About the Course:

The increasing adoption of e-mobility presents both opportunities and challenges for the existing electrical infrastructure. The traditional charging methods can strain the conventional grid during peak demand, potentially leading to power outages and increased costs. Smart charging solutions address these concerns by dynamically managing power delivery to electric vehicles (EVs) based on grid conditions and economic aspects. Therefore, the transition to electric mobility is a critical component of global efforts toward sustainability and carbon neutrality. This short-term course, *Sustainable Electric Mobility through Intelligent Charging and Microgrid Control* offers an introduction to the key concepts, technologies, and strategies that enable efficient integration of EVs with modern power systems and microgrids. The course focuses on intelligent charging techniques, vehicle-to-grid (V2G) interactions, demand-side management, and the role of microgrids powered by renewable energy sources. The course also delves into advanced technologies and strategies for optimizing EV charging, enhancing grid stability, and integrating renewable energy sources.

Upon completion of this course, participants will be equipped with the knowledge and skills to contribute to the development and implementation of sustainable electric mobility solutions within the context of a rapidly evolving energy landscape.

Course Coverage:

- Intelligent Charging Infrastructure for Electric Vehicles in Smart Microgrid Environments.
- Introduction to Charge Scheduling through AI/ML
- Coordinated Control and Energy Management of Renewable-Assisted EV Charging Stations.
- Vehicle-to-Grid (V2G) and Grid-to-Vehicle (G2V) Integration: Concepts and Control Strategies.
- Design and Optimization of Hybrid AC/DC Microgrids with Electric Mobility Integration.
- Real-Time Energy Management Algorithms for Renewable-Rich Microgrids.
- Advanced MPPT and Power Sharing Techniques in Multisource Distributed Energy Systems.
- Sustainable Planning and Economic Assessment of EV-Integrated Microgrids.

Lab Sessions:

- Design and Simulation of DAB Converter for Battery- Charging Applications
- Experimental validation of DAB Converter using C2000 Microcontroller
- Closed loop Controller Implementation for HESS

Key Speakers:

- Prof. Premalata Jena, IIT Roorkee
- Prof. Sandip Ghosh, IIT BHU
- Prof. Indrajit Sarkar, NIT Rourkela
- Prof. Monalisa Pattnaik, NIT Rourkela
- Prof. Susovon Samanta, NIT Rourkela
- Prof. Arnab Ghosh, NIT Rourkela
- Prof. Pravat Kumar Ray, NIT Rourkela
- Prof. Arijit Guha, NIT Rourkela
- Prof. Surja Sekhar Chakraborty, NIT Rourkela

National Institute of Technology Rourkela

Short Term Course & Faculty Development Programme On

Sustainable Electric Mobility through Intelligent Charging and Microgrid Control

(SEMICMC -2025)

10th - 14th October 2025

Online Mode

Coordinators

Prof. Monalisa Pattnaik
Prof. Indrajit Sarkar
Prof. Susovon Samanta
Prof. Arnab Ghosh

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Organized By

Dept. of Electrical Engineering
National Institute of Technology
Rourkela, Odisha - 769008

Technically Co-sponsored by:

IEEE ROURKELA SUBSECTION

IEEE Kolkata Section IA & PE Joint Societies Chapter-Rourkela

Introduction:

The rapid transition toward sustainable transportation and clean energy demands intelligent integration of electric mobility with advanced microgrid systems. This short-term course is designed to provide foundational and practical knowledge on the synergistic operation of electric vehicles (EVs), renewable energy sources, and energy storage within microgrids. Emphasis is placed on smart charging strategies, coordinated control, and real-time power management techniques to ensure reliability, efficiency, and sustainability.

The course also highlights energy management, voltage/frequency regulation, and optimal energy dispatch in the presence of dynamic EV charging loads. Through a combination of theoretical sessions and hands-on labs, participants will explore recent advancements in energy management schemes (EMS) & EV charging control algorithms, dual active bridge (DAB) converter modulation techniques and validation using simulation platforms and experimental testbeds. This program is ideally suited for students, researchers, and professionals working in power systems, power electronics, renewable integration, and electric vehicle infrastructure development.

About the Institute:

The course will be organized by the Centre of Excellence on Renewable Energy Systems at the 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	19 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.

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

Registration Details:

Category	Online Registration Fee (Including 18% GST)
Research Scholars/ PG / UG Students (3rd year onwards)	₹ 708.00
Faculty from Engineering Institutes	₹ 1180.00
Engineers from Industry and R&D Organizations	₹ 1770.00
Participant from Abroad	$ 118.00

No registration fee for students / staffs of NIT Rourkela and need to register separately.

Online Account Details:

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

Important Dates:

Registration Deadline: 1st October 2025

Short-term Course Date: 10th-14th October 2025

Online Registration Form:

EXTERNAL NITR INTERNAL 01389517841@sbi

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