Indian Institute Of Technology Delhi
भारतीय प्रौद्योगिकी संस्थान दिल्ली

Online Certificate Programme on
Battery Technology for Electric Vehicle (BatTechEV)

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**PROGRAMME OVERVIEW**

Electric vehicles is a sunrise industrial sector contributing to environmental friendly and sustainable transportation. Many manufacturers have made major investments in electric automobile technology opening up employment and growth opportunities for individuals with knowledge in the required field. One of the important technological components of E-mobility space is the electrochemical energy storage. The electrochemical energy storage and conversion devices used in Electric Vehicles (EV) are primarily batteries, fuel cells, and supercapacitors. These devices invariably require power electronic interface to couple with the vehicle drivetrain and charging points.

The programme will provide a comprehensive knowledge of electrochemical energy storage devices from a single cell to pack level, duty cycles led sizing of storage, battery testing, failure mechanisms, and basics of power electronics required for interfacing devices with drivetrains. The programme will help to cater for the training and development need of industry 4.0 and enable the participants to build the required skill set, capabilities and knowledge in the e-mobility domain.

**PROGRAMME HIGHLIGHTS**

- Live online interactive sessions by IITD faculty
- Cutting-edge curriculum designed by IITD faculty
- Gain industry-oriented designed by IITD faculty
- Group projects and assignments
- Peer-to-peer learning

**KEY LEARNING OUTCOMES**

- Vehicle power requirements
- Comprehensive understanding of batteries, fuel cells and supercaps
- Li-ion battery failure mechanisms and testing
- Battery: From cell to module/pack
- Mechanical design and thermal management of battery pack
- Power electronics interface and chargers
- Battery management system
**PROGRAMME CURRICULUM**

**Module 1 - Overview of Electric Vehicles**
- Basic scheme of EV drivetrain
- Vehicle dynamics and drive cycles
- Range of EV and EV battery trends

**Module 2 - Electrochemical Energy Storage Devices**
- Electrochemical cell - Internals and operating principles
- Types of batteries used in EV
- Other electrochemical storage devices in EV space

**Module 3 - Battery Characteristics**
- Capacity, I-V curves, SoC, SoH, C-rate
- Battery models

**Module 4 - Li-ion Cells for EV**
- Li-ion battery: Present state of the art and future directions
- Cell manufacturing
- Degradation, failure mechanism, and testing

**Module 5 - Module and Pack Design**
- Electrical design, pack sizing and cell balancing
- Cell sorting and pack design case
- Mechanical design and thermal management of battery pack

**Module 6 - Power Electronics Interface and BMS**
- Components and convertors
- Battery Management System (BMS)
- Chargers for EV

**PEDAGOGY**

- Live-online interactive sessions
- Industry relevant project work
- Flipped and peer learning
- Hands-on exercises and assignments
- Continuous evaluation
PROGRAMME DETAILS

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<thead>
<tr>
<th>Duration</th>
<th>• 4 months</th>
<th>45+ Total Learning Hours</th>
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<tbody>
<tr>
<td>Delivery</td>
<td>• Live Online</td>
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<tr>
<td>Schedule</td>
<td>• Session Timings: Sunday</td>
<td>3:00 PM to 6:00 PM (IST)</td>
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<td>• Commencement Date: 28th January 2024</td>
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<td>Eligibility</td>
<td>• Graduates or Diploma Holders from a recognised University/Institutes (UGC/AICTE/DEC/AIU/State Government) in any discipline</td>
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<td>Screening &amp; Selection</td>
<td>• Screening and selection will be done by IIT Delhi</td>
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PROGRAMME FEE DETAILS

Programme Fee: INR 60,000 + 18% GST

Early Bird Enrollment: INR 50,000 + 18% GST

Participation e-certificate will be provided, if you obtain 50% aggregate marks in the evaluation components and maintain a minimum attendance of 50% in lectures

Disclaimer: IIT Delhi reserves the right to withdraw the programme at any time without citing any reason.

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• The above e-certificate is for illustrative purposes only and the format of the certificate may be changed at the discretion of IIT Delhi
• Only e-certificates will be provided and it will be issued by CEP, IITD
• The organising department of this programme is the Department of Chemical Engineering, IIT Delhi
About IIT Delhi

The Indian Institute of Technology Delhi (IIT Delhi) is one of the 5 initial IITs established for training, research and development in science, engineering, and technology in India. Established as the college of Engineering in 1961, the institute was later declared as an institution of national importance under the “Institute of Technology (Amendment) Act, 1963” and was renamed as “Indian Institute of Technology Delhi”. It was then accorded the status of a deemed university with the power to decide its own academic policy, to conduct its own examinations, and to award its own degree.

Since its inception, over 48000 students have graduated from IIT Delhi in various disciplines, including engineering, physical Science, Management, Humanities and Social Sciences. Of these, nearly 5070 received PhD degrees. The rest obtained a master’s degree in engineering, Science and Business Administration. These alumni today work as scientists, technologists, business managers and entrepreneurs. There are several alumni who have moved away from their original disciplines and have taken to a administrative services, active politics, or are NGOs. In doing so, they have significantly contributed to the building of this nation and to industrialization around the world.

About Continuing Education Programme (CEP)

Executive education is a vital need for the companies to build a culture that promotes newer technologies and solutions and build a workforce that stays abreast of the rapidly transforming needs to the technological, business and regulatory landscape. The CEP Certificate Programmes are outreach programmes offered by the Indian Institute of Technology Delhi (IIT Delhi). The programmes are designed to cater to the training and development needs of various organisations, industries, society and individual participants at national and international level.

For more details, please visit: http://cepqip.iitd.ac.in.