भारतीय प्रौद्योगिकी संस्थान दिल्ली
Indian Institute of Technology Delhi

Ignite the Future of **EV Mobility**

Online PG Diploma in

Electric Vehicle (EV) Technology

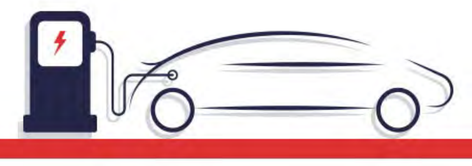
LIMITED SEATS

IITD is Ranked #1 in Asian University Rankings - Southern Asia as per QS World University Rankings 2025 in India

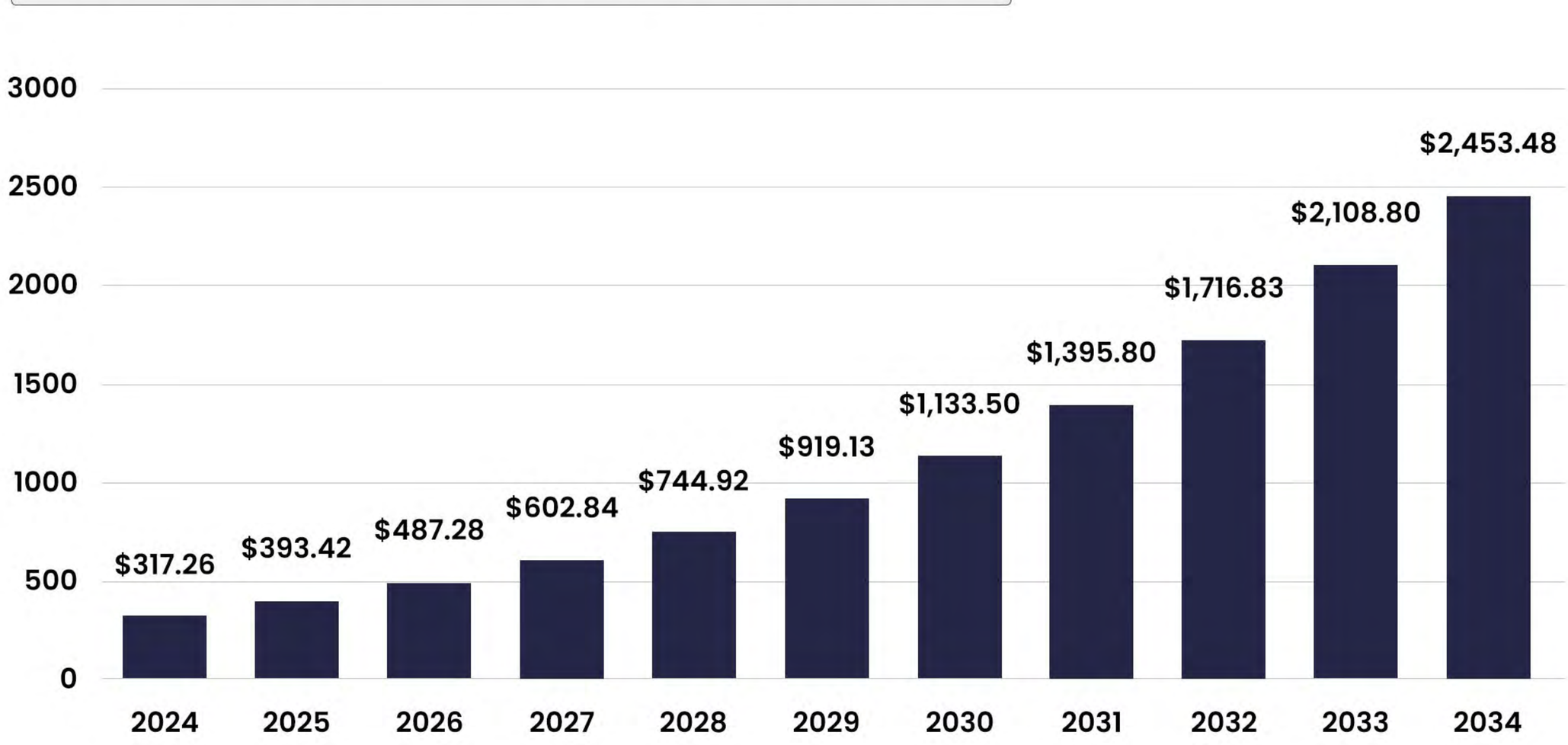
Ranked #2 as per NIRF India Engineering Rankings (2024)

Programme offered by Centre for Automotive Research and Tribology (CART), IIT Delhi

Charging Forward: Critical Drivers Propelling the Electric Vehicle Industry's Rise



Global Electric Vehicle Industry Market Valuation



*Precedence Research

Indian Electric Vehicle Industry

- Fortune Business Insights, the Indian EV market is forecasted to expand from **US$ 3.21 billion in 2022 to US$ 113.99 billion** by 2029, with a **66.52% CAGR.**
- The Indian EV battery market is projected to surge from **US$ 16.77 billion in 2023** to a remarkable **US$ 27.70 billion by 2028.**
- According to NITI Aayog and Rocky Mountain Institute (RMI), India's EV finance industry is likely to reach **Rs. 3.7 lakh crore (US$ 50 billion)** in 2030.

*ibef.org

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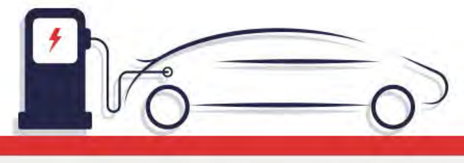
Harmonizing EV Systems for Seamless Integration



The electric vehicle (EV) industry faces several key challenges that impact its growth and widespread adoption. Below is a table summarizing these challenges along with potential solutions, supported by insights from leading consulting firms:

DESCRIPTION	CHALLENGE	WAY FORWARD
▪ Insufficient and unevenly distributed charging stations create accessibility issues, leading to consumer hesitancy.	**Charging Infrastructure**	▪ Expand public charging networks through partnerships between governments, manufacturers, and energy providers; standardize charging systems. McKinsey & Company
▪ Concerns over limited driving range and battery performance deter consumers.	**Battery Technology and Range Anxiety**	▪ Invest in advanced battery research to enhance energy density and reduce charging times; develop fast-charging infrastructure. INFORMS
▪ Dependence on scarce materials like lithium and cobalt raises sustainability and availability concerns.	**Supply Chain and Raw Materials**	▪ Explore alternative materials and battery chemistries; establish transparent and ethical sourcing practices. The Guardian

Consumer Concerns

- Apprehensions about charging infrastructure, vehicle range, and battery replacement costs hinder adoption.

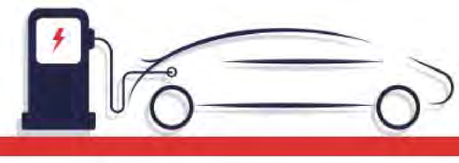
- Implement educational campaigns to inform consumers about advancements; improve infrastructure to alleviate concerns.

EY Global

Addressing these challenges requires collaborative efforts among industry stakeholders, policymakers, and consumers to foster a sustainable and accessible EV ecosystem.

Programme offered by Centre for Automotive Research and Tribology (CART), IIT Delhi

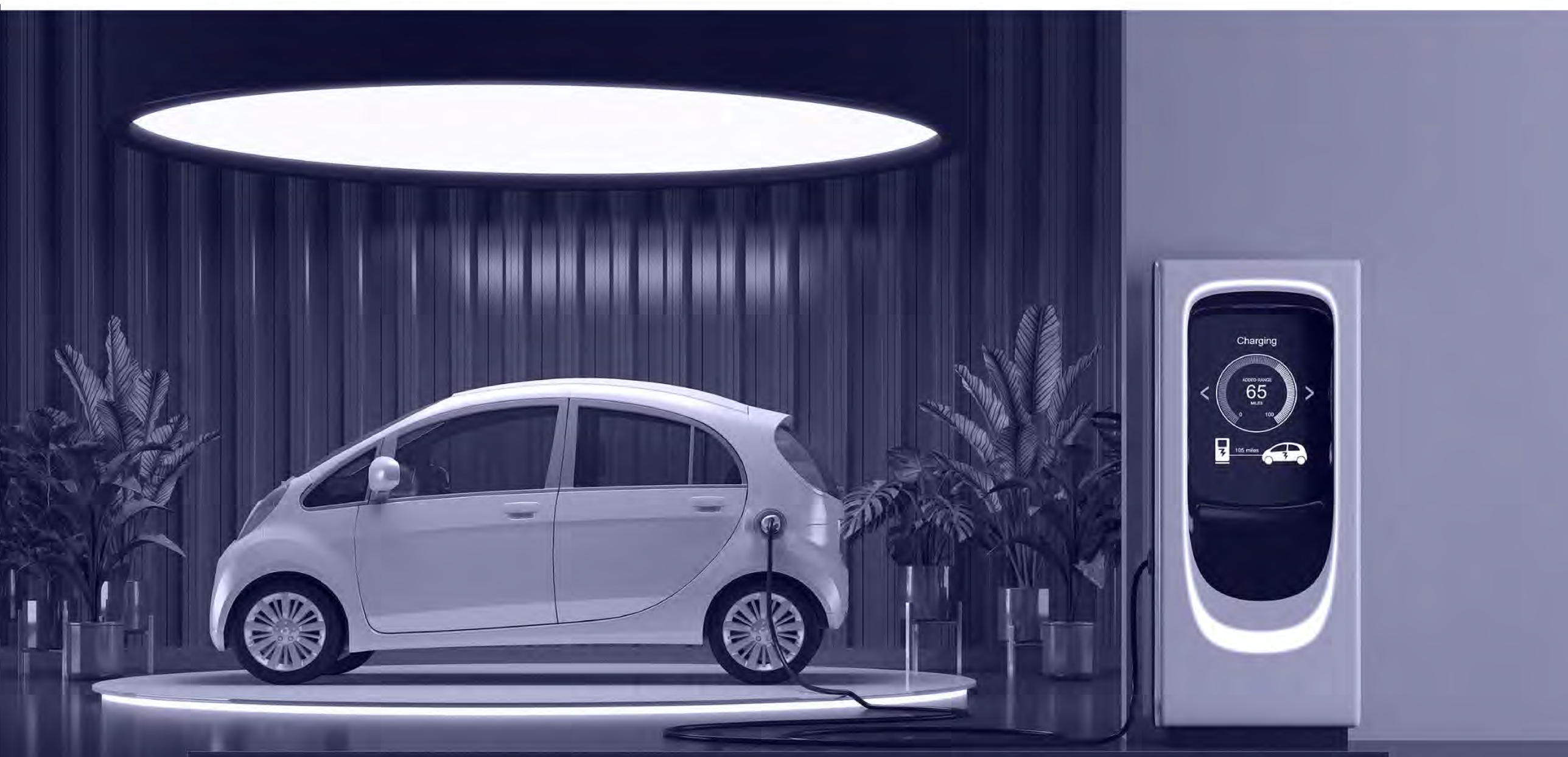
Programme Overview



The IIT Delhi, presents the first-ever Online PG Diploma in Electric Vehicle (EV) Technology, an interdisciplinary programme with a future outlook that grooms professionals with cutting-edge skills in EV powertrains, batteries, chargers, and infrastructure. Designed by IIT Delhi faculty, this multidisciplinary programme embarks on a deep and in-depth analysis of EV components, including motors, power electronics, hybrid systems, charging infrastructure, and automotive diagnostics. Theory and hands-on training go together in a rich and balanced academic schedule, through which participants develop real-life expertise in EV system designing, optimizing, and maintenance.

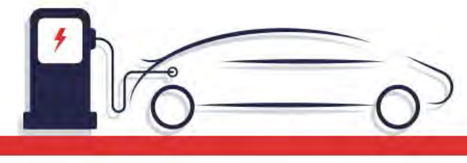
This diploma is for engineers, researchers, and entrepreneurs who have an interest in creating breakthroughs in EV technology, efficiency in powertrains, and cleaner forms of transportation. With India planning for 2030, 30% EV in private cars, 70% in commercial, and 80% in two-wheelers, high-level EV professionals will be in demand. With the exponential expansion of the EV technology sector worldwide, demand for EV technology engineers is at an all-time high. The global EV market size was valued at **USD 317.26 billion in 2024** and is **anticipated to reach around USD 2,453.48 billion by 2034,** expanding at a CAGR of 22.69% from 2025 to 2034.

Take the first step in your career—apply today and become an early pioneer in the EV revolution.



Programme offered by Centre for Automotive Research and Tribology (CART), IIT Delhi

Programme Highlights



High-impact live online learning and real-world case studies

Engage in three immersive on-campus experiences at IIT Delhi

Industry insights from esteemed IIT Delhi faculty

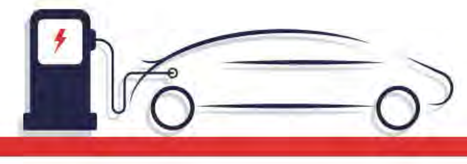
Peer networking with like-minded professionals

Earn Online PG Diploma upon successful completion

Affiliate Alumni status

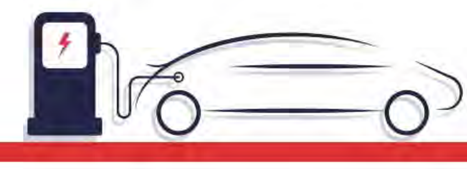
Programme offered by Centre for Automotive Research and Tribology (CART), IIT Delhi

Key Objectives



- Build a strong foundation in EV engineering, covering components, design, and operation.
- Develop expertise in power electronics, motor drives, and EV motor selection.
- Explore advanced energy storage systems, including batteries and hybrids.
- Understand EV charging infrastructure, global standards, and sustainable solutions.
- Learn condition monitoring, noise control, and the role of IoT & ML in diagnostics.
- Gain practical experience through hands-on projects and case studies.

Key Learning Outcomes



Master electric vehicle electrical systems: batteries, motors, chargers, and protocols.

Acquire expertise in power electronics: electric drivetrain and charging infrastructure design.

Gain hands-on experience: EV systems at IIT Delhi labs.

Collaborate on R&D projects: innovative start-up solutions with expert faculty.

Programme offered by Centre for Automotive Research and Tribology (CART), IIT Delhi

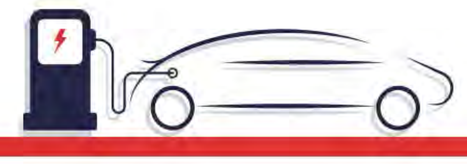
Who Should Attend ?

This PG Diploma in EV Technology is designed for:

- **Engineering Graduates** – Ideal for students from Electrical, Electronics, and related fields, building on core engineering principles to excel in the EV industry.
- **Postgraduate Students** – Perfect for those specializing in EV technology, renewable energy, or power systems, offering advanced technical knowledge and research insights.
- **Industry Professionals** – Suited for engineers and researchers in automotive, power electronics, and renewable energy, looking to gain hands-on expertise in EV design, drivetrains, charging infrastructure, and energy storage.
- **Entrepreneurs & Innovators** – Tailored for startups and professionals working on EV technology, charging solutions, and sustainable mobility, providing a holistic understanding of the evolving EV ecosystem.

Programme offered by Centre for Automotive Research and Tribology (CART), IIT Delhi

Programme Content



SEMESTER - 1

Course 1: Introduction to Electric Vehicles | Credits - 03

- Introduction to HEV, PHEV, and EV Powertrain
- Fuel cell vehicles
- Comparison between ICE and EV: operating principles, emission control
- Overview of Indian and international regulatory requirements for EV - AIS-048 BoV
- Fundamentals of Vehicle Propulsion
- Electric Propulsion System: drives
- Hybrid Electric Vehicles: series, parallel hybrid powertrains
- Energy Storage for EVs: Battery, ultracapacitors, Fuel cells
- Battery Management System (BMS)
- Chargers and charging infrastructures, Battery swapping stations
- Controllers, sensors, and communication protocols
- EV Telematics
- Fundamentals of Regenerative Braking
- Modeling and simulation of EVs
- Design examples for HEV, EVs

Course 2: Power Electronics and Drives for Electric Vehicles | Credits - 03

- Global overview of Transportation electrification
- Role of Power Electronics and Drives in Transportation Electrification
- Vehicle system dynamics
- Introduction to Electromagnetic Energy Conversion
- Electric drivetrain system
- System design considerations, rating, and sizing of electric drivetrain components
- Machines and drives for traction and EVs: BLDC, PMSM, IM, SRM
- Control of Electric Drives
- Starter-generators in HEV
- Battery Charging
- Bidirectional DC-DC converters

- Control of grid-connected converters
- Architectures, modeling, and simulations of electric drivetrains
- Case study: Railway Traction, Aircraft Power Generation

Course 3: Computer Aided Analysis of Power Electronics | Credits - 03

- Driving cycles for EVs
- Design driving factors
- Vehicle System Modeling
- Real-time controllers: Compilers, linkers, debuggers, Interrupt-based programming
- Different PWM schemes and generation
- Design and simulation of basic converter topologies, drivetrains
- PWM switching and average converter model
- Controller design and stability analysis
- EMI/EMC design considerations in PCB design of power electronics
- Thermal analysis for power electronic components
- Failure analysis techniques: FMEA, ISO 26262, Fault tree analysis

Course 4: Batteries for Electric Vehicles: Multidisciplinary Perspectives | Credits - 03

- Introduction to Energy Storage Systems (ESS)
- Types of Batteries, their working mechanisms, and characteristics
- Applications of Batteries and ultracapacitors in EVs
- Component sizing and simulations
- Comparison between different cell chemistry w.r.t. power, energy, safety, lifespan, performance, cost
- Battery design parameters for EVs
- Battery Architecture, passive components sizing, isolation requirements
- Manufacturing of batteries
- Battery modeling: cell to pack
- Battery pack design issues and failures
- Battery Pack Performance & Safety testing standards
- Battery management systems (BMS)
- Overview of Safety circuits: overvoltage, undervoltage, pre-charge circuit, isolation monitoring, HVIL, MSD, Fuses
- Impact of temperature on batteries

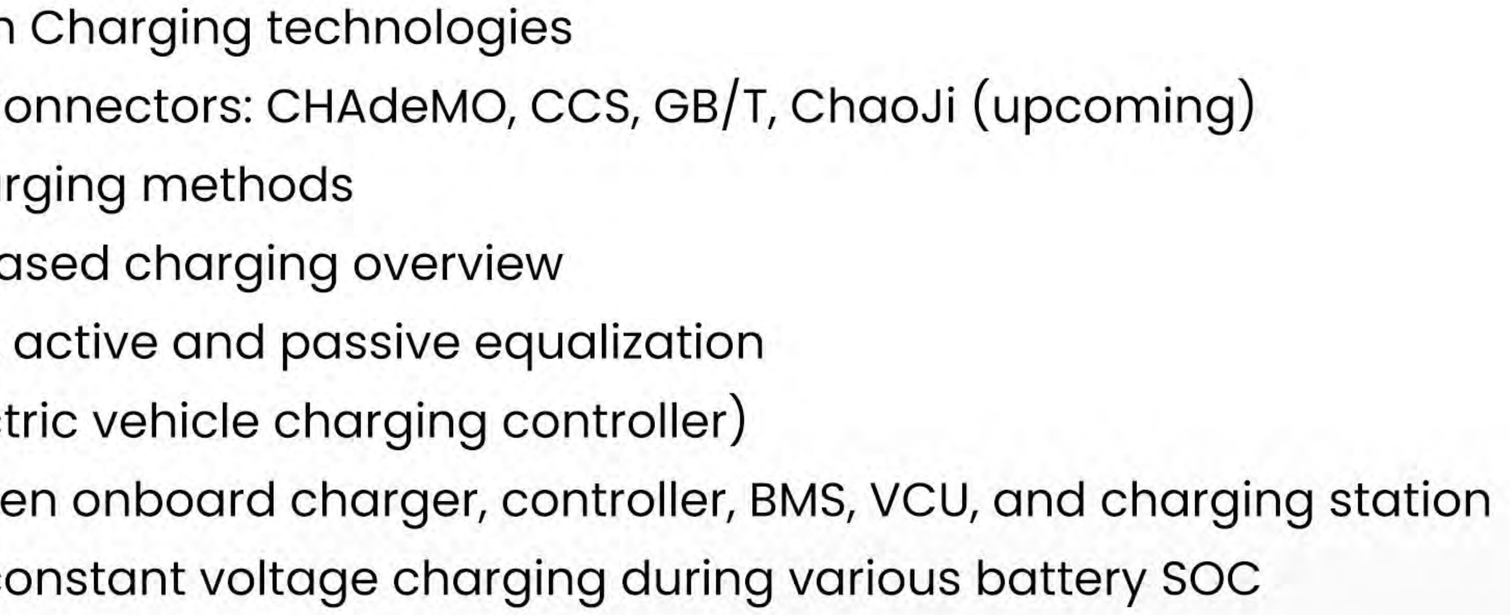
SEMESTER - 2

Course 5: Automotive Noise and Condition Monitoring | Credits - 03

- Introduction to noise, vibration, harshness (NVH)
- Noise measurement parameters, standards, and techniques
- Instrumentation for noise measurement and analysis
- Noise source characterization and control
- Noise and Vibration control measures in automobiles
- Sound Quality and Human Response
- Maintenance strategies and condition monitoring in automotive
- Instrumentation of Condition Monitoring techniques
- Signal analysis and fault classification
- Automotive elements health monitoring
- Concept of Machine learning and IoT in condition monitoring of automobile
- Case studies on automobile noise and condition monitoring

Course 6: Charging Infrastructure for EVs | Credits - 03

- National EV charging station status
- Charger types, Charging station types
- Connectors and Plug-in Charging technologies
- Charging Protocols & Connectors: CHAdeMO, CCS, GB/T, ChaoJi (upcoming)
- Slow charging, fast charging methods
- CAN-based and PLC-based charging overview
- Thermal management, active and passive equalization
- Overview of EVCC (electric vehicle charging controller)
- Communication between onboard charger, controller, BMS, VCU, and charging station
- Constant current and constant voltage charging during various battery SOC
- Sustainable Charging systems
- Solar Powered Charging stations
- V2H, V2X, Vehicle to Vehicle, Vehicle to Grid



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Course 7: Energy Storage Systems for EVs | Credits - 03

- Energy storage systems for electric transportation, smart grid, and renewable energy systems
- Working principles of batteries (various chemistries)
- High power ultra-capacitors and energy-dense fuel cell systems
- Battery energy management techniques
- Ultra-capacitor power management techniques
- Power electronics for energy and power management
- Hybrid energy storage systems and controller development
- Charging and infrastructure design

Course 8: Minor Project | Credits - 03

- Students will select a research topic for the minor project. It is expected that such topics would involve an understanding of basic processes and applications

TOTAL CREDITS - 24

DISCLAIMER:

- The total credits will be added in the credit bank as per NEP policy.
- The Programme Curriculum is subject to change based on inputs from the institute and experts.
- Each course will have two or three evaluations, along with other evaluation components such as quizzes, presentations, and more.

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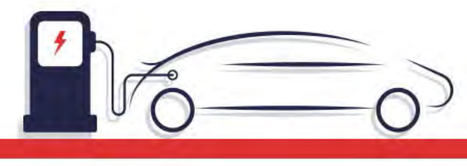
Pedagogical Methodologies



Live Online Lectures
Engage in interactive, expert-led sessions from anywhere.

In-person, Hands-on Lab Sessions
Experience hands-on learning at IIT Delhi's cutting-edge facilities.

Hands-on Projects
Apply concepts to real-world EV challenges.

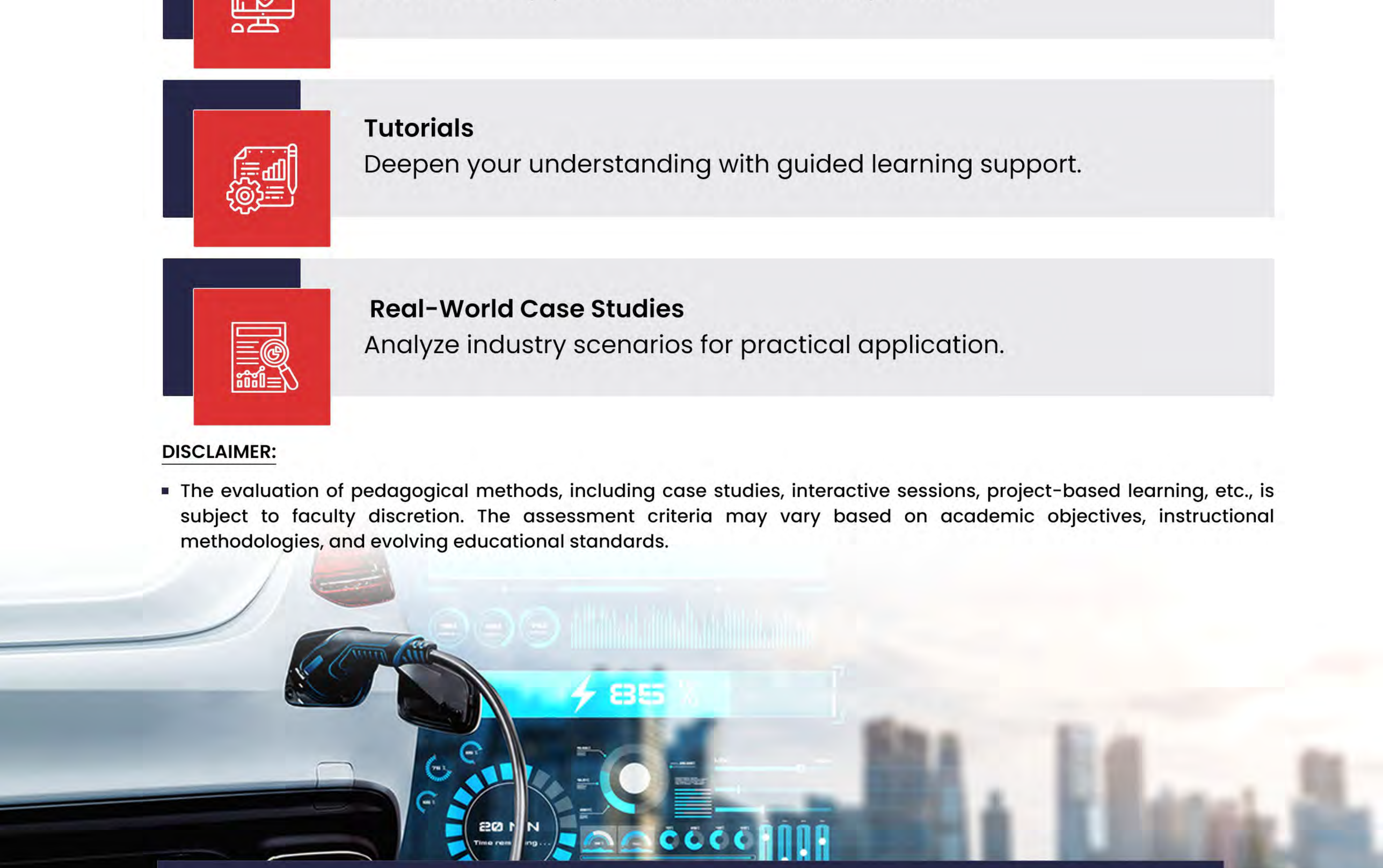
Guest Lectures
Learn from top professionals and industry leaders.

Tutorials
Deepen your understanding with guided learning support.

Real-World Case Studies
Analyze industry scenarios for practical application.

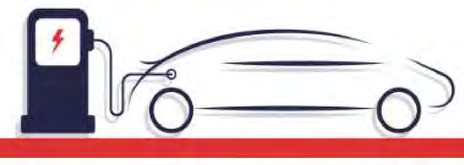
DISCLAIMER:

- The evaluation of pedagogical methods, including case studies, interactive sessions, project-based learning, etc., is subject to faculty discretion. The assessment criteria may vary based on academic objectives, instructional methodologies, and evolving educational standards.



Programme offered by Centre for Automotive Research and Tribology (CART), IIT Delhi

Programme Details



Duration	12 Months
Learning Hours	240 Hours of Learning • Online- 210 Hours • Campus- 30 Hours
Delivery	Live Online Sessions delivered through Direct-to-Device (D2D)
Campus Immersion	The programme includes three campus immersion sessions, each lasting three days. • 1st Immersion **(Mandatory)**: Held at the start of the programme. • 2nd Immersion **(Mandatory)**: Conducted midway through the programme. • 3rd Immersion **(Optional)**: Takes place at the end of the programme. **Note:** • Attending the 1st and 2nd immersion sessions is mandatory. The 3rd immersion session is optional. • Participants are responsible for their own travel and accommodation expenses.

SCHEDULE

Session Timings:

Saturday, 6:00 pm to 9:00 pm and Sunday, 10:00 am to 1:00 pm

Application End Date | 30th September 2025

Commencement Date | October 2025

Programme offered by Centre for Automotive Research and Tribology (CART), IIT Delhi

ELIGIBILITY CRITERIA

- Bachelor's degree in any Electrical Science discipline with a minimum of first-class.
- Diploma in any Electrical Science discipline with a minimum of first-class and at least 3 years of experience.

SCREENING & SELECTION

- **Prescreening:** All the applications are evaluated against eligibility criteria, including 3+ years of experience and a Diploma in Electrical Sciences.
- **Selection:** Admission is merit-based, determined through a holistic assessment of the candidate's application.

Note: *For borderline cases or applications requiring further clarity, personalized consultations may be conducted to ensure fair and informed decisions.*

EVALUATION PROCESS

- The course evaluation will consist of exams, assignments, and class projects as specified by the course instructor at the beginning of the course.

ADMISSION CRITERIA

- Selections will be based on a detailed profile of the candidate in his own words elaborating on his academic along with professional experience and a write up on "expectations from the programme".

ADMISSION PROCESS

Programme offered by Centre for Automotive Research and Tribology (CART), IIT Delhi

ASSESSMENT: MINOR PROJECT EVALUATION (JID800)

- **Selecting Your Supervisor**
  Secure a minor project supervisor within the first two months of the programme, with help from IIT Delhi's faculties. A list of projects will be floated shortly after the beginning of the semester for students to choose from.

- **Executing Your Project**
  Conduct your minor project in an online or offline mode, based on discussions with your supervisor.

- **Project Evaluation Process**
  - Get assessed by IIT Delhi's faculty team through online evaluations or special arrangements coordinated with your supervisor.
  - **Minor Project:** At the beginning of the programme, participants will choose from a selection of minor projects. Each project will be carried out under the guidance of a faculty supervisor and will be evaluated by a panel of IIT Delhi faculty members as per the approved guidelines.

ATTENDANCE

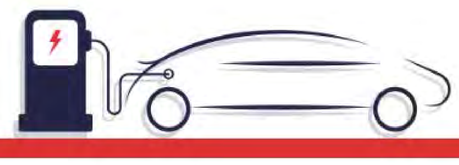
- 75% attendance is mandatory as per institute norms.

DISCLAIMER:

- Online PG Diplomas are the academic programme of IIT Delhi, and there is no campus placement or assistance provided from IIT Delhi in these programmes.
- The evaluation of minor projects is subject to the faculty's discretion, based on academic guidelines and instructional objectives. Assessment criteria may vary depending on the nature of the project and its alignment with the course framework.

Programme offered by Centre for Automotive Research and Tribology (CART), IIT Delhi

Programme Fee Details



Fee Structure

Application Fee: INR 1,000/- + GST

Total Programme Fee: INR 4,50,000/- + GST

Instalment Pattern

INSTALMENT 1	INR 1,50,000/- + GST	At the time of enrollment and as mentioned in the offer letter
INSTALMENT 2	INR 1,50,000/- + GST	4th month from commencement date
INSTALMENT 3	INR 1,50,000/- + GST	8th month from the commencement date

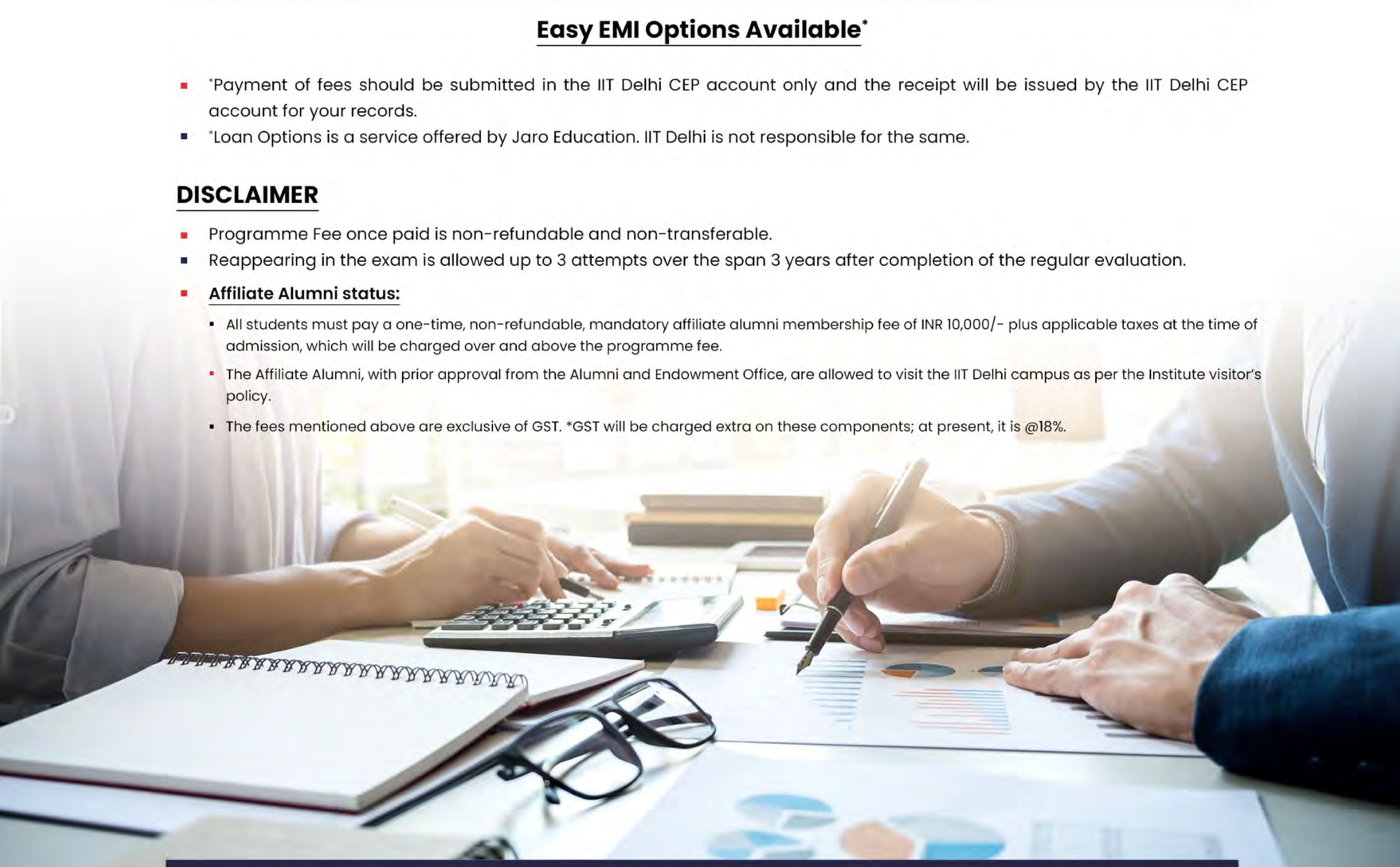
Affiliate Alumni Membership Fee*	INR 10,000/- + GST
Re-Examination Fee (per course, per attempt)	INR 10,000/- + GST

Easy EMI Options Available*

- *Payment of fees should be submitted in the IIT Delhi CEP account only and the receipt will be issued by the IIT Delhi CEP account for your records.
- *Loan Options is a service offered by Jaro Education. IIT Delhi is not responsible for the same.

DISCLAIMER

- Programme Fee once paid is non-refundable and non-transferable.
- Reappearing in the exam is allowed up to 3 attempts over the span 3 years after completion of the regular evaluation.
- **Affiliate Alumni status:**
  - All students must pay a one-time, non-refundable, mandatory affiliate alumni membership fee of INR 10,000/- plus applicable taxes at the time of admission, which will be charged over and above the programme fee.
  - The Affiliate Alumni, with prior approval from the Alumni and Endowment Office, are allowed to visit the IIT Delhi campus as per the Institute visitor's policy.
  - The fees mentioned above are exclusive of GST. *GST will be charged extra on these components; at present, it is @18%.



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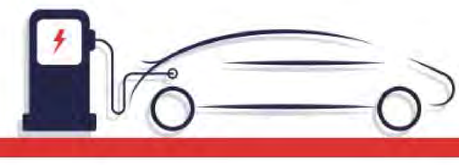
Explore Diploma Specimen Criteria Details



- Complete all the course requirements successfully to obtain this prestigious recognition from IIT Delhi.

भारतीय प्रौद्योगिकी संस्थान दिल्ली
Indian Institute of Technology Delhi

प्रविष्टि संख्या/Entry No.

भारतीय प्रौद्योगिकी संस्थान दिल्ली

अभिषद की अनुशंसा पर

ऑनलाइन स्नातकोत्तर डिप्लोमा (शीर्षक)

विद्यार्थी का नाम

को प्रदान करता है। आपने इस उपाधि पत्र के अर्जन हेतु विनियम विहित निर्धारित अपेक्षाओं को वर्ष XXXX में सफलतापूर्वक पूर्ण किया है।
10 अंकीय मापक्रम में आपका उपाधि कोटि अंक माध्य XXXX है।
भारतीय गणराज्य में दिल्ली स्थित संस्थान की मुद्रा अंकित यह उपाधि पत्र आज दिनांक XX अगस्त XXXX को दिया गया।

Indian Institute of Technology Delhi

Upon the recommendation of the Senate hereby confers the

Online Post Graduate Diploma in (Title)
on
NAME OF THE STUDENT

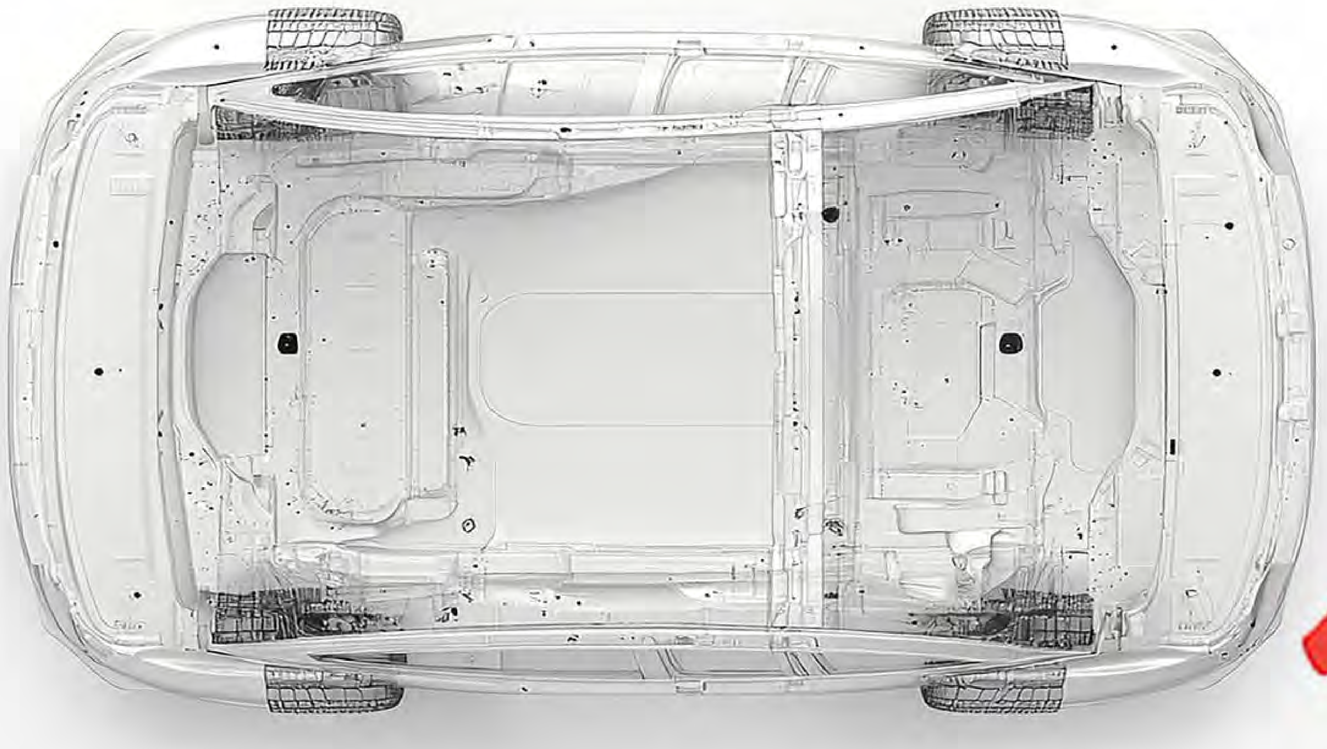
who has successfully completed in the year XXXX the requirements prescribed under the regulations for the award of this diploma with a Cumulative Grade Point Average of xxxx on a 10 point scale.
Given this day, the (diploma awarding date), under the seal of the Institute at Delhi in the Republic of India.

अध्यक्ष, अभिशासक परिषद
Chairperson, Board of Governors

अध्यक्ष, अभिषद एवं निदेशक
Chairperson, Senate & Director

कुलसचिव
Registrar

- The above Online PG Diploma is for illustrative purposes only, and the format of the certificate may be changed at the discretion of IIT Delhi.
- The organising department of this programme is the Centre for Automotive Research and Tribology (CART), IIT Delhi.
- Online PG Diploma will be issued separately by the organizing department.



Programme offered by Centre for Automotive Research and Tribology (CART), IIT Delhi

Know The Programme Coordinators

PROF. SANTANU KUMAR MISRA

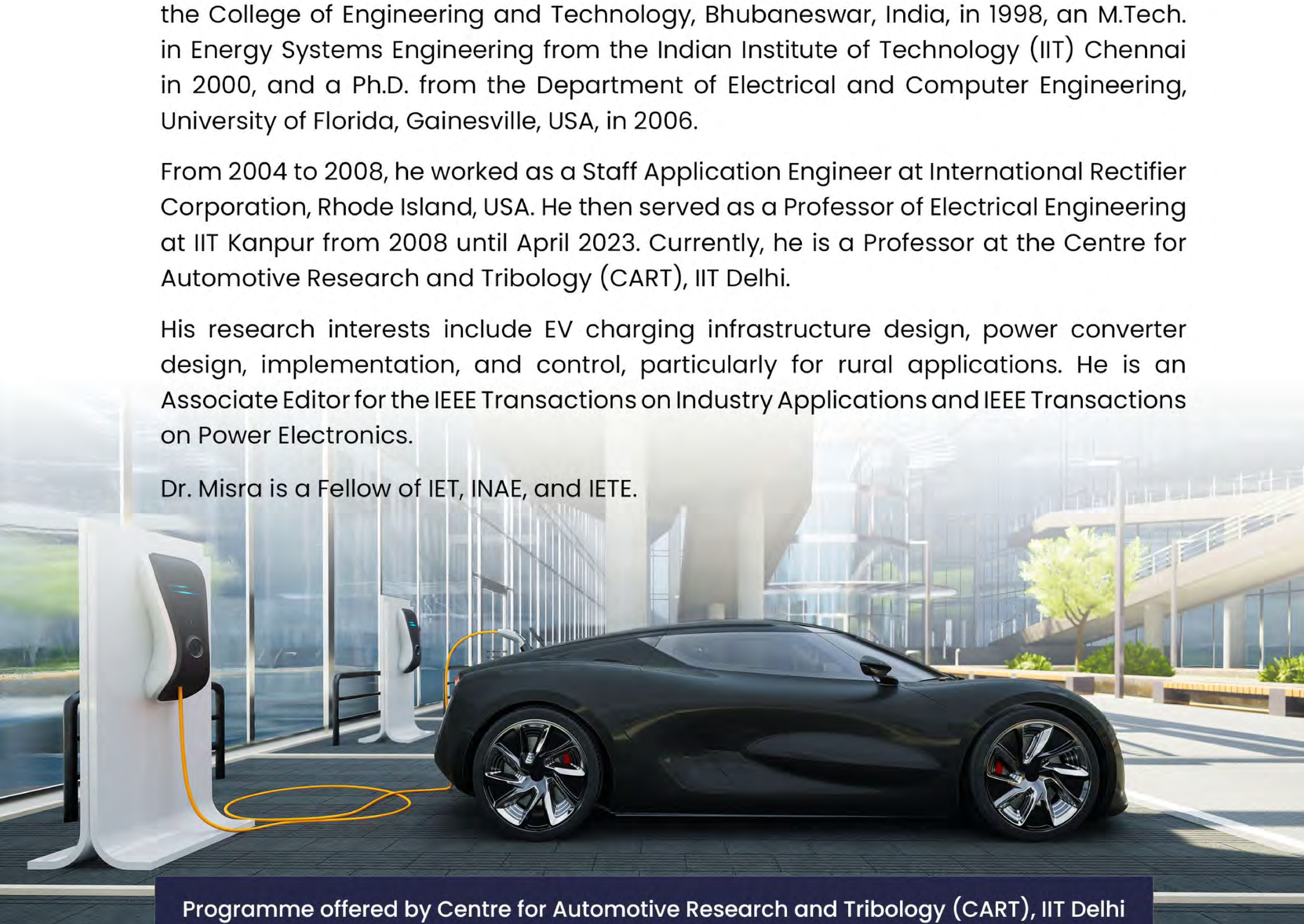
Professor, Centre for Automotive Research and Tribology (CART), IIT Delhi

Dr. Santanu K. Misra (S'00-M'04-SM'12) earned his B.Tech. in Electrical Engineering from the College of Engineering and Technology, Bhubaneswar, India, in 1998, an M.Tech. in Energy Systems Engineering from the Indian Institute of Technology (IIT) Chennai in 2000, and a Ph.D. from the Department of Electrical and Computer Engineering, University of Florida, Gainesville, USA, in 2006.

From 2004 to 2008, he worked as a Staff Application Engineer at International Rectifier Corporation, Rhode Island, USA. He then served as a Professor of Electrical Engineering at IIT Kanpur from 2008 until April 2023. Currently, he is a Professor at the Centre for Automotive Research and Tribology (CART), IIT Delhi.

His research interests include EV charging infrastructure design, power converter design, implementation, and control, particularly for rural applications. He is an Associate Editor for the IEEE Transactions on Industry Applications and IEEE Transactions on Power Electronics.

Dr. Misra is a Fellow of IET, INAE, and IETE.



Programme offered by Centre for Automotive Research and Tribology (CART), IIT Delhi

PROF. BIJAYA K. PANIGRAHI

Professor, Department of Electrical Engineering

Founder & Former Head, CART, IIT Delhi

Dr. Bijaya Ketan Panigrahi (Fellow, IEEE) has been a Professor in the Department of Electrical Engineering at IIT Delhi since 2005 and was the Founding Head of the Centre for Automotive Research and Tribology (CART). He currently holds the Indu Shrivastava & Serla Singh Chair Professorship in Artificial Intelligence at IIT Delhi.

He is an Associate Faculty at the Bharti School of Telecommunication Technology and Management, the Amar Nath and Shashi Khosla School of Information Technology, and the Yardi School of Artificial Intelligence at IIT Delhi. Before joining IIT Delhi, he was a faculty member in the Department of Electrical Engineering, University College of Engineering, Burla, Sambalpur, Odisha, from 1992 to 2005.

His research focuses on AI-based solutions for power quality event detection, induction motor fault diagnostics, and electric vehicle motor diagnostics. He has also worked extensively on maximum power point tracking controllers for solar photovoltaic systems. His current research explores energy management in smart grids, EV charging infrastructure, the impact of fast charging on the grid, EV battery technology, battery management systems, and cybersecurity in power infrastructure.

Dr. Panigrahi has published over 700 research articles in international journals and conference proceedings. He is a Fellow of IEEE, the Indian National Academy of Engineering (INAE), the National Academy of Sciences (NASI), and the Asia-Pacific Artificial Intelligence Association (AAIA).

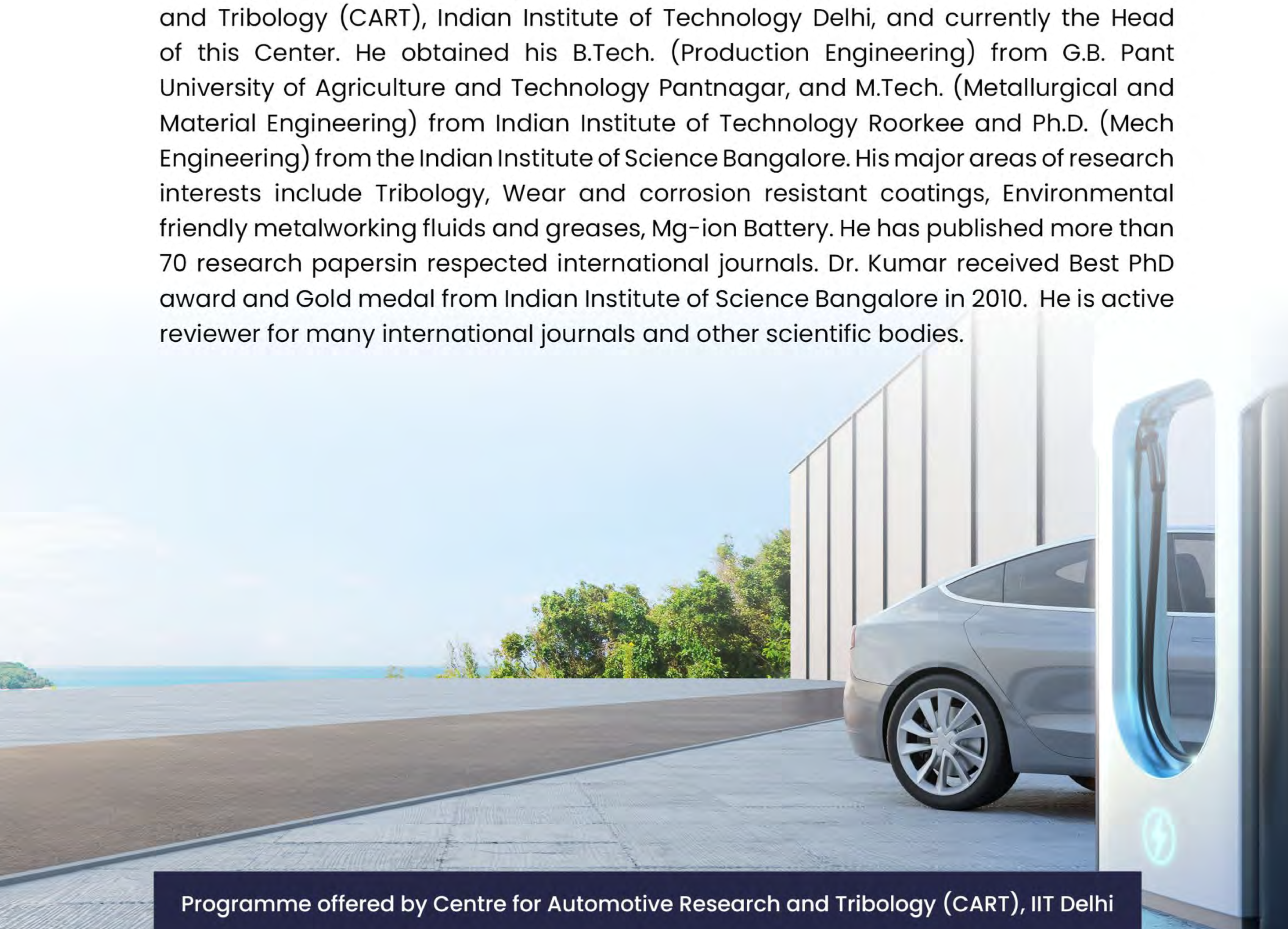
Programme offered by Centre for Automotive Research and Tribology (CART), IIT Delhi

Know the Resource Facilitators

PROF. DEEPAK KUMAR

Professor & Head, CART, IIT Delhi

Dr. Deepak Kumar is working as a Professor at Centre for Automotive Research and Tribology (CART), Indian Institute of Technology Delhi, and currently the Head of this Center. He obtained his B.Tech. (Production Engineering) from G.B. Pant University of Agriculture and Technology Pantnagar, and M.Tech. (Metallurgical and Material Engineering) from Indian Institute of Technology Roorkee and Ph.D. (Mech Engineering) from the Indian Institute of Science Bangalore. His major areas of research interests include Tribology, Wear and corrosion resistant coatings, Environmental friendly metalworking fluids and greases, Mg-ion Battery. He has published more than 70 research papersin respected international journals. Dr. Kumar received Best PhD award and Gold medal from Indian Institute of Science Bangalore in 2010. He is active reviewer for many international journals and other scientific bodies.



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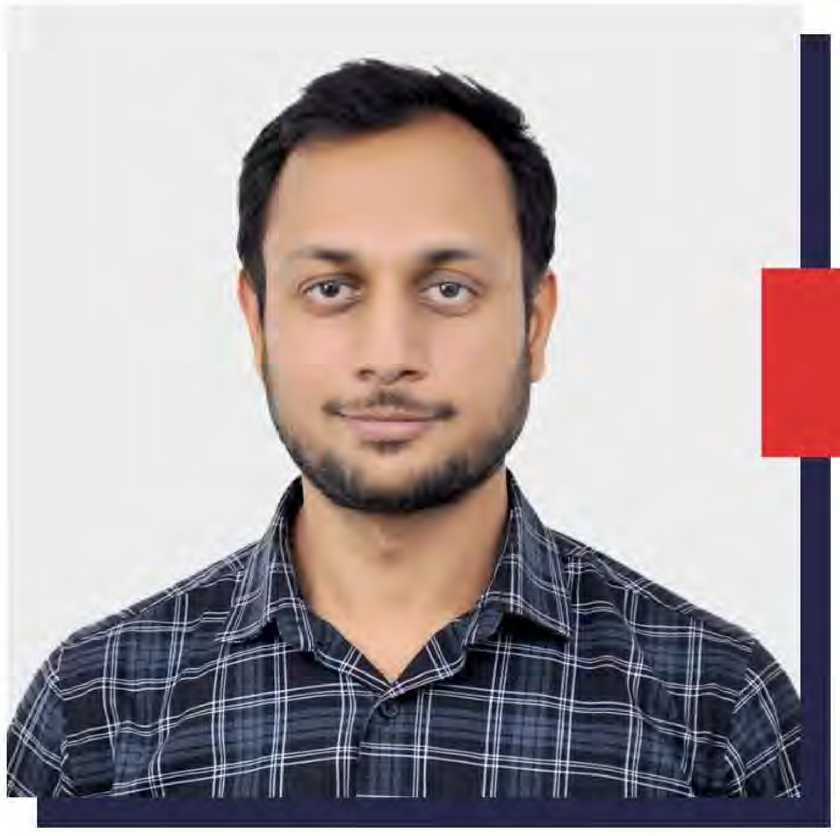


PROF. SAURABH SAXENA

Assistant Professor, CART, IIT Delhi

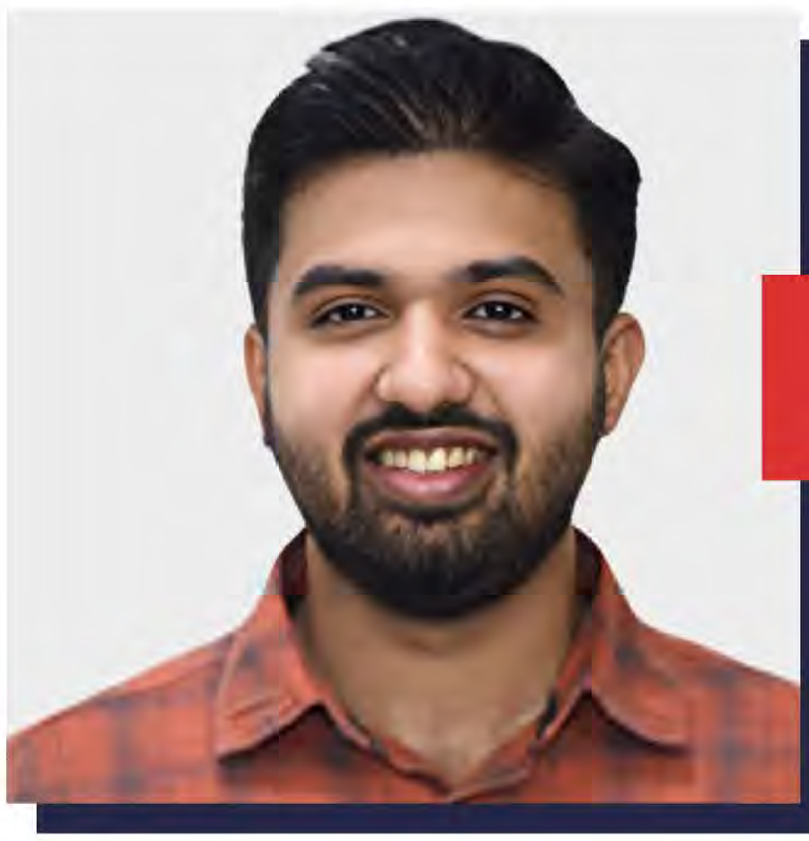
Dr. Saurabh Saxena received his B.Tech. in Electrical Engineering from the Indian Institute of Technology (Banaras Hindu University), Varanasi, in 2011, and his Ph.D. in Mechanical Engineering from the University of Maryland, College Park, in 2020. He worked as a Project Assistant at the Indian Institute of Science, Bangalore, focusing on the modeling of lithium-ion batteries and supercapacitors. Currently, he is an Assistant Professor at the Centre for Automotive Research and Tribology (CART), Indian Institute of Technology Delhi. Over the past ten years, he has been involved in various battery research projects, with research interests in accelerated testing and modeling, failure analysis, reliability, safety, and artificial intelligence-enabled health management of lithium-ion batteries.

PROF. SAPTARSHI BASAK

Assistant Professor, CART, IIT Delhi

Dr. Jadavpur University, Kolkata, in 2010, an M.Tech degree in Electrical Engineering with a specialization in Machines, Drives, and Power Electronics from the Indian Institute of Technology Kharagpur in 2012, and a Ph.D. degree from the Department of Electrical Engineering, Indian Institute of Technology Kharagpur, in 2019. After completing his Ph.D., he joined the Electronics and Control (R&D) Division of Shakti Pumps (India) Limited, where he was involved in firmware development for solar pump drives, grid-connected photovoltaic converters, and hybrid inverters. In

April 2021, he joined the Centre for Automotive Research and Tribology (CART). His research interests include the design and control of special electric machines, on-board generation systems, estimation techniques, control of AC drives, and on-board chargers.



PROF. KRISHNA RAJ R

Assistant Professor, CART, IIT Delhi

Dr. Krishna Raj R is an Assistant Professor at IIT Delhi's Centre for Automotive Research and Tribology, specializing in power electronics and electric vehicle (EV) technologies. He holds a PhD (2015–2019) and M.Tech from IISc Bangalore, and a B.Tech from College of Engineering Trivandrum. As a Postdoctoral Fellow at the University of Houston (2018–2020), he collaborated with GE Aviation and Sandia National Labs on energy storage systems. His research focuses on EV motor control, second-life battery applications, and indigenous motor controllers for urban EVs. He teaches courses like Power Electronics for EVs and mentors students, bridging academia and industry to advance sustainable mobility solutions tailored to Indian conditions.

PROF. HUSAIN KANCHWALA

Assistant Professor, CART, IIT Delhi

Dr. Husain Kanchwala is an Assistant Professor at the Center for Automotive Research and Tribology, specializing in vehicle system dynamics, control, and

dynamical systems. His research encompasses vibrations, applied mechanics, material modeling, and condition monitoring, with a focus on developing innovative and simplified solutions for complex automotive challenges. He collaborates with institutions such as the University of Warwick, Cranfield University, and KTH Royal Institute of Technology, bridging the gap between academia and industry, and has prior experience at Mahindra & Mahindra (R&D, Mumbai). His future research directions include tire vibration analysis using vision-based techniques, EV/HEV battery optimization, autonomous vehicle path planning, and vehicle safety enhancement through bifurcation analysis. Additionally, he explores fault monitoring in suspension and steering systems, as well as transmission health diagnostics, aiming to advance sustainable and safe mobility through interdisciplinary models and tools.

PROF. S. FATIMA

Associate Professor, CART, IIT Delhi

Dr. S. Fatima is an Associate Professor in CART, IIT Delhi. Her research focuses on machinery health monitoring, NVH, machinery and industrial noise control, acoustical natural materials, reliability, and maintenance. Dr. Fatima holds a Ph.D. and a Master's degree from the Indian Institute of Technology Kharagpur. She is a recipient of the DST Inspire Faculty Award and the Young Professional Award from the International Institute of Noise Control Engineering. She was a postdoctoral fellow at the Ray W. Herrick Laboratories of Purdue University, USA, under the Schlumberger Foundation Faculty for the Future Award before joining the Indian Institute of Technology Delhi. She has extensive experience in NVH, industrial noise control, and machinery health monitoring and has received several international and national awards for her research in noise control.

PROF. MANDEEP SINGH RANA

Assistant Professor (Grade-II), IIT Delhi

Dr. Mandeep Singh Rana received his B.Tech. degree in Electrical Engineering from the National Institute of Technology, Bhopal, India, in 2013 and his Ph.D. degree in Power Engineering from the Department of Electrical Engineering, Indian Institute of Technology Kanpur, in 2023. Prior to joining IIT Delhi, he worked as a Controls Engineer at GE Aviation. His current research interests include electric vehicle automation, maglev drive systems, and the design and control of power electronic converters.

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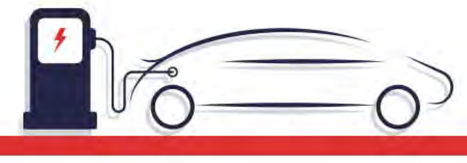
About IIT Delhi



IITD is Ranked #1 in Asian University Rankings - Southern Asia as per QS World University Rankings 2025 in India

Ranked #2 as per NIRF India Engineering Rankings (2024)

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 students have graduated from IIT Delhi in various disciplines, including Engineering, Physical Sciences, Management, Humanities and Social Sciences. Of these, nearly 5070 received Ph.D. 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 significantly contributed to the building of this nation and to industrialization around the world.

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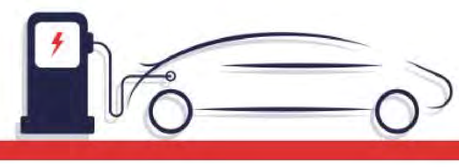
About Centre For Automotive Research And Tribology (CART)



The Centre for Automotive Research and Tribology (CART) was established in May 2019 with a vision to promote interdisciplinary research in the area of Electric Vehicle (EV), energy storage and other relevant areas. The centre envisages strong networking and collaboration among various academia, industries, research labs in India and abroad to carry out cutting edge research.

Following are the five major verticals of CART:

- Electric Vehicle (EV)
- Energy Storage and Monitoring
- Automotive Health Monitoring
- Calibration and Diagnostics
- Tribology

As this new entity has been evolved from,ITMMEC, the current strength of the centre is in Tribology and will be building expertisein all other verticals very soon.

Mission

The centre envisages strong networking & collaboration among various industries, research labs and unive- rsities in India and abroad to carry out cutting edge research in the area of automotive research and tribology along with offering post graduate programs.

Vision

To become an internationally recognized centre in teaching, research, and technological service in the area of electric vehicle, energy storage and tribology & related interdisciplinary fields.

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Jaro's Programme Expert

MR. MRINAL MODAK

+91-97693 95935

mrinal.modak@jaro.in

11th, Vikas Centre, CG Rd, Wadavli,
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