About the Course:

The evolution of power systems toward high penetration of renewable energy sources, widespread deployment of microgrids, and rapid growth of electric vehicles (EVs) has introduced unprecedented complexity in power network planning and operation. Conventional analysis and control techniques are no longer sufficient to address the dynamic, distributed, and real-time nature of next-generation power networks.

Artificial Intelligence (AI) and real-time simulation have emerged as key technologies to enable intelligent, adaptive, and resilient power systems. AI facilitates predictive analytics, optimal control, and autonomous decision-making, while real-time simulation provides a realistic platform for system modeling, hardware-in-the-loop testing, and validation of control strategies. Their integration is particularly crucial for effective microgrid management and EV charging coordination.

This Faculty Development Programme (FDP) is designed to provide participants with a comprehensive understanding of AI-enabled power networks using real-time simulation tools. The programme emphasizes both foundational concepts and hands-on exposure, enabling faculty members to incorporate these advanced topics into teaching and research. This will serve as a platform for capacity building by offering in-depth theoretical knowledge and practical training fostering research and innovation in this emerging domain.

Course Coverage:

- Opportunities and Challenges in Power Flow Control in a Modern Grid
- India's Regulatory Lens on AI-Powered Microgrids & EV Infrastructure
- Real-Time Simulation for Power Electronics & Power System Applications
- **Power Electronics at its Best in High Voltage, High Power Applications (DLP)**
- Optimise hybrid power systems with HOMER Pro and HOMER Grid
- Introduction to OPAL-RT MATLAB Modelling & I/O configuration
- Hardware-in-the-Loop (HIL) and controller-in-the-loop (CIL)
- Introduction to Microgrid Test Bed
- Modelling Microgrids and EV systems
- OPAL-RT for EV applications

Lab Sessions:

- MATLAB Modelling in RT-Lab Software
- HIL using different microcontrollers
- HYPERSIM & Communication Protocols
- Power Electronics & Power System Solvers
- RCP using Power converter modules

Key Speakers:

- ***Dr. Kalyan K. Sen,*** *IEEE Life Fellow, President & CTO, Sen Engineering Solutions, Inc.* ***(DLP)***
- ***Dr VSK Murthy Balijepalli,,*** *Promoter at LUCES and Innovation Consulting, IEEE PES Region 10 Secretary*
- Ms Nidhi Verma, *UL Solutions Lead Trainer*
- Mr. Gagan Deep Singh Puri, *Regional Head - Products & Solutions Opal RT Technologies India Pvt Ltd*
- Mr. Manish Barwar, *OPAL RT Technologies India Pvt. Ltd.*
- Prof. Pravat Kumar Ray, *NIT Rourkela*
- Prof. Monalisa Pattnaik, *NIT Rourkela*

Anusandhan National Research Foundation

IEEE Kolkata Section IA & PE Joint Societies Chapter-Rourkela

NATIONAL INSTITUTE OF TECHNOLOGY ROURKELA

ANRF-PAIR Outreach Activity

Short Term Course & Faculty Development Programme on

Next-Gen Power Networks: AI & Real-Time Simulation for Microgrids and EVs

(NEXG-AIMEV -2026)

11th - 15th March 2026

Hybrid Mode

Coordinators

Prof. Pravat Kumar Ray
Prof. Monalisa Pattnaik

Organized By

IEEE Kolkata Section IA & PE Joint Societies Chapter-Rourkela in association with
Dept. of Electrical Engineering
National Institute of Technology Rourkela
Rourkela, Odisha – 769008

Introduction:

The rapid proliferation of renewable energy resources, microgrids, and electric vehicles is fundamentally reshaping modern power networks. Traditional planning and control methods, designed for centralized and predictable systems, are increasingly inadequate for managing the complexity, uncertainty, and real-time dynamics of next-generation power infrastructures. Artificial Intelligence and real-time simulation are emerging as powerful enablers for next-generation power networks.

This FDP focuses on the application of AI and real-time simulation for the planning, operation, and control of microgrids and EV-integrated power systems. Participants will gain insights into modern simulation platforms like Homer-Pro, Homer Grid, OPAL-RT, AI-based optimization and control methods, and emerging challenges such as EV charging coordination, grid stability, and resilience. The programme aims to bridge the gap between theory and practice, equipping faculty members with the knowledge and tools needed to teach, research, and innovate in next-generation power systems.

About the Institute:

The course will be organized by the Dept. of Electrical Engineering at National Institute of Technology (NIT), Rourkela. It is one of the premier national level institutions for technical education in the country and is funded by the Government of India.

Please visit *https://www.nitrkl.ac.in*

34 NIRF Overall	**13** NIRF Engineering	**30** NIRF Research	**317 – 78** QS Asia

About the Department:

The department of Electrical Engineering is established with the vision to design technologies and nurture technologists for diverse and sustainable growth in electrical engineering, leading to wealth and welfare of humanity. The department offers various UG and PG programmes with the mission to develop a platform for forging students as technocrats in line with cutting-edge academic, research and modern industrial practices, and enhancing their aptness in any technical sectors across the globe.

Contact us:

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Online Account Details:

Account No: 10138951784
Account Name: CONTINUING EDUCATION NIT ROURKELA
IFSC No: SBIN0002109
Branch: State Bank of India, NIT Campus Rourkela.

Online Registration Form:

EXTERNAL NITR INTERNAL 01389517841@sbi

Important Dates:

Registration Deadline: 5th March 2026
Short-term Course Date: 11th-15th March 2026

Registration Details:

Category	Online Registration Fee (Including 18% GST)	Offline Registration Fee (Including 18% GST)
Research Scholars / PG / UG Students (3rd year onwards)	₹ 944.00	₹ 1770.00
Faculty from Engineering Institutes	₹ 1770.00	₹ 2950.00
Engineers from Industry and R&D Organizations	₹ 2360.00	₹ 4720.00
Participant from Abroad	$ 118.00	$ 236.00

Accommodation & Food Extra for Offline Participants.
No registration fee for students / staffs of NIT Rourkela and need to register separately.