



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:

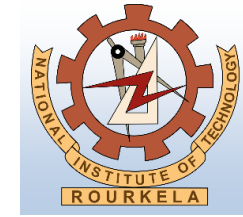
By the end of the workshop, participants will gain a solid understanding of both theoretical concepts and practical skills necessary to design, implement, and optimize DC/DC converters using microcontrollers effectively. This knowledge is crucial for engineers and professionals involved in power electronics, 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

### 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 Workshop on AI/ML based Controllers Design and their Applications in Real-time Platform**

**28<sup>th</sup> September to 2<sup>nd</sup> October 2024**

**Principal Coordinator**  
**Dr. Arnab Ghosh**

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

### Technically Supported by:

**Science for Equity Empowerment and  
Development (SEED), Department of  
Science and Technology (DST), Ministry of  
Science and Technology, Govt. of India**



### 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 Engg.	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 programmed 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/>

### Online Account Details:

**Account No:** 10138951784  
**Account Name:** CONTINUING EDUCATION NIT ROURKELA  
**IFSC No:** SBIN0002109  
**Branch:** State Bank of India, NIT Campus Rourkela  
**UPI ID:** 01389517841@sbi



### QR Code of Registration Form:



### Online Registration Form:

<https://forms.gle/jpG9tMZfT8XLEYdHA>

### Registration Details:

Category	Online Registration Fee in INR
Research Scholars/ PG / UG Student	500/-
Faculty from Engineering Institutes	600/-
Engineers from Industry and R&D Organizations	800/-
International Participants	50 USD
<b>No registration fee for students / staffs of NIT Rourkela</b>	

### Important Dates:

**Registration Deadline:** 20<sup>th</sup> September 2024

**Workshop Date:** 28<sup>th</sup> – 2<sup>nd</sup> October 2024

### Contact:

✚ **Dr. Arnab Ghosh, Assistant Professor**  
**Dept. of Electrical Engineering**  
 Ph: 0661-2462417(O), 9433379717 (M)  
 Email: ghosha@nitrkl.ac.in, aghosh.ee@gmail.com  
**National Institute of Technology Rourkela**  
**Rourkela– 769008, Odisha.**

# AI/ML based Controllers Design and their Applications in Real-time Platform (AMCDARP-2024)

28<sup>th</sup> September- 2<sup>th</sup> October 2024 at NIT Rourkela

**Coordinator: Dr. Arnab Ghosh**

## Workshop Schedule (Online)

<b>Day #1 (28 September 2024 Saturday) INAUGURAL SESSION</b>			
09:00 AM - 09:30 AM Workshop Coordinator: Dr. Arnab Ghosh, NIT Rourkela			
<b>Day #1 (28 September 2024 Saturday)</b>			
<b>Session 1: 09:30 AM - 11:00 AM</b>	<b>Session 2: 11:00AM - 1:00PM</b>	<b>Session 3: 3:00PM - 5:00PM</b>	<b>Laboratory Session 1: 5:00PM - 6:00PM</b>
Title: Designing of Switching Converters for Microgrid Application Dr. Arnab Ghosh, NIT Rourkela	Title: Real-time implementation of intelligent control methods for grid forming inverters Dr. Vikash Gurugubelli	Title: Demonstration on Design and Implementation of Intelligent controller for Efficient Power Management in Hybrid Microgrids Suchismita Patel, NIT Rourkela	Title: Real-time Integration of Solar and Pico-hydro with energy storage systems for stand-alone microgrid Jayadev Meher, NIT Rourkela
<b>Day #2 (29 September 2024 Sunday)</b>			
<b>Session 4: 09:00 AM - 11:00 AM</b>	<b>Session 5: 11:00AM - 1:00PM</b>	<b>Laboratory Session 2: 3:00PM - 4:00PM</b>	<b>Session 6: 4:00PM - 6:00PM</b>
Title: Machine learning (ML) based State of Charge Estimation for Lithium-ion Battery Pack Sourabh Das, NIT Rourkela	Title: Demonstration of Various Intelligent MPPT Techniques of Solar and Wind Energy System Riju Nandi, NIT Rourkela	Title: Real-time Implementation of Intelligent and Optimized MPPT Algorithm techniques for MPP tracking of PV Module with Arduino AT Mega Board Riju Nandi, NIT Rourkela	Title: Active Power Management In A Hybrid AC/DC Microgrid Integrated With Composite Energy Storage Devices Anindya Bharatee, Manager- Vehicle Engineering, OLA Electric
<b>Day #3 (30 September 2024 Monday)</b>			
<b>Session 7: 09:00AM - 11:00AM</b>	<b>Session 8: 11:00AM - 1:00PM</b>	<b>Session 9: 3:00PM - 5:00PM</b>	<b>Laboratory Session 3: 5:00PM - 6:00PM</b>
Title: Analysis of Different Phase Shifting Techniques for DAB Converter in EV Application Boddepalli Hemanth Kumar and Basava Thirumala Rao, NIT Rourkela	Title: Advance Power Management Techniques of a DC Microgrid Ananya Pritilagna Biswal, NIT Rourkela	Title: Interfacing of C2000 Launch pad with MATLAB and PWM Signal Generation Gaurav Kumar, NIT Rourkela	Title: Battery Charging and Discharging with DAB Converter Jayadev Meher and Riju Nandi, NIT Rourkela
<b>Day #4 (1 October 2024 Tuesday)</b>			
<b>Session 10: 09:00AM - 11:00AM</b>	<b>Session 11: 11:00AM - 1:00PM</b>	<b>Session 12: 3:00PM - 5:00PM</b>	<b>Laboratory Session 4: 5:00PM - 6:00 PM</b>
Title: Inverter Control of Bidirectional Converter with PV System in Islanded and Grid-Connected Mode Pranati Rani Purohit, NIT Rourkela	Title: Interfacing of PV Module and Battery through SEPIC and DAB Converter Jayadev Meher, NIT Rourkela		Title: Fabrications of Driver Circuits and Sensors for Converter Applications Gaurav Kumar, NIT Rourkela
<b>Day #5 (2 October 2024 Wednesday)</b>			
<b>Laboratory Session 5: 09:00AM - 11:00AM</b>	<b>Session 13: 11:00AM - 1:00PM</b>	<b>Session 14: 3:00PM - 5:00PM</b>	
Title: PCB Layout design for DC-DC Converters, and Testing with Arduino Board interface Riju Nandi and Jayadev Meher, NIT Rourkela	Title: Applications of Convolutional Neural networks in Electric Vehicle Dr. Prasenjit Dey, NIT Rourkela	Title: Forecasting of Solar Energy using ML Approaches Basava Thirumala Rao, NIT Rourkela	
<b>Day #5 (2 October 2024 Wednesday) VALEDICTORY SESSION</b>			
5:00PM - 5:30PM Workshop Review, Feedback, Valedictory Session, and Vote of thanks by Workshop Coordinator Workshop Coordinator: Dr. Arnab Ghosh, NIT Rourkela			