

The DC/DC converter design workshop aims to provide participants with a comprehensive understanding of the principles, methodologies, and practical aspects of designing efficient and reliable DC/DC converters. This workshop is tailored for engineers, researchers, and enthusiasts looking to deepen their knowledge of power electronics and advance their skills in converter design. This workshop focuses also on the integration of microcontrollers for advanced closed-loop control in DC/DC converters. Participants will gain hands-on experience in implementing control algorithms to optimize performance, stability, and efficiency in power electronics applications.

Highlights of the Event

- ❖ Introduction to DC/DC Converters
- ❖ Design Considerations and Component Selection
- ❖ Simulation and Verification
- ❖ Microcontroller Overview and Programming Basics
- ❖ Integration of Microcontroller in DC/DC Converter Design
- ❖ PCB Layout
- ❖ Hands-on Labs and Case Studies
- ❖ Testing and Validation
- ❖ Case Studies and Practical Examples

Workshop Outcome:

By the end of the workshop, participants will gain a solid understanding of both theoretical concepts and practical skills necessary to design, implement, and optimize DC/DC converters using microcontrollers effectively. This knowledge is crucial for engineers and professionals involved in power electronics, embedded systems, and related fields seeking to enhance their expertise in power management and control technologies.

Workshop Topics:

- ✓ Machine learning (ML) based State of Charge Estimation for Lithium- ion Battery Pack
- ✓ Designing of Switching Converters for Microgrid Application
- ✓ Real-time implementation of intelligent control methods for grid forming inverters
- ✓ Demonstration on Design and Implementation of Intelligent controller for Efficient Power Management in Hybrid Microgrids
- ✓ Demonstration of Various Intelligent MPPT Techniques of Solar and Wind Energy System
- ✓ Active Power Management In A Hybrid AC/DC Microgrid Integrated With Composite Energy Storage Devices
- ✓ Analysis of Different Phase Shifting Techniques for DAB Converter in EV Application
- ✓ Advance Power Management Techniques of a DC Microgrid
- ✓ Interfacing of C2000 Launch pad with MATLAB and PWM Signal Generation
- ✓ Inverter Control of Bidirectional Converter with PV System in Islanded and Grid Connected Mode
- ✓ Interfacing of PV Module and Battery through SEPIC and DAB Converter
- ✓ Applications of Convolutional Neural networks in Electric Vehicle
- ✓ Forecasting of Solar Energy using ML Approaches
- ✓ Some Analytical Perspectives on Modeling, Small-Signal Stability Analysis and Chaos Control of Power Electronic Converters
- ✓ Real-Time Application of Smith Predictor for systems with dead time

Laboratory Sessions:

- ✓ Real-time Integration of Solar and Pico-hydro with energy storage systems for stand-alone microgrid
- ✓ Real-time Implementation of Intelligent and Optimized MPPT Algorithm techniques for MPP tracking of PV Module with Arduino AT Mega Board
- ✓ Battery Charging and Discharging with DAB Converter
- ✓ Fabrications of Driver Circuits and Sensors for Converter Applications
- ✓ PCB Layout design for DC-DC Converters, and Testing with Arduino Board interface



NATIONAL INSTITUTE OF
TECHNOLOGY ROURKELA

Five Days Virtual FDP/ Workshop/ Webinar on “AI/ML-Based Controller Design and Deployment on Real-Time Platforms” (AMCDDRP-2025)

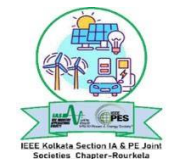
5th November to 9th November 2025
(Online Mode)

Principal Coordinator
Dr. Arnab Ghosh

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

Technically Co-sponsored by:

**IEEE Kolkata Section IA & PE Joint
Societies Chapter-Rourkela**





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	13 NIRF Engineering	30 NIRF Research	281-290 QS Asia
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About the Departments:

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.

Please visit <https://website.nitrkl.ac.in/EE/>

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QR Code of Registration Form:



Online Registration Form:

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Registration Details:

Category	Online Registration Fee in INR (including 18% GST)
Research Scholars/ PG / UG Students	Rs. 559/-
Faculty from Engineering Institutes	Rs. 669/-
Engineers from Industry and R&D Organizations	Rs. 779/-
International Participants	90 USD
No registration fee for students/ staff of NIT Rourkela	

Important Dates:

Registration Deadline: 3rd November 2025

Workshop Date: 5th – 9th November 2025

Contact:

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“AI/ML-Based Controller Design and Deployment on Real-Time Platforms”

5th November- 9th November 2025 at NIT Rourkela

Coordinator: Dr. Arnab Ghosh

Workshop Schedule (Online)

Day #1 (5th November 2025 Wednesday) INAUGURAL SESSION			
09:00 AM – 09:15 AM Workshop Coordinator: Dr. Arnab Ghosh, NIT Rourkela			
Day #1 (5th November 2025 Wednesday)			
Session 1: 09:15 AM – 11:00 AM	Session 2: 11:00 AM – 1:00 PM	Session 3: 3:00 PM – 5:00 PM	Laboratory Session 1: 5:00 PM – 6:00 PM
Title: MPPT Techniques for DC-DC Converters Switched Model and Experimental Validation Speaker: Dr. Kuntal Mondal, Company: IDIADA Automotive Technology, Position: R&D Engineer, location: Santa Oliva, Tarragona, Spain	Title: Control of Induction Motor Drive Systems for Automotive Applications Speaker: Prof. Saptarshi Basak, IIT Delhi	Title: Energy Management Strategies for Renewable Energy Systems Integrated with Hybrid Energy Storage Speaker: Pranati Rani Purohit, NIT Rourkela	Title: Real-Time Integration and Experimental Demonstration of a 500W DC Microgrid System Speaker: Jayadev Meher, NIT Rourkela
Day #2 (6th November 2025 Thursday)			
Session 4: 09:00 AM – 11:00 AM	Session 5: 11:00 AM – 1:00 PM	Session 6: 3:00 PM – 5:00 PM	Laboratory Session 2: 5:00 PM – 6:00 PM
Title: Design of gate driver circuit using Kicad, and control of driver circuit using a microcontroller Speaker: Shaswat Chandra Mishra and Suvankar Chakraborty, NIT Rourkela	Title: Design and Application of Integrated Multiport Converters in DC Microgrids: Enabling Efficient Renewable Energy and Storage Integration Speaker: Jayadev Meher, NIT Rourkela	Title: Development of vibration and solar energy harvester-based self-powered sensor system and its applications towards AI/ ML enabled structural health monitoring Speaker: Prof. Banibrata Mukherjee, IIT Kharagpur	Title: Real-time Implementation of Intelligent and Optimized MPPT Algorithm techniques for MPP tracking of PV Module with Arduino AT Mega Board Speaker: Mainak Biswas & Riju Nandi, NIT Rourkela
Day #3 (7th November 2025 Friday)			
Session 7: 09:00 AM – 11:00 AM	Session 8: 11:00 AM – 1:00 PM	Session 9: 3:00 PM – 5:00 PM	Laboratory Session 3: 5:00 PM – 6:00 PM
Title: Machine learning (ML) based State of Charge Estimation for Lithium-ion Battery Pack and Interfacing of C2000 Launch Pad with MATLAB and PWM Signal Generation Speaker: Mainak Biswas	Title: Real-time Implementation of Standard AC Motor Control Algorithms (with PI Controller) in TI Microcontroller Speaker: Prof. Prasun Mishra, IIT Kharagpur	Title: Designing of Switching Converters for Microgrid Application Speaker: Souvik Mondal	Title: Real-Time Simulation Using OPAL-RT for Renewable Energy Systems Speaker: Pranati Rani Purohit, NIT Rourkela
Day #4 (8th November 2025 Saturday)			
Session 10: 09:00 AM – 11:00 AM	Session 11: 11:00 AM – 1:00 PM	Session 12: 3:00 PM – 5:00 PM	Laboratory Session 4: 5:00 PM – 6:00 PM
Title: High power DC-DC Converters design, Battery Charging and Discharging with Bidirectional Buck-Boost Converter, Controller design and Testing with C2000 microcontroller interface Speaker: Riju Nandi and Mainak Biswas	Title: Power Quality Improvement and Power Flow Analysis of a Grid connected Photovoltaic System Speaker: Prof. Pravat Kumar Ray, HOD, EE, NIT Rourkela	Title: A Study on DAB Converter Control Using Different Modulation and Switching Techniques Speaker: Jayadev Meher	Title: Real-Time Integration of Solar and Wind (PMSG Coupled with DC Motor) With Energy Storage Systems for A Stand-Alone Microgrid Speaker: Riju Nandi & Jayadev Meher
Day #5 (9th November 2025 Sunday)			
Session 13: 09:00 AM – 11:00 AM	Session 14: 11:00 AM – 1:00 PM	Session 15: 3:00 PM – 4:30 PM	Session 16: 4:30 PM – 6:00 PM
Title: Forecasting of Solar Energy using ML Approaches Speaker: Prof. Amit Kumar Yadav, School of Computer Science and Artificial Intelligence, SRM University	Title: Power Management Scheme with Intelligent Control Techniques Speaker: Ananya Pritilagna Biswal, NIT Rourkela	Title: Some New Analytical Perspectives on Parasitics and Inherent Time Delay in Modelling and Stability Analysis of Power Electronic Systems Speaker: Dr. Aranya Bandyopadhyay, IISc Bangalore	Title: Energy Management Strategy of a Fuel Cell Hybrid Electric Vehicle using AI/ML Speaker: Prof. Chiranjit Sain, GKCIET Malda
Day #5 (9th November 2025 Sunday) VALEDICTORY SESSION			
6:00 PM – 6:30 PM Workshop Review, Feedback, Valedictory Session, and Vote of Thanks by Workshop Coordinator Workshop Coordinator: Dr Arnab Ghosh, NIT Rourkela			