

Delhi Technological University Delhi (DTU Delhi)

presents

Two-Week ATAL Faculty Development Programme

on

Electric Vehicle Technology

Challenges & Infrastructure



Week 1: December 12-17, 2022 (Online)

Week 2: December 19-23, 2022 (Offline)

EVT @ DTU Delhi Challenges & Infrastructure

Coordinator: Prof. Madhusudan Singh
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FDP is designed for

Assistant Professors/
Associate Professors/Ph.D.
scholars/PG students.

Participants should be from
the same city/within 100
km of host institute

Center of Attention

- ❖ EV charging infrastructure integrated with Renewable Energy Sources (RESs).
- ❖ Power converters for EV infrastructure.
- ❖ High power density converters for on-board charging.
- ❖ Off-board ac/dc chargers for EV charging.
- ❖ Challenges in EV Battery charging and Battery Management Systems (BMS).
- ❖ Battery pack design and motor controllers.

In Association with



AICTE Training and Learning (ATAL) Academies,
All India Council for Technical Education, New Delhi

Centre of Excellence for Electric Vehicles and Related Technologies (CoE for EVRT)
Electrical Engineering Department

Delhi Technological University (Formerly Delhi College of Engineering)

Shahbad Daultpur, Main Bawana Road, Delhi-110042, India. website: <http://www.dtu.ac.in>

ABOUT DEPARTMENT OF ELECTRICAL ENGINEERING

The Department of Electrical Engineering, DTU has significantly grown during the last seventy years since its inception. With the recent advances of growth in Industrial Electronics, Industrial Energy Sources and Utilization, the Department has acquired an important place in the National Capital Region of Delhi. Presently the Department runs undergraduate programme in Electrical Engineering and offers post-graduate programme in the area of Control and Instrumentation, Power Electronics and Systems and Power System Engineering, in addition to Ph.D. programme. The Department also offers a B Tech part-time programme for working professionals who hold Diploma in Electrical Engineering.

ABOUT CoE FOR EVRT

The University has established a centre of excellence for Electric Vehicles and Related Technologies (CoE for EVRT) to impart training & research in thrust area of Electric Vehicles and Related Technology. The centre will help in developing an eco-system for transformation from a traditional to eco-friendly transportation system. State-of-the-art facility for training & testing will be created to carry out interdisciplinary research in Electric Vehicles and associated areas.

The Centre is jointly funded by Delhi Knowledge Development Foundation (DKDF), Govt. of NCT of Delhi, and Delhi Technological University, Delhi. CoE for EVRT focused research areas will include but are not limited to the design, development and analysis of electric vehicle motors and drives, charging station infrastructure, charge controllers,

communication infrastructure for information dissemination between the power grid and EVs, battery management systems, retrofitting, etc.

SCOPE AND OBJECTIVES

To meet the growing electric energy demand and to reduce the pollution, renewable based power generation and Electric vehicles Technologies (EVT) are the main thrust area of research in all over the world. Power Electronics converters are the crucial component of the EVs and researchers are continuously working towards the efficiency improvement and high-power density (i.e. to reduce the weight and size) of the converters. In general, most of the electric vehicle comprises of on-board charger for charging plug-in vehicles, bidirectional converters, motor controller for traction drives, hybrid energy storage systems, and motor. With the use of GaN, SiC devices the efficiency of the converter can be increased. SPVEVs also contains solar PV panels, MMPT charge controller, dc-dc converters in addition. The increase in the power density of converter and hence reduction in volume and weight would make these decrease the converters more attractive for the application in EVs. The second aspect of electric vehicles are reliable operation. The prime objective of this FDP is to familiarize and train the academicians and research scholars in these emerging areas. The participant of this FDP is expected to gain the knowledge in the following area: on-board battery charger for EV, application of wide band gap-based devices, EV charging infrastructure integrated with Renewable Energy Sources (RESs), power converters for EV infrastructure, Off-board ac/dc chargers for EV charging, challenges in EV Battery charging and Battery Management Systems (BMS), Battery pack design, motor controllers and so on.

COURSE CONTENT

- ❖ Introduction to electric vehicles, classifications and vehicle technologies.
- ❖ Battery electric vehicle (BEV), hybrid electric vehicle (HEV), Plug-in hybrid electric vehicle (PHEV), Fuel cell electric vehicle (FCEV).
- ❖ Power flow management system: design and limitations.
- ❖ EV charging infrastructure integrated with Renewable Energy Sources (RESs).
- ❖ Power converters for EV infrastructure.
- ❖ High power density converters for on-board charging.
- ❖ Off-board ac/dc chargers for EV charging.
- ❖ Challenges in EV Battery charging and Battery Management Systems (BMS).
- ❖ Battery pack design and motor controllers.
- ❖ Hybrid Energy Storage Systems (HESS).

INSTRUCTION TO THE PARTICIPANTS

- ❖ The FDP is of two weeks: first week, online for theory; and second week, offline for practical / labs / experiential learning.
- ❖ Continuous Comprehensive Assessment of Attendees - Overall 70% to receive a certificate, 90% and above distinction.
- ❖ Participants shall bear the cost of travelling and boarding/lodging if he/she wishes to attend ATAL FDP. However, refreshment & lunch would be provided for free.
- ❖ **The FDP is free, and No fee will be charged from any participant attending ATAL FDP.**

AICTE ATAL FDP: Session Flow

Week 1: December 12-17, 2022 – Online (7:00 pm – 9:30 pm)

Day 1	Day 2	Day 3	Day 4	Day 5	Day 6
7:00 – 9:30 Prof. B. K. Panigrahi (IIT Delhi) Session 1	7:00 – 9:30 Prof. Bhim Singh (IIT Delhi) Session 2	7:00 – 9:30 Prof. Rajesh Gupta (NIT Prayagraj) Session 3	7:00 – 9:30 Prof. Mukesh Pathak (IIT Roorkee) Session 4	7:00 – 9:30 Prof. Madhusudan Singh (DTU Delhi) Session 5	7:00 – 9:30 Prof. Mini Sreejeth (DTU Delhi) Session 6

Week 2: December 19-23, 2022 – Offline (9:30 am – 4:30 pm)

Day 1	Day 2	Day 3	Day 4	Day 5
9:00 – 9:30 Inauguration	9:30 – 12:00 National Education Policy (NEP) 2020 Col. B Venkat (Director Faculty Development Cell, AICTE) Session 8	9:30 – 12:00 Time and stress management Prof. T. Vijaya Kumar (DTU Delhi) Session 10	9:30 – 12:00 Research Methodology Dr. Shikha N Khara (Delhi School of Management, Delhi) Session 12	9:30 – 12:00 Mr. Vinit Bansal (EV Motors India Pvt. Ltd) Session 14
9:30 – 12:00 Indian values & Ethos Mr. Karnal Singh (Retired IPS officer Former Chief of Enforcement Directorate) Session 7	12:00 – 1:00 Article 1 Discussion	12:00 – 1:00 Article 2 Discussion	12:00 – 1:00 MCQs	12:00 – 1:00 Visit Report (Team)
12:00 – 1:00 Lunch	1:00 – 2:00 Lunch	1:00 – 2:00 Lunch	1:00 – 2:00 Lunch	1:00 – 2:00 Lunch
1:00 – 2:00 Travel for Visit	2:00 – 4:00 Dr. Rahul Pandey (Exicom Power Solutions) Session 9	2:00 – 4:00 Mr. Sohinder Singh Gill (CEO, Hero Electric Vehicles India) Session 11	2:00 – 4:00 Mr. Radhakrishna Upadhyay Director- Technology Lithion Power Pvt. Ltd. Session 13	2:00 – 3:00 Reflection Journal
2:00 – 4:00 Visit to Lithion Power Pvt. Ltd.	4:00 – 5:15 Teaching Practice	4:00 – 5:15 Teaching Practice	4:00 – 5:15 Teaching Practice	3:00 – 4:00 Feedback
4:00 – 5:00 Travel back				4:00 – 5:00 Valedictory