भारतीय प्रौधोगिकी संस्थान दिल्ली

Indian Institute of Technology Delhi

E-vehicles are the future!

Get ready to be a part of the revolution

Advanced Programme in

E-vehicle Technology

Programme - 2

Starts March 2022 | 6 Months | Online Learning

Programme offered by Continuing Education Programme (CEP), IIT Delhi

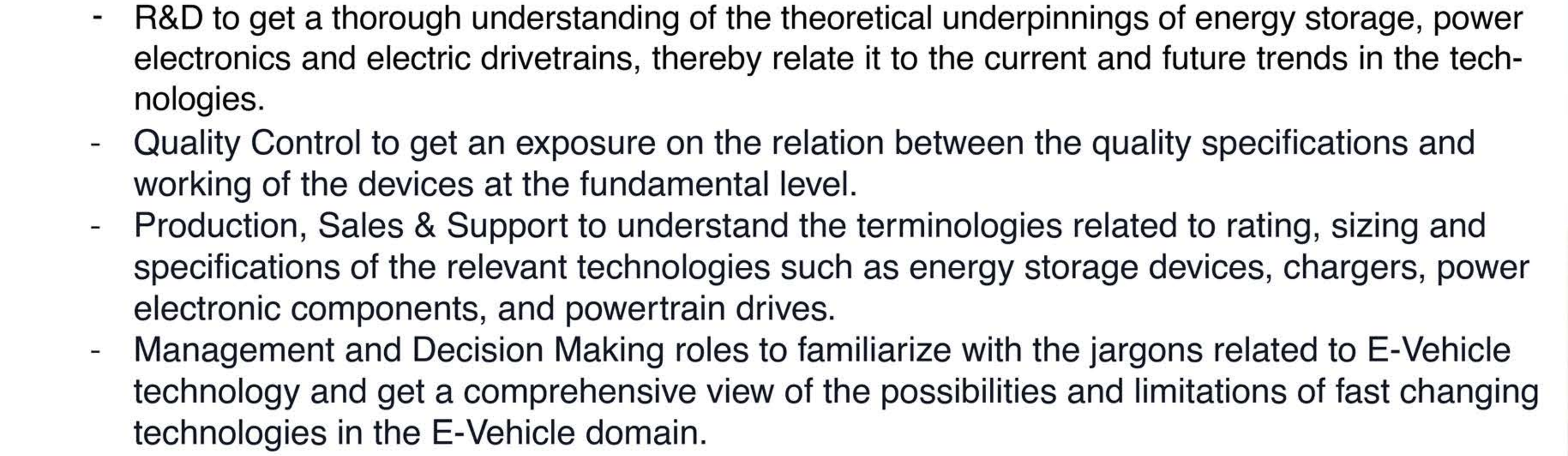
Overview

E-Vehicle revolution, unfolding now, requires significant investments for the development of requisite manufacturing capacity, supporting infrastructure and most importantly manpower with relevant skills. This skill set includes electrochemical storage, power electronics and electrical machines.

The programme will provide a comprehensive exposure to the above skill sets with a judicious mix of the fundamental and practical aspects of the relevant devices and technologies. The programme will help to cater the training and development need of industry 4.0 and enable the participants to build the required skill sets, capabilities and knowledge in the e-mobility domain.

Who should attend?

- Fresh graduates who aspire to work in the sunrise sector of E-vehicles to get a comprehensive overview of the technology space.
- Working professionals in
  - R&D to get a thorough understanding of the theoretical underpinnings of energy storage, power electronics and electric drivetrains, thereby relate it to the current and future trends in the technologies.
  - Quality Control to get an exposure on the relation between the quality specifications and working of the devices at the fundamental level.
  - Production, Sales & Support to understand the terminologies related to rating, sizing and specifications of the relevant technologies such as energy storage devices, chargers, power electronic components, and powertrain drives.
  - Management and Decision Making roles to familiarize with the jargons related to E-Vehicle technology and get a comprehensive view of the possibilities and limitations of fast changing technologies in the E-Vehicle domain.



Programme offered by Continuing Education Programme (CEP), IIT Delhi

Programme Highlights

Basic understanding of storage devices from single cell to sizing at the pack level and basics of power electronics for interfacing with drivetrains and charging stations.

Different aspects of E-vehicle charging: chargers, (smart) electric grid, net metering and system integration.

Help the individuals and working professionals to understand the E-mobility in a comprehensive way.

Caters to the training and development need of industry 4.0 and enables the participants to build required skill-set.

Prestigious IIT Delhi Completion Certification in E-vehicle Technology.

Programme Faculty

Dr. Anil Verma
Professor
Department of Chemical Engineering
Indian Institute of Technology Delhi

Dr. Anil Verma is a Professor in the Department of Chemical Engineering, IIT Delhi. In addition, Prof. Verma was also a Visiting Professor at Energy, Environmental & Chemical Engineering, Washington University in St Louis, USA and Visiting Fellow at Department of Chemical Engineering, Newcastle University, Newcatle upon Tyne, UK. He is also Principal Investigator and Administrator of DST-IIT Delhi Centre for Energy Storage Platform on Batteries (ESPOB) funded by the Department of Science and Technology, Ministry of Science and Technology, Govt. of India. He is also an active Professorial Member in Centre for Automotive Research and Tribology (CART), IIT Delhi.

Prof. Verma holds B.Tech. and M.Tech. (Silver Medal) from H.B.T.I. Kanpur. Prof. Verma served in industry also before doing Ph.D. from IIT Delhi. He is also associated with various IITs, NITs, State Engineering Colleges, IOCL, BIS, DST etc. in various capacities. Prof. Verma has successfully completed several Projects and Consultancies for various National and International organizations such as DST; CSIR; BRNS; ISRO; LG; Cenovus, Canada etc. He has also done many CEP programmes such as Electrochemical Energy Devices; Advanced Pedagogies: Electric Vehicle Theme.

Prof. Verma mainly works in the area of Electrochemical systems like Fuel Cells for Portable Devices; and Batteries for Energy Storage and Electric Vehicle Charging Station. His research group comprises Chemists, Physicists, Chemical Engineers, Mechanical Engineers, Electrical, Electronics, communication and Instrumentation Engineers. Prof. Verma has supervised 11 Ph.D. theses and presently 10 Ph.D. students are pursuing Ph.D. under him. He has filed 9 National and International patents, out of which 2 have been granted. He has published 3 Monographs, 6 Book Chapters, and published 82 Research Papers in high quality International Peer Reviewed Journals. Moreover, he has presented his research work in more than 150 National and International Conferences.

Dr. Anupam Shukla
Professor
Department of Chemical Engineering
Indian Institute of Technology Delhi

Dr. Anupam Shukla is a Professor in the Department of Chemical Engineering, IIT Delhi and has been a faculty member of IIT Delhi for last 15 years. Prof. Shukla completed 5 Year Integrated M. Tech. in Chemical Engineering from IIT Bombay and Ph.D. from IIT Kanpur. He then worked as a faculty member at IIT Guwahati for a little more than 2 years before moving to IIT Delhi.

Prof. Shukla works in the area of electrochemical systems with focus on electrochemical energy storage, mainly supercapacitors and batteries. The area of interest also includes membrane electrolysis, electrodialysis, electrochemical route to graphene synthesis, and ion exchange membranes.

Prof. Shukla served as a member of curriculum development for post-graduate programme on E-mobility hosted by Centre for Automobile Research (CART) at IIT Delhi and has also served in a few committees of funding agencies to review proposals for support funding for setting up plants on new electrochemical technologies.

Prof. Shukla has completed more than 10 projects sponsored by Government funding agencies and Industries on materials and cells related to electrochemical systems and has several ongoing sponsored projects. Prof. Shukla has supervised 7 Ph.D. theses and currently have 5 Ph.D. students working in different areas of electrochemical energy storage. He has published 50 papers in international journals and several in conference proceedings.

Programme Faculty

Dr. ing. Praveen Kumar
Professor
Department of Electronics and Electrical Engineering
Indian Institute of Technology Guwahati

Dr. Praveen Kumar is a Professor in the Department of Electronics and Electrical Engineering, IIT Guwahati. Professor Kumar did his B.Tech., M.Tech., and Ph.D. from REC Hamirpur, IIT Delhi, and TU Delft, respectively. He worked for a decade in the automobile industry in Germany and in 2009 joined IIT Guwahati in the department of EEE. Currently, he is a Professor in the Department of EEE, IIT Guwahati, and heads the E-Mobility lab. His group's research areas are high power density motor design, intelligent chargers, and EV drivetrain architecture.

Dr. Sumit Kumar Pramanick
Assistant Professor
Department of Electrical Engineering
Indian Institute of Technology Delhi

Dr. Sumit Kumar Pramanick is working as an Assistant Professor in the Department of Electrical Engineering, IIT Delhi. His area of expertise is in the field of design of power electronic converters and its control for applications like machine drives, renewable energy, and e-mobility.

His research group in IIT Delhi is currently working towards development of high-power density power converters for EV battery charging using energy efficient power devices, high bandwidth embedded current sensors, high frequency magnetics design, and wireless power transfer technology.

Dr. Pramanick is closely working with a few start-ups in NCR region to develop products related to power electronics. He has introduced concepts of adaptation of digital controllers in standalone power electronic converters as per industry practice. Separate hands on module has also been developed as a part of the M.Tech. curriculum with Power Electronics and Machine Drives specialization in IIT Delhi. His contributions to this curriculum was recognized through Teaching Excellence Awards, 2018 in IIT Delhi. He is a recipient of INAE Young Engineer Award, 2020. He is a Member of IEEE, IEEE Industrial Electronics Society, and IEEE Power Electronics Society. He is a regular reviewer in reputed journals like IEEE Transactions on Industrial Electronics, IEEE Transactions on Power Electronics, IEEE Transactions on Industrial Applications and Sadhana. Prior to joining IIT Delhi, he was a Post-Doctoral Fellow in the Cullen College of Engineering at University of Houston, Texas, USA. He finished his doctoral research in Department of Electronic Systems Engineering, Indian Institute of Science, Bangalore. He completed B.E. in Electrical Engineering from Indian Institute of Engineering Science and Technology, Shibpur.

Dr. Akhil Garg
Assistant Professor
Centre for Automotive Research and Tribology (CART)
Indian Institute of Technology Delhi

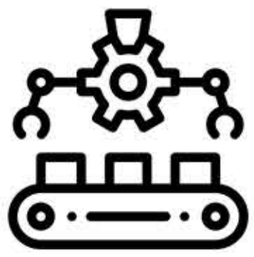
Dr. Akhil Garg is an Assistant Professor in the Centre for Automotive Research and Tribology (CART), IIT Delhi. Dr. Garg has done B. Tech. in Mechanical Engineering from NIT Rourkela, and Ph.D. from NTU, Singapore. His main research interests include Renewable Energy and Energy Storage Systems, Recycling of Battery Pack for EVs, Thermal Designs of Battery Packs, and Intelligent Optimization for Engineering design.

Past Participants Profile

Participants of the previous programme come from a wide range of industries, job functions and management levels.

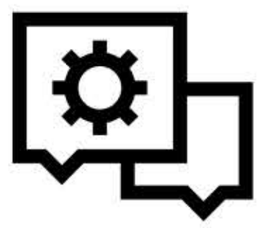
Industries

56%
Automotive



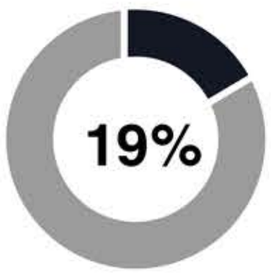
27%
Manufacturing

12%
Professional Services

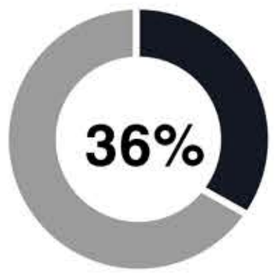


5%
IT

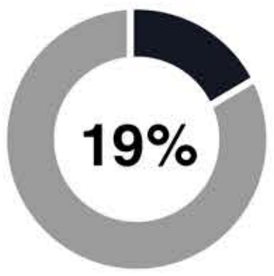
Work Experience



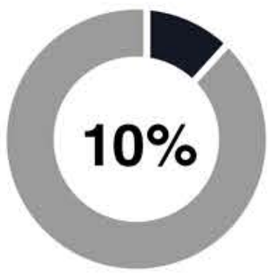
0-5 years



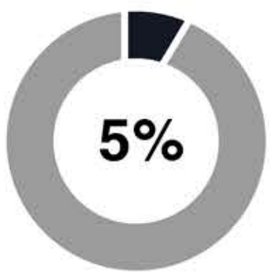
5-10 years



10-15 years

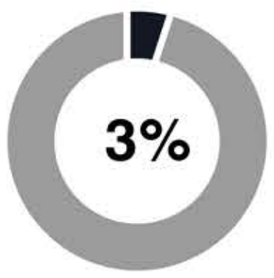


15-20 years



20-25 years

25-30 years



30 & Above years

Participants of Previous Programme Work at*

- Bajaj Auto Ltd
- Bosch Ltd
- Capgemini
- Hero Motorcorp Ltd
- Hyundai Motor India Ltd
- Inox Wind Ltd
- Jaguar Overseas Ltd
- Maruti Suzuki India Ltd
- Mercedes-Benz India Ltd
- Tech Mahindra
- TVS Motors
- Yuki Electric India Pvt Ltd

*Representative list

Programme Modules

Module 1 : Overview of Electric Vehicle

This module will provide the background and overview of the programme learning. It will introduce the need for the electric vehicles, classification of the electric vehicles, understanding electric drive train etc.

Module 2 : Revisiting Fundamentals

This module is designed to provide a relevant and holistic view of the various terminologies and fundamentals of any electrochemical device.

Module 3 : Electrochemical Cells

Knowledge of various energy storage devices such as Li-ion battery, supercapacitor, fuel cells, and flow batteries etc. will be discussed in details at cell level.

Module 4 : Module and Pack Design from Cell Level

The understanding gained from module 3 will be used for design and building of module and packs from the cells for real application.

Module 5 : Power Electronics Interface

This module will provide an understanding of poser electronics required for interfacing energy storage device with the charger and drivetrains. The module will also cover fundamentals and practical aspects of drivetrains.

Module 6 : Charging Infrastructure

The success of the electric vehicle will depend on the suitable charging infrastructure. The module will cover the relevant details related to chargers as well as smart and mini-grids etc.

Module 7 : Techno-Economic Aspects and Policies

This module will provide exposure to techno-economic aspects and policies related to electric vehicles.

Disclaimer: Modules/ Topics are indicative only, and the given time and sequence may be modified to fit the total programme hours.

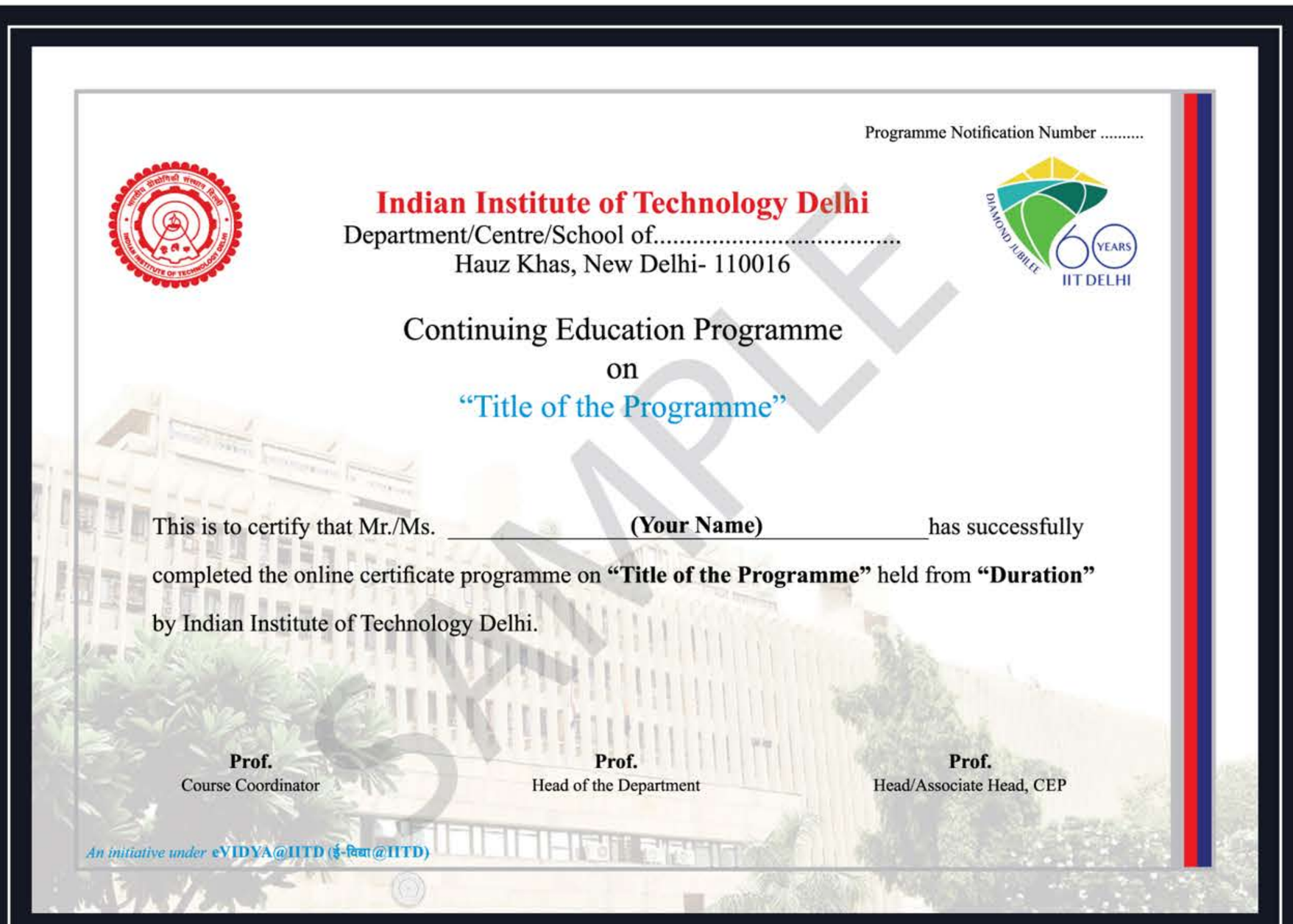
Programme offered by Continuing Education Programme (CEP), IIT Delhi

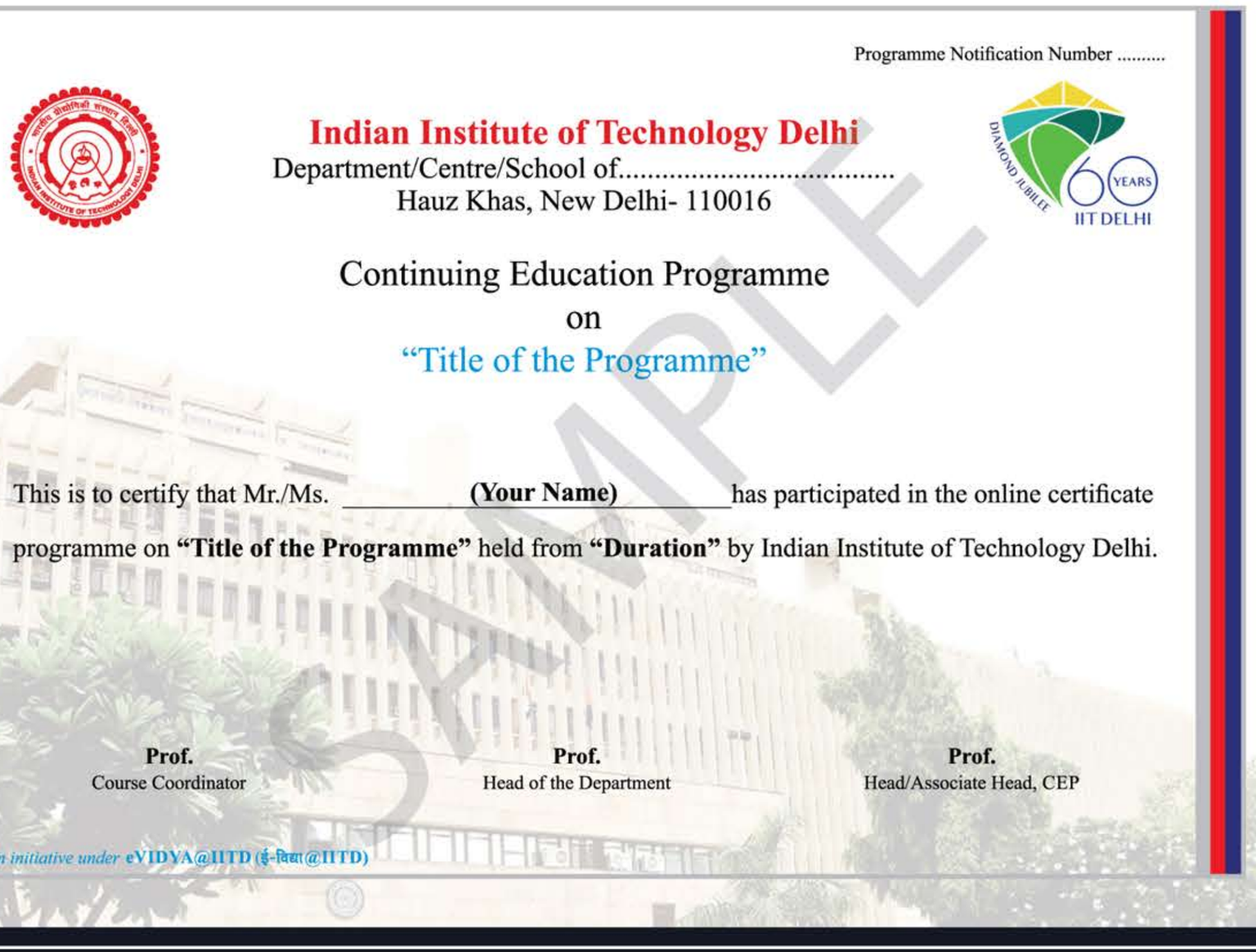
Programme Certificate

Participant will be awarded a Successful Completion Certificate from IIT Delhi on scoring at least 50% aggregate marks in the evaluation components and maintaining a minimum attendance of 60% in lectures and tutorials. Participants who are unable to score 50% marks in the evaluation will be eligible for the Participation Certificate if their attendance is above 60%.

Only e-certificates will be issued by CEP IIT Delhi

"Certificate of Successful Completion"





"Certificate of Participation"

Note: All certificate images are for illustrative purposes only and may be subject to change at the discretion of IIT Delhi.

Programme Details

Duration	Academic Orientation	Online Learning Sessions
6 Months	27th March, 2022	Sunday 9:30 AM – 12:30 PM

Total number of hours - 70 IOL Hours

Eligibility

- For Indian Participants - Graduates or Diploma Holders from a recognized University/Institutes (UGC/A-ICTE/DEC/AIU/State Government) in any discipline
- For International Participants - Graduation or equivalent degree from any recognized University or Institution in their respective country

Selection Process

Screening and selection will be done by IIT Delhi

Payment Schedule

Programme Fee – INR 1,00,000 + Applicable GST*

Installment Schedule

	Installment 1	Installment 2
Payment Dates	15th March, 2022	2nd June, 2022
Amount	50,000/- + GST	50,000/- + GST

Important Information:

Last Date to Apply: 4th March, 2022

Declaration of Eligible Candidates: 8th March, 2022

Note: Applications will be reviewed based on eligibility and subsequent shortlisting and selection will be done by IIT Delhi.

All fee should be submitted in the IIT Delhi CEP account only, and the receipt will be issued by IIT Delhi CEP account for your records.

*GST is currently prevailing at 18%

Application Requirements

- **Higher Secondary (10+2) Marksheet**
- **Passing Certificate – Diploma/ Degree**

ID Proof

- **Any Government-issued photo ID like PAN Card/ AADHAR Card, Driving License, Passport, etc.**

System Requirements

This programme includes online learning classes conducted on Zoom. To attend the online learning classes you will need to have a PC/ Laptop/ Mac with:

- Speakers and microphone: built-in or a USB plug-in or wireless Bluetooth
- Webcam: built-in or USB plug-in
- Processor: with Dual Core 2Ghz or higher (i3/ i5/ i7 or AMD equivalent)
- RAM: 4 GB or higher
- OS: Either MacOS 10.7 or higher OR Windows 8 or higher
- An internet connection: Minimum bandwidth of 3.0 Mbps (up/ down)
- Browser: IE 11+, Edge 12+, Firefox 27+, Chrome 30+
- Zoom software client installed on your PC/ Laptop/ Mac

We use the Zoom software application to conduct online learning classes. Zoom works on a variety of PCs/ Laptops/ Mac systems and also on phones and tablets.

You can join the online learning classes from a phone or tablet if it supports the Zoom client.

We recommend that you attend classes from a PC/ Laptop/ Mac.

Apply Now

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 College of Engineering in 1961, the Institute was later declared as an Institution of National Importance under the "Institutes 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 powers to decide its own academic policy, to conduct its own examinations, and to award its own degrees. Since its inception, over 48000 have graduated from IIT Delhi in various disciplines including Engineering, Physical Sciences, Management and Humanities & Social Sciences. Of these, nearly 5070 received PhD degrees. The rest obtained a Master's Degree in Engineering, Sciences 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 administrative services, active politics or are with NGOs. In doing so, they have contributed significantly to the building of this nation, and to industrialisation around the world. For more details, please visit: www.iitd.ac.in

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 builds a workforce that stays abreast of the rapidly transforming needs to the technological, business and regulatory landscape.

Committed to the cause of making quality education accessible to all, IIT Delhi has launched Online Certificate Programmes under eVIDYA@IITD (ई-विद्या@IITD): enabling Virtual & Interactive-learning for Driving Youth Advancement@IITD for Indian as well as international participants. These outreach programmes offered by the Indian Institute of Technology Delhi (IIT Delhi) are designed to cater to the training and development needs of various organisations, industries, society and individual participants at national and international level with a vision to empower thousands of young learners by imparting high-quality Online Certificate Programmes in cutting-edge areas for their career advancement in different domains of engineering, technology, science, humanities and management. For more details, please visit: http://cepqip.iitd.ac.in

About Hughes

Hughes Global Education, is a premier institution providing interactive onsite learning through satellite based education and training service. It was initiated by Hughes for corporate and working professionals/students. It has live, interactive, real-time, two way video, voice, and data classes with a spread across 75+ class-rooms in 40+ cities/towns. Hughes Global Education platform has redefined the next generation of education i.e. real-time Interactive Onsite Learning (IOL). Its platform seamlessly integrates the strengths of the traditional method of educa-tion - classroom teaching with the latest in technology.

For registration and any other information,
please contact us at **wecare@hughes.in**

For any feedback, write to Head CEP, IIT Delhi
At **hodqipcep@admin.iitd.ac.in**

Service Provider

Hughes Ed™

HUGHES GLOBAL EDUCATION INDIA PVT LTD
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Tel : +91-9311775485
Website : www.hugheseducation.com

Online Certificate Programmes are offered by the Indian Institute of Technology Delhi under the aegis of Continuing Ed-ucation Programme (CEP) so that the Institute can realise its vision of serving as a valuable resource for industry and society, and fulfil its mission to develop human potential to its fullest extent so that intellectually capable and imaginative-ly gifted leaders can emerge in a range of professions.