by PhD scholars created an academic experience that went well beyond the conventional classroom. The inclusion of industry perspectives further strengthened the bridge between fundamental research and engineering practice, reminding participants that the true worth of an innovation is ultimately measured by its ability to translate intellectual ingenuity into technological and societal impact.



The Summer School was also distinguished by its commitment to **diversity, leadership and inclusion through the IEEE Women in Engineering (WiE) program**. The half-day event on 15 July, themed “Women in Engineering & Leadership-Pioneering Change, Leading Innovation,” brought together a keynote address, a panel discussion on women leaders in power engineering, and mentoring on Government of India schemes and fellowships for women scientists. Alongside the academic sessions, the participation of experts from academia and industry, the opportunity for PhD scholars to present their research before an expert panel, and the emphasis on hands-on learning gave the Summer School an unusually rich character. In a year when **IIT (ISM) Dhanbad commemorates a hundred years of institutional legacy**, the program offered an apt glimpse of its future: intellectually ambitious, technologically consequential, globally connected and increasingly inclusive.



STUDENTS CORNER

Progress in Quantum Computing Designs: Photonic Qubits and Trapped-Ion Systems

Sahaj Sundar Keshri – (24JE0163)

Quantum information processing is about finding the right physical platforms that can create and control quantum bits also known as qubits. Now people are really looking into photonic systems and trapped-ion architectures. Both of these approaches try to solve the problem of quantum hardware: keeping the quantum state stable while still being able to control it precisely.

Photonic quantum computing uses photons to store quantum information. It mainly uses the polarization of light to represent qubits. In this design single-qubit gates are created by rotating the polarization of light with components. The good thing about photonic systems is that light particles do not interact much with their surroundings or with each other. This means that photons have decoherence rates compared to solid-state hardware. However this also makes it hard to do direct two-qubit entangling gates. To get around this problem photonic quantum processors often use the cluster-state model. This is a way of doing quantum

computing that is based on measurements, where big entangled states are built and processed by making measurements one after the other.

Trapped-ion architectures are different. They use the energy levels of isolated atomic ions that are trapped using electromagnetic fields. These energy levels are very precise. Are used in modern atomic time and frequency standards. In quantum computing these stable energy states make good qubits. Because trapped ions are well isolated from disturbances they can keep their quantum state for a long time, often seconds or even longer. This makes them a top choice for building fidelity, scalable quantum processing systems. Quantum computing systems like these are being developed using qubits and trapped-ion systems. These systems are really important for quantum computing. Photonic qubits and trapped-ion systems are the key to making progress in this field.

Beyond photonics and trapped ions, neutral atoms. Superconducting circuits of-

fer interesting choices for building real quantum devices. Neutral atoms held in tweezers have the same good coherence and same type of atoms as trapped ions but they use special Rydberg states to make complex multi-qubit operations. Superconducting qubits use circuits with Josephson junctions that work at very cold temperatures to make gates that are very fast and can fit with regular chip making methods.

In the future closing the gap between tests and big quantum computers needs solving big engineering problems. Making bigger photonic systems needs single-photon sources on chips and ways to send light with little loss. Trapped-ion systems need tiny mechanical systems to hold the ions and send light around. As research on these types of systems gets better, mixing the long-lasting storage of atomic qubits with the fast light connections of photonic links could be the way to build large quantum networks.

UPCOMING EVENTS

Executive Development Program (EDP) on “Mine Electrical Drives Technology and Safety Challenges” (EDP No. OCEP/T003E/2026-27) to be held during 17th–21st August 2026 at Seminar Room (No. 113), 1st Floor, New Academic Complex, Department of Electrical Engineering, IIT (ISM) Dhanbad. CI- **Prof. Nitai Pal**, Professor and Co-CI- **Prof. P. K. Sadhu**, Professor (HAG), Department of Electrical Engineering.

Link: <https://www.iitism.ac.in/seminar-1>

Registration Details:

https://www.iitism.ac.in/storage/SeminarDoc/SeminarDoc_6a02b76b0d0641778562923.pdf

Link: <https://www.iitism.ac.in/electrical-engineering>

IEEE International Conference on “Condition Assessment Techniques in Electrical Systems”, “CATCON-2026” under IEEE Dielectrics and Electrical Insulation Society (DEIS) to be held during 18th – 20th December 2026.

Link: <https://catcon2026.iitism.ac.in/index.php>

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