

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. 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 March-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. K. C Jana has received a DST(ANRF), GOI funded project as PI with the valuation of Rs. 57,84,480.

The Title of the Project is: Integration of Multilevel Multiphase Motor for Electric Vehicles: Design, Development, Real-time Fault Diagnosis, and Fault-Tolerant Control for Reduced Harmonics and Torque Ripples at All Speed

Hearty Congratulations for his achievement!



Prof. Sethupathy S and Prof. Tanmoy Maity received a Project "Bioscopy - Towards Modern Transdisciplinary Education and Research in Microscopy," under Indo-Norwegian Cooperation Programme 2024 (INCP2), UGC as Co-PI. with the valuation of Rs. 1,14,66,000.0

Hearty Congratulations for his achievement!



PUBLICATIONS

Journals

- C.M. Banerjee, D. Mishra, **A.Baral**, S.Chakravorti, "Compensating the Impact of Residual Energy on Time Domain Dielectric Response using Time-Varying Model," *IEEE Sensors Journal*, 2025, DOI: 10.1109/JSEN.2025.3552516. [Accepted]
- A. Alzhrani, P. K. Sahay, S. N. Chandra and **V. L. Srinivas**, "A Multifunctional Wind Power Conversion System With Sensorless Operation and Power Quality Improvement Features," *IEEE Access*, vol. 13, pp. 51632-51644, 2025, DOI:10.1109/ACCESS.2025.3552989.
- Sagar Babu Mitikiri, Yash Tiwarib, **V. L. Srinivas**, Mayukha Pal, "Regression Based Anomaly Detection in Electric Vehicle State of Charge Fluctuations Through Analysis of Electric Vehicle Charging Infrastructure Data," *Sustainable Energy, Grids and Networks*, Elsevier. [Accepted (Early Access)]
- Sagar Babu Mitikiri, **V. L. Srinivas**, Mayukha Pal, "Anomaly detection of adversarial cyber attacks on electric vehicle charging stations," *e-Prime - Advances in Electrical Engineering, Electronics and Energy*, vol. 11, pp. 100911, 2025, <https://doi.org/10.1016/j.prime.2025.100911>.
- Nirmalya Mallick, Chandan Kumar Shiva, **V. Mukherjee**, "Novel optimized closed-loop fuzzy control for maximum power tracking of proton exchange membrane fuel cell," *Results in Engineering*, Vol. 25, pp. 104303, 2025.
- Y K Singh, Subrata K Ghosh, **Tanmoy Maity**, "Experimental and numerical investigation of the impact of turbulence on a small-scale double-stage Savonius vertical axis wind turbine in an open environment application," *Thermal Science and Engineering Progress*, Vol. 61, 2025, <https://doi.org/10.1016/j.tsep.2025.103540>.

- Ashiwani Yadav, Jagannath Patra, Rohit Verma, **Nitai Pal**, Scion Samantray, Kunja Bihari Sahoo, Pragya Singh, Ramesh Singh Parihar, Anil Kumar Panda, "Efficient Multi-Objective Approach using ABC Algorithm for Minimizing Generation Fuel Cost and Transmission Loss through FACTS Controllers Placement and Sizing," *Iranian Journal of Science and Technology, Transactions of Electrical Engineering–Springer Nature*, 2025. [Accepted]

Conferences

- Prakirty Kumari and **Dushyant Sharma**, "A comparative study of droop and VSG controlled grid forming inverters integrated with D-STATCOM," *IEEE 1st International Conference on Smart and Sustainable Developments in Electrical Engineering (SSDEE-2025)*, IIT (ISM) Dhanbad 2025. [Accepted & Presented]
- A Alzhrani, P Samanta, S B Mitikiri, P K Sahay and **V. L. Srinivas**, "DC-DC Cascode Converter-Based Speed Control of PMBLDC Motors for EV Drive Applications," *IEEE 1st International Conference on Smart and Sustainable Developments in Electrical Engineering (SSDEE-2025)*, IIT(ISM) Dhanbad, 2025. [Accepted & Presented]
- B. Mohan, A. Charchit, Sajgane, Harshit, V. K. Gupta, P. K. Sahay, S. B. Mitikiri, **V. L. Srinivas**, A. Kumar, "Optimal Location and Sizing of Distributed Generation using Horse Herd Optimization," *IEEE 1st International Conference on Smart and Sustainable Developments in Electrical Engineering (SSDEE-2025)*, IIT(ISM) Dhanbad, 2025. [Accepted & Presented]
- P. K. Sahay, S. B. Mitikiri, P. Samanta, Tushita Das, B. Mohan, **V. L. Srinivas**, "DSOGI Based Power Quality Control with Grid Connected SECS," *IEEE 1st International Conference on Smart and Sustainable Developments in Electrical Engineering (SSDEE-2025)*, IIT(ISM) Dhanbad, 2025. [Accepted & Presented]
- Tushita Das, Bharat, Kanakasabapathy, S. B. Mitikiri, P. K. Sahay, V. K. Gupta, N. Kumar, **V. L. Srinivas**, "Super Capacitor Assisted DC Microgrid Voltage Regulation Using Multipoint Droop Control Mechanism," *IEEE 1st International Conference on Smart and Sustainable Developments in Electrical Engineering (SSDEE-2025)*, IIT(ISM) Dhanbad, 2025. [Accepted & Presented]
- Aman Kumar, P. K. Sahay, S. B. Mitikiri, Tushita Das, P. Samanta, V. K. Gupta, S. Kumar, **V. L. Srinivas**, "An Efficient Bi-directional based Single Phase V2G and G2V technology," *IEEE 1st International Conference on Smart and Sustainable Developments in Electrical Engineering (SSDEE-2025)*, IIT(ISM) Dhanbad, 2025. [Accepted & Presented]
- V. K. Gupta, P. Samanta, P. K. Sahay, **V. L. Srinivas**, "From Conveyor Belts to Crushers: A Review on Radial and Axial Flux Induction Motor Advances and Applications in Industrial Mining Operations," *IEEE 1st International Conference on Smart and Sustainable Developments in Electrical Engineering (SSDEE-2025)*, IIT(ISM) Dhanbad, 2025. [Accepted & Presented]
- Sriballabha, B. Mohan, P. K. Sahay, Tushita das, P. Samanta, V. K. Gupta, **V. L. Srinivas**, **A. Ghoshal**, "Modeling and Monthly Maximum Power Analysis of Solar Photovoltaic Modules in Dhanbad Using MATLAB," *IEEE 1st International Conference on Smart and Sustainable Developments in Electrical Engineering (SSDEE-2025)*, IIT(ISM) Dhanbad, 2025. [Accepted & Presented]
- S. Basak, **B. Bhattacharyya**, S.K. Rajbhar, "Dynamic Load Scheduling Optimization Utilizing the Rao Algorithm for Improved System Performance," *IEEE 1st International Conference on Smart and Sustainable Developments in Electrical Engineering (SSDEE-2025)*, IIT(ISM) Dhanbad, 2025. [Accepted & Presented]
- A. Mishra, **B. Bhattacharyya**, "Power Quality Improvement of Switched Reluctance Motor using Different PFC Converter," *IEEE 1st International Conference on Smart and Sustainable Developments in Electrical Engineering (SSDEE-2025)*, IIT(ISM) Dhanbad, 2025. [Accepted & Presented]

- Basanta Kumar Panigrahi, **Ashok Kumar**, Archana Panda, "An Extensive Review of Techniques for Transmission Line Fault Classification," *3rd International Conference in Advances in Power, Signal, and Information Technology (APSIT-2025)*. [Selected for presentation].
- Anagha Rajendran K. P., **Soumyabrata Barik**, Sudarshan swain, "Fuzzy PSO Algorithm for Optimal DG Integration in a Practical Indian Distribution Network Using Logic OR-Based Forward Backward Load Flow," *IEEE 1st International Conference on Smart and Sustainable Developments in Electrical Engineering (SSDEE-2025)*, IIT(ISM) Dhanbad, 2025. [Accepted & Presented]

FDP/EDP PROGRAM

- A FDP program named "Innovation & Entrepreneurship" funded by AICTE, MoE, GoI, has been conducted from 24th March to 28th March.
PI & Co-ordinator: **Prof. Sukanta Halder**
Co-PI & Co-ordinator: **Prof. Soumyabrata Barik**
Co-ordinating Team Members: **Prof. Pradip K. Sadhu, Prof. Nitai Pal, Prof. Anirban Ghosal.**

OUTREACH ACTIVITIES

- **Prof. Arijit Baral** has delivered a keynote speech in National Conference on Recent Trends in Science and Technology, 2025, organized by Jalpaiguri Govt. Engg. College, West Bengal, India. The title of the talk was "Leveraging Signal Processing for Offline Transformer Insulation Diagnosis: Key Findings and Insights".
- **Prof. Sukanta Halder** and **Prof. Soumyabrata Barik** attended a national workshop under the SSM on the theme-"Scaling up Electric Mobility and Charging Infra: Role of States and

UTs" organized by Niti Aayog, Govt. of India, in New Delhi.

- **Prof. Arijit Baral** and **Prof. K. C. Jana** chaired a technical session in the "Operation, Control, Monitoring, Protection, FACTS Devices, Stability, High Voltage Engineering, Energy Market and Deregulation" at the IEEE SSDEE-2025 conference at IIT (ISM) Dhanbad.
- **Prof. Sukanta Halder** chaired a technical session in the "Renewable Energy Resources, Microgrid, Grid Integration, Energy Management, Islanding, IoT" at the IEEE SSDEE-2025 conference at IIT (ISM) Dhanbad.
- **Prof. V. L. Srinivas** chaired a technical session in the "Renovating Power System Structural form for Sustainable Development Leveraging AI/ML Driven Engineering Innovations" at the IEEE SSDEE-2025 conference at IIT (ISM) Dhanbad.
- **Prof. Sethupathy S.** chaired a technical session in the "Operation, Control, Monitoring, Protection, FACTS Devices, Stability, High Voltage Engineering, Energy Market and Deregulation" at the IEEE SSDEE-2025 conference at IIT (ISM) Dhanbad.
- **Prof. Sonam Acharya** chaired a technical session in the "Renewable Energy Resources, Microgrid, Grid Integration, Energy Management, Islanding, IoT" at the IEEE SSDEE-2025 conference at IIT (ISM) Dhanbad.
- **Prof. Anirban Ghosal** chaired a technical session in the "Devices and Converters, Electrical Drives, Power Quality" at the IEEE SSDEE-2025 conference at IIT (ISM) Dhanbad.
- **Prof. Soumyabrata Barik** chaired a technical session in the "Emerging Smart Technologies in Electrical Engineering: AI, IoT, and Advanced Control for Sustainable Power Systems" at the IEEE SSDEE-2025 conference at IIT (ISM) Dhanbad.
- **Prof. Sukanta Das** and **Prof. Ashok Kumar** chaired a technical session in the "Electric Vehicle, Electric Aircraft, Electrical Machines, Energy Storage Devices, Charging Infrastructure, Wireless Power Transfer" at the IEEE SSDEE-2025 conference at IIT (ISM) Dhanbad.
- **Prof. Sanjoy Mandal** chaired a technical session in the "Operation, Control, Monitoring, Protection, FACTS Devices, Stability, High Voltage Engineering, Energy Market and Deregulation" at the IEEE SSDEE-2025 conference at IIT (ISM) Dhanbad.
- **Prof. Vivekanada Mukherjee** chaired a technical session in the "Soft Computing Techniques in Electrical Engineering" at the IEEE SSDEE-2025 conference at IIT (ISM) Dhanbad.
- **Prof. Nitai Pal** chaired a technical session in the "Empowering the Future: Cybersecurity and Resilient Integration of Electric Vehicles, Power Systems, Energy Storage, Power Electronics, IoT, and Renewable Energy" at the IEEE SSDEE-2025 conference at IIT (ISM) Dhanbad.
- **Prof. Tanmoy Maity** chaired a technical session in the "DC-DC Power Converters: Innovative Circuits, Advanced Control and its applications in Renewable energy and Electric Vehicles" at the IEEE SSDEE-2025 conference at IIT (ISM) Dhanbad.
- **Prof. Tanmoy Maity** worked as an 'Expert Visiting Committee (EVC)' member of the AICTE.
- **Prof. Arijit Baral** chaired a technical session in the "Operation, Control, Monitoring, Protection, FACTS Devices, Stability, High Voltage Engineering, Energy Market and Deregulation" at the IEEE SSDEE-2025 conference at IIT (ISM) Dhanbad.
- **Prof. Ananda Shankar Hati** chaired a technical session in the "Artificial Intelligence, Machine Learning, Big Data Analytics, Cyber Security, Quantum Computing" at the IEEE SSDEE-2025 conference at IIT (ISM) Dhanbad.
- **Prof. Somnath Pan** chaired a technical session in the "Cyber Physical Systems, Robotics, Sensors, Interfacing Electronics, Fibre Optics" at the IEEE SSDEE-2025 conference at IIT (ISM) Dhanbad.

STUDENTS' CORNER

How Machine Learning is Revolutionizing Fault Detection and Maintenance in Electrical Engineering Upasana Tharu – (22JE1028)

In today's world, where even a few minutes of equipment failure can cause major disruptions, the need for reliable electrical systems is more critical than ever. Whether it's a transformer, a transmission line, or a motor, any fault—no matter how small—can have far-reaching consequences. This is where Machine Learning (ML) steps in, offering a smarter, faster, and more efficient way to detect faults and manage maintenance.

From Reactive to Predictive: A Smarter Maintenance Approach:

Historically, maintenance was carried out either after a failure occurred or at scheduled intervals—both approaches often being inefficient and costly. Machine Learning changes this by continuously analyzing both live and historical data to forecast potential issues before they arise. This predictive maintenance approach not only helps avoid downtime but also extends the life of equipment and reduces maintenance overhead.

How Machine Learning Spots Faults Before They Occur:

Machine Learning models are trained on data gathered from various sensors—measuring things like current, voltage, temperature, vibration, and even sound. Over time, these models learn what “normal” looks like for a system. When a pattern deviates from that normal behavior, ML can raise a flag—often well before the fault becomes visible or critical.

Key Applications Across Electrical Systems:

In the context of power transmission, ML helps identify warning signs of insulation failure, line overloading, or short circuits by analyzing electrical signals. Within transformers, it can detect internal degradation by monitoring changes in temperature, oil properties, and loading conditions. For motors and generators, machine learning can catch subtle shifts in vibration or acoustic data that hint at mechanical wear or imbalance.

Smarter Grids and Self-Monitoring Infrastructure:

Machine Learning also plays a key role in advancing smart grids. These grids use ML to monitor energy flow, predict consumption patterns, and detect anomalies in real time. Algorithms such as reinforcement learning or time-series analysis help systems respond dynamically to changes, improving resilience and reducing the risk of widespread failures.

Real-World Implementations:

Several leading organizations have already embraced ML in their operations. For instance, General Electric uses ML to monitor wind turbines, predicting issues like blade fatigue or gearbox failure before they become serious. In India, Indian Railways employs similar technology to monitor the electrical systems in its trains, improving reliability and reducing unexpected stoppages. These examples

show that ML isn't just theoretical—it's already delivering results.

Why This Matters:

Using ML in fault detection transforms how we maintain systems. It enables early intervention, cuts unnecessary maintenance costs, boosts safety, and keeps operations running smoothly. Moving from a reactive to a predictive strategy marks a fundamental shift—one that favors long-term efficiency and resilience.

What Challenges Still Exist?

Despite its promise, Machine Learning isn't without obstacles. High-quality, well-organized data is essential for training accurate models. Legacy systems may need upgrades to support real-time data collection and analysis. Moreover, as these systems become more connected, ensuring cybersecurity becomes increasingly important to avoid potential threats.

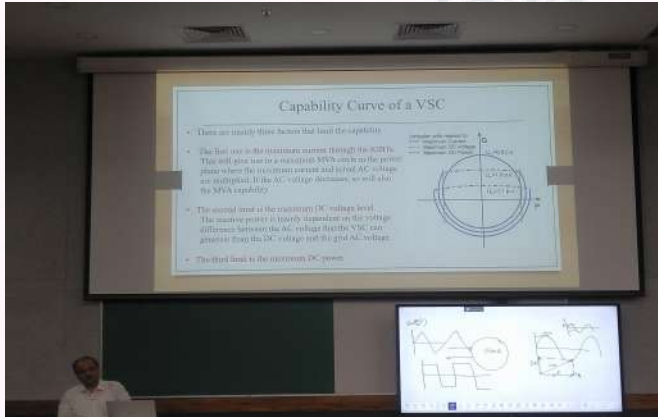
Looking Forward:

With the rise of technologies like IoT, 5G, and edge computing, Machine Learning will only become more embedded in our electrical systems. We're heading toward a future where equipment not only reports faults but can also make informed decisions about how to prevent them. In this context, Machine Learning isn't just a tool—it's becoming a core part of engineering smarter, safer, and more dependable systems.

Mr. Bikramaditya Chandan, a full-time research scholar, working under **Prof. K. C. Jana**, has submitted his PhD Thesis. The title of the Thesis is: Design and Control of a High Gain Switched-Capacitor Multilevel Inverter for a Transformerless Grid-Connected Photovoltaic Systems.

Mr. Korra Balu (19DR0072), an Ex research scholar, working under **Prof. Vivekananda Mukherjee** has been selected for the position of Assistant Professor at the National Institute of Technology Calicut.

GLIMPSES OF LECTURE BY PROF. SUKUMAR MISHRA, DIRECTOR, IIT (ISM) DHANBAD



Prof. Sukumar Mishra, Director, IIT (ISM) Dhanbad is delivering a lecture to the Postgraduate (PG) and Ph.D. students of the Electrical Engineering (EE) department on 30th March 2025 at NAC Auditorium.

GLIMPSES OF INVITED LECTURE IN THE DEPARTMENT OF EE



Prof. Mahesh Kumar, Professor, Department of Electrical Engineering, IIT Madras, is delivering a lecture on 21st March 2025, at NAC Auditorium.

INAUGURAL SESSION OF 5-DAYS FDP ON “INNOVATION & ENTREPRENEURSHIP”



The FDP Program was inaugurated on 24th March 2025 at i2H, IIT (ISM) Dhanbad. The FDP was funded by AICTE and the Ministry of Education's Innovation Cell. The FDP program has been designed for the faculty members to provide the necessary knowledge, tools, and best practices to integrate innovation and entrepreneurship into their teaching and research.

GLIMSES OF PANEL DISCUSSION FOR EMPOWERING WOMEN IN ENGINEERING IN SSDEE-2025

The Women Empowerment in Engineering was scheduled on the second day of the International Conference (WIE) organized on Smart and Sustainable Development in Electrical Engineering at IIT ISM Dhanbad, 01 March 2025. Women technocrats and academicians participated in it to express their views to young women to pursue a career in STEM, research funding opportunities for women, and how mentorship and support play a significant role for women faculty in engineering.





Prof. Prerna Gaur, Director of Netaji Subhas University of Technology, west Campus, one of the panel members, discussed her views on women leadership roles, subconscious bias in hiring and promotion for women. Bhawana Singh shared her hardships in her PhD and postdoctoral journey to encourage more women in academia. She also expressed her journey to engineering, research and academia and advice women's to be self-reliant, motivated and have focused goals.

A FEW GLIMSES OF SSDEE-2025 CONFERENCE AT IIT (ISM) DHANBAD





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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

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