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
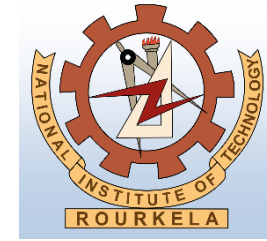
National Institute of Technology Rourkela

Five Days Virtual Workshop on AI/ML based Controllers Design and their Applications in Real-time Platform

28th September to 2nd 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/

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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/

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Category	Online Registration Fee in INR
Research Scholars/ PG / UG Student	500/-
Faculty fromEngineering Institutes	600/-
Engineers from Industry and R&D Organizations	800/-
International Participants	50 USD

No registration fee for students / staffs of NIT Rourkela

Important Dates:

Registration Deadline: 27th September 2024
Workshop Date: 28th – 02nd 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, Odisa.

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

28th September- 2th October 2024 at NIT Rourkela

Coordinator: Dr. Arnab Ghosh

Workshop Schedule (Online)

Day #1 (28 September 2024 Saturday) INAUGURAL SESSION			
09:00 AM – 09:30 AM Workshop Coordinator: Dr. Arnab Ghosh, NIT Rourkela			
Day #1 (28 September 2024 Saturday)			
Session 1: 09:30 AM – 11:00 AM	Session 2: 11:00AM – 1:00PM	Session 3: 3:00PM – 5:00PM	Laboratory Session 1: 5:00PM – 6:00PM
Title: Analysis of Different Phase Shifting Techniques for DAB Converter in EV Application Boddepalli Hemanth Kumar and Basava Thirumala Rao, NIT Rourkela	Title: Real-time implementation of intelligent control methods for grid forming inverters Dr. Vikash Gurugubelli	Title: Efficient Torque Control of IPMSM Using MTPA Algorithm on C2000 DSP Platform with MATLAB Embedded Coder Manas Ranjan Jena, Senior Power Electronics Engineer, L&T Technology Services, Bengaluru	Title: Real-time Integration of Solar and Pico-hydro with energy storage systems for stand-alone microgrid Jayadev Meher, NIT Rourkela
Day #2 (29 September 2024 Sunday)			
Session 4: 09:00 AM – 11:00 AM	Session 5: 11:00AM – 1:00PM	Laboratory Session 2: 3:00PM – 4:00PM	Session 6: 4:00PM – 6:00PM
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
Day #3 (30 September 2024 Monday)			
Session 7: 09:00AM – 11:00AM	Session 8: 11:00AM – 1:00PM	Session 9: 3:00PM – 5:00PM	Laboratory Session 3: 5:00PM – 6:00PM
Title: Real-time Implementation of Selective Harmonic Control in Multilevel inverters Dr Kaibalya Panda, School of Energy Technology, Pandit Deendayal Energy University, Gujarat	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
Day #4 (1 October 2024 Tuesday)			
Session 10: 09:00AM – 11:00AM	Session 11: 11:00AM – 1:00PM	Session 12: 3:00PM – 5:00PM	Laboratory Session 4: 5:00PM – 6:00 PM
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: Some Analytical Perspectives on Modeling, Small-Signal Stability Analysis and Chaos Control of Power Electronic Converters Aranya Bandyopadhyay, IIEST Shibpur	Title: Fabrications of Driver Circuits and Sensors for Converter Applications Gaurav Kumar, NIT Rourkela
Day #5 (2 October 2024 Wednesday)			
Laboratory Session 5: 09:00AM – 11:00AM	Session 13: 11:00AM – 1:00PM	Session 14: 3:00PM – 4:30PM	Session 15: 4:30PM – 6:00PM
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	Title: Real-Time Application of Smith Predictor for systems with dead time Dr. Neelbrata Roy
Day #5 (2 October2024 Wednesday) VALEDICTORY SESSION			
6:00PM – 6:30PM Workshop Review, Feedback, Valedictory Session, and Vote of thanks by Workshop Coordinator Workshop Coordinator: Dr. Arnab Ghosh, NIT Rourkela			