

ICDECT-2025

6th International Conference on Data Engineering and Communication Technology
(1st - 2nd December, 2025)

Bhubaneswar Engineering College (BEC), Bhubaneswar

CALL FOR SPECIAL SESSION PROPOSAL

Title of the proposed special session along with a short abbreviation

**AI-Driven Optimization for Renewable Energy Integration
and Power Electronics (AI-REIPE)**

Names/affiliation of the Session Chair(s) (including brief bio and contact info) along with emails of all chairs).

Dr. Nazrin Salma S, Assistant Professor Department of General Engineering (Electrical and Electronics Engineering), R.M.K. College of Engineering and Technology, Thiruvallur, Tamil Nadu, India.

E-mail: nazrinsh@rmkcet.ac.in,

Contact Number: +91 77087 14742

Dr. Nageswari D, Associate Professor – I, Department of General Engineering (Electrical and Electronics Engineering), R.M.K. College of Engineering and Technology, Thiruvallur, Tamil Nadu, India.

E-mail: nageswari@rmkcet.ac.in,

Contact Number: +91 99623 98977

Dr. Bindu K V, Associate Professor – I, Department of General Engineering (Electrical and Electronics Engineering), R.M.K. College of Engineering and Technology, Thiruvallur, Tamil Nadu, India.

E-mail: bindu@rmkcet.ac.in,

Contact Number: +91 824 836 1274

Dr. Hariharan N, Associate Professor – I, Department of General Engineering (Electrical and Electronics Engineering), R.M.K. College of Engineering and Technology, Thiruvallur, Tamil Nadu, India.

E-mail: hariharan@rmkcet.ac.in,

Contact Number: +91 94441 37300

Session abstract/theme (should clearly mention the significance of the topic and the rationale of the need for the proposed session).

The global transition to Renewable Energy Sources (RES) faces challenges like intermittency and grid stability. Power electronics are vital for integrating these sources efficiently. This special session, "AI-Driven Optimization for Renewable



ICDECT-2025

6th International Conference on Data Engineering and Communication Technology
(1st - 2nd December, 2025)

Bhubaneswar Engineering College (BEC), Bhubaneswar

Energy Integration and Power Electronics," focuses on the transformative role of Artificial Intelligence (AI) in addressing these complexities.

The significance of this topic stems from AI's capability to optimize complex energy systems. AI algorithms enable precise RES forecasting, intelligent control of power converters, and real-time energy management, ultimately enhancing grid resilience and efficiency. This convergence of AI with power electronics offers novel solutions for maximizing energy harvest, reducing losses, and improving overall system performance for a sustainable energy future.

This session provides a dedicated forum for researchers and professionals to share cutting-edge advancements and discuss challenges at this crucial intersection. It aims to foster interdisciplinary collaboration and highlight innovative AI-driven approaches vital for achieving smart and sustainable energy grids, aligning directly with the data and technology focus of ICDECT-2025.

Topics of Interest

- AI-based forecasting and prediction for renewable energy sources (solar, wind, hydro).
- Intelligent control strategies for power converters in renewable energy systems.
- Machine learning for fault detection, diagnosis, and predictive maintenance in power electronics.
- AI for optimal energy management and dispatch in smart grids and microgrids.
- Deep learning applications for grid stability, synchronization, and voltage regulation with high RES penetration.
- Reinforcement learning for energy trading, demand-side management, and grid optimization.
- AI-driven design, simulation, and optimization of power electronic devices and systems.
- Digital twins and AI for real-time monitoring and control of renewable energy infrastructure.
- Cybersecurity and data privacy challenges in AI-driven energy systems.
- Hardware-in-the-loop and software-defined power electronics with AI integration.

