



MHRD, Govt. of India under the scheme Global Initiative for Academic Network (GIAN)
sponsored Advanced Course
via Online Mode on

Evolution of Power Electronics for Electric Vehicles Charging Infrastructure

[From 2nd January to 6th January, 2023]

Overview of the Course

The demand for charging infrastructure, including charging stations in parking structures and garages is more important as the electric vehicles on the road multiply. For long distance commuters, an available charging station may be a critical requirement to ensure the ability to finish the round trip. This course is designed to teach how to implement on-board and off-board chargers for vehicular applications. It will help to prepare today's power electronics design engineers in vehicular industry which is the demand of the present scenario. The course contains Basic of Power Electronics and its role in Electric Vehicles, EV charging methods etc.

The participation fees for taking the course are as follows:

- Participants from abroad: US\$100
- Industry/Research Organizations: Rs. 2950 /-
- Faculty from Indian academic Institutions: Rs.1180 /-
- Research Scholars and students: Rs.590 /- (Including GST)

Objectives of the Course

- ✓ Exposing participants to the state-of-the art of power electronics converters for EVs.
- ✓ Introduce recent advances in power electronics circuit topologies and challenges regarding EV infrastructure implementation.
- ✓ Introduce the status of the selecting components and switches.
- ✓ Explain challenges and considerations for selection of gate drivers with the performance of the switch for the full-load variation.
- ✓ Discuss reliability issues and circuit design for improved reliability.

Foreign Expert



Dr. Akshay Kumar Rathore
(Affiliate Professor)

Department of Electrical and Computer Engineering at Concordia University, Montreal, Canada.

Course Coordinators



Dr. Arun Kumar Verma (Assistant Professor) &
Dr. Sandeep N (Assistant Professor)
Dr. Saravana Prakash P (Assistant Professor)
Dr. Kapil Shukla (Assistant Professor)

Department of Electrical Engineering
Malaviya National Institute of Technology,
Jaipur (Rajasthan)

Registration Form

Name (In Block Letters):

Designation:

Qualification:

Institution:

Address:.....
.....

Email address:

Mobile No:

Details of Demand Draft:

DD No/ Transaction ID:

Bank Name:

Amount Rs:

Date:

Signature of the Candidate

**Participants are required to fill an online registration form by clicking on the following link: <https://forms.gle/BWSPcuXzkbCq4ePF9>

Participants are requested to transfer the registration amount in the following account:

- Account Name: Registrar (Sponsored research) MNIT Jaipur
- Account no: 676801700388
- Bank name: ICICI Bank Ltd., MNIT Jaipur
- IFSC code: ICIC0006768
- Branch name: MREC branch, Malaviya National Institute of Technology Jaipur, J.L.N. Marg, 302017.

Evolution of Power Electronics for Electric Vehicles Charging Infrastructure

[2nd January to 6th January, 2023]

Time Day	10:00 AM – 12:00 PM	01:30 PM – 02:30 PM	03:00 PM – 05:00 PM
January 2, 2023	Inaugural session Dr. Akshay Kumar Rathore Introduction, the way to understand power electronics circuits, basic circuit topologies.	Dr. Akshay Kumar Rathore Recent development of SiC and GaN devices, evaluation methods and modeling of SiC devices, effect of GaN devices on the present generation topologies.	Dr. Arun Kumar Verma Emphasis on switch selection for electric vehicle battery charging.
January 3, 2023	Dr. Akshay Kumar Rathore Devices evaluation methods and modeling of SiC devices. And Challenges of implementing SiC and GaN devices in power electronics circuits, selection of gate driver with minimal loss	Dr. Akshay Kumar Rathore Introduction of battery load, Behavior of conventional voltage and current source converter with phase shift modulation for battery load.	Dr. Arun Kumar Verma Different communication techniques and their advancement for electric vehicle battery charging.
January 4, 2023	Dr. Akshay Kumar Rathore Effect of introducing auxiliary circuit in the conventional H-Bridge network. And Why current source converters are preferred over voltage source converter for battery charging application.	Dr. Akshay Kumar Rathore Evolution of current source converter for wireless charging topologies.	Dr. Arun Kumar Verma Evolution of voltage fed and current fed converters for vehicle-to-grid and grid-to-vehicle applications.
January 5, 2023	Dr. Akshay Kumar Rathore Detailed designing the basic structure of converter topology for battery charging applications. And Component selection and parameter designing for the current fed half-bridge and full-bridge configurations for battery charging load.	Dr. Akshay Kumar Rathore An introduction for interleaved converter configurations for electric vehicle applications with its advantage and disadvantage.	Dr. Arun Kumar Verma Designing of boost converter-based converter topology for grid-to-vehicle and vehicle-to-grid applications.
January 6, 2023	Dr. Akshay Kumar Rathore Evolution of topological advancement for off-board chargers and associated control techniques. And Challenges of power electronics for electric vehicle applications.	Dr. Arun Kumar Verma An introduction to different suitable control schemes for vehicle-to-grid and grid-to-vehicle Applications.	Dr. Arun Kumar Verma Designing of control scheme for a dc-dc converter connected to V2G and G2V with its merits and demerits. Valedictory Session

Note: An online quiz will be scheduled on 6th January 2023.

**Please email the snapshot of transaction and the signed registration form to Dr. Arun Kumar Verma at arun.ee@mnit.ac.in or seasrlab.ee@mnit.ac.in

**Participants are also WhatsApp the snapshot of transaction and the signed registration form at 8058520645 or 9521886574