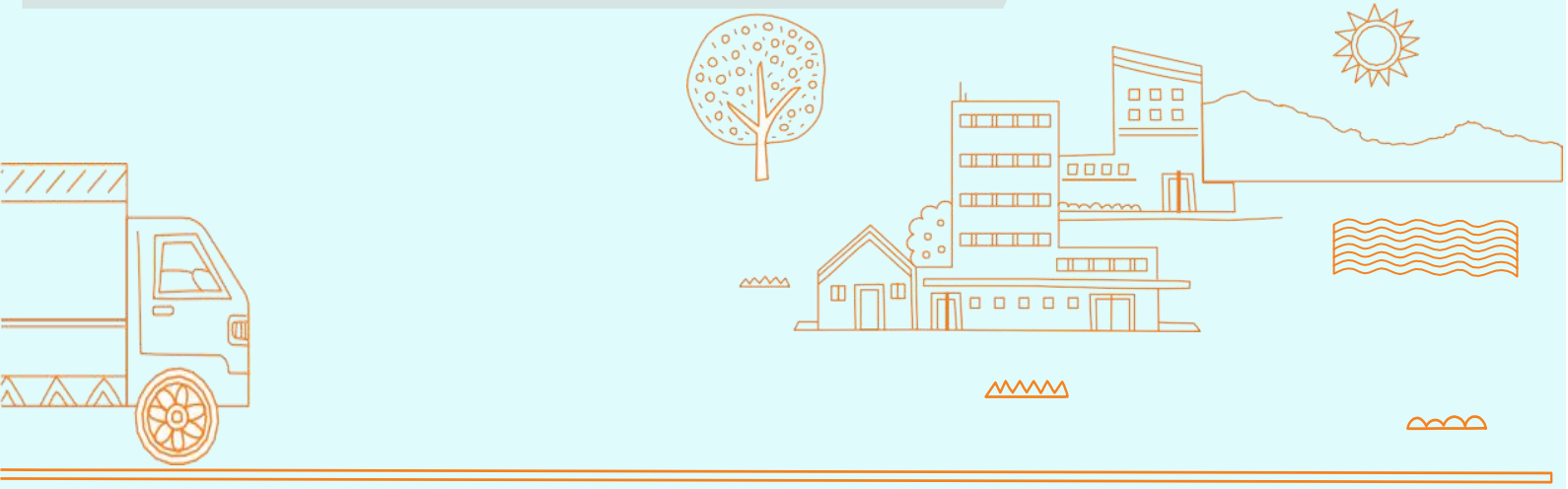
INDIAN INSTITUTE OF INFORMATION TECHNOLOGY RANCHI

An Institute of National Importance under
Ministry of Education, Government of India

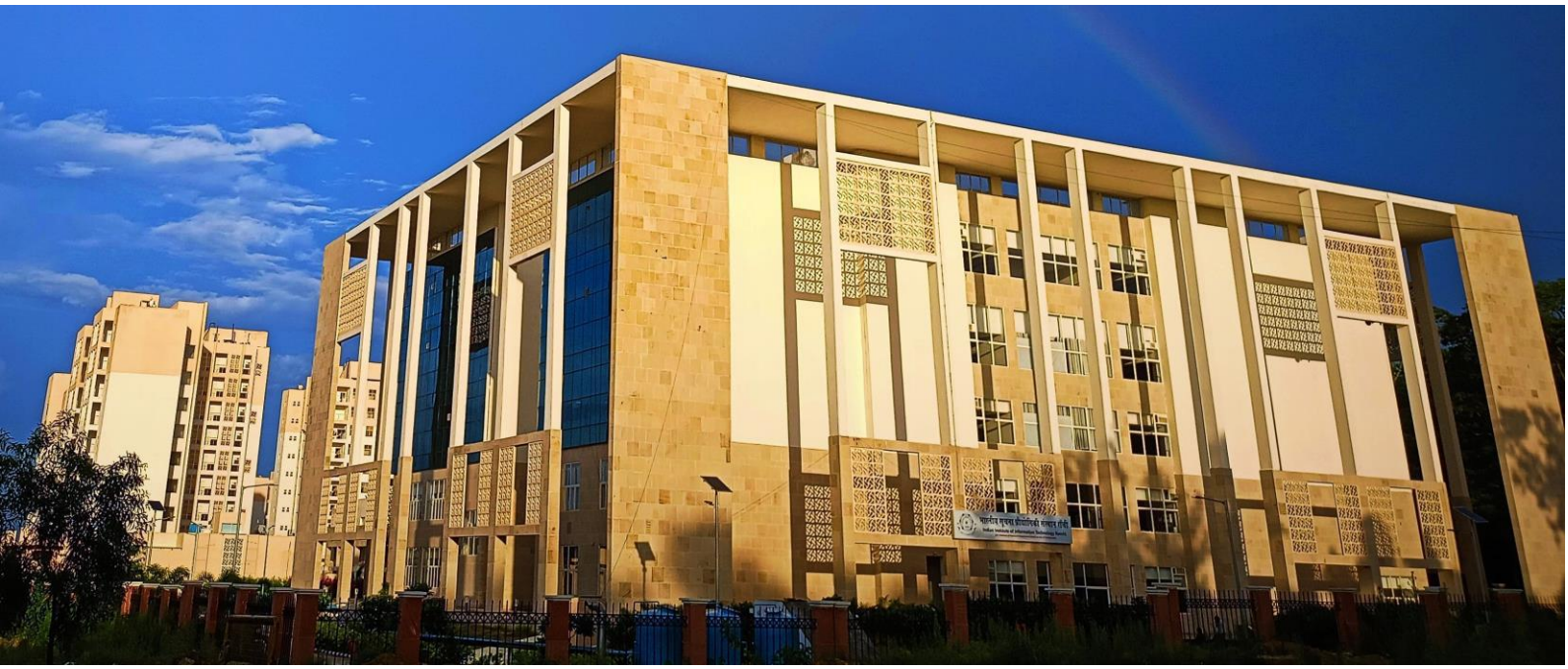


EXECUTIVE M.TECH. PROGRAMME IN

ECE (Autonomous Connected Electric Vehicles)

ADMISSION BROCHURE

2022-23



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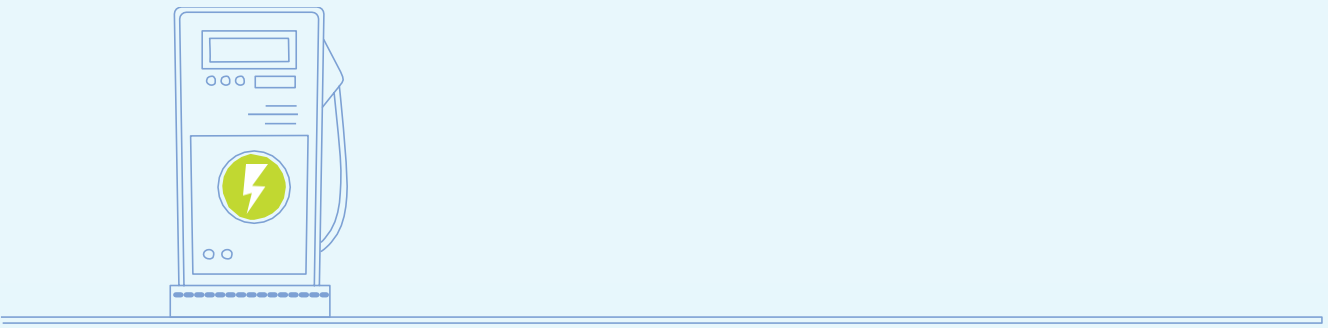
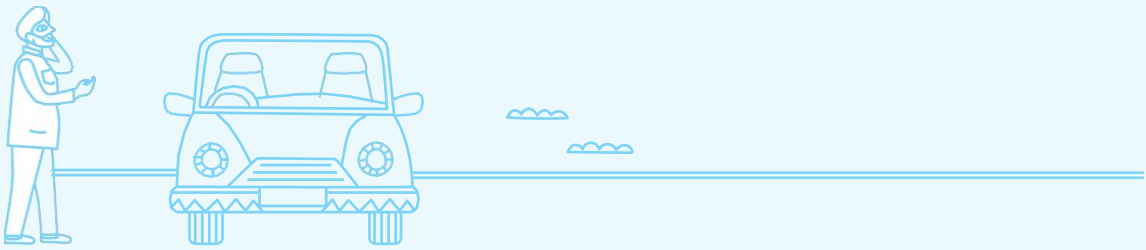
MOTIVATIONS

The Government of India released the National Electric Mobility Mission Plan 2020 (NEMMP 2020) to enhance national fuel security, provide affordable and environmentally friendly transportation, and enable the Indian automotive industry to achieve global manufacturing leadership. As part of the NEMMP 2020, the Department of Heavy Industry formulated a scheme, i.e., Faster Adoption and Manufacturing of Hybrid and Electric Vehicles in India, which will achieve the promotion of manufacturing of electric and hybrid vehicle technology and ensure sustainable growth of the same. The Indian automobile industry is expected to become one of the top two countries in the world in global exports of electric vehicles and their segments. To achieve such ambitious targets, the industry would require technological development, upgradation, digitization, automation, and skilled human resources. India's automotive industry is self-sufficient in the design and manufacture of internal combustion engine technology. However, the industry is looking for experts in EV technology by training existing skilled manpower through industry-academia interaction programs, exclusively in battery technology, power electronics, motor drives, system integration, battery management systems, testing infrastructure, charging infrastructure, and controllers. Academic institutions are eager to collaborate with industry to conduct research and address the challenges of promoting EV technology.

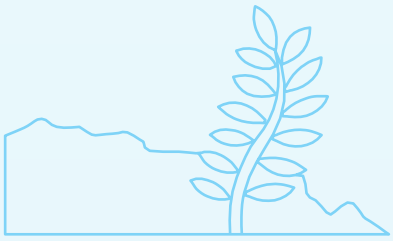
ABOUT THE PROGRAMME

The Executive M.Tech. programme in Autonomous Connected Electric Vehicles (ACE) is an interdisciplinary programme (one of the main pillars of the New Education Policy, NEP-2020) being offered in the academic year 2022–23. It is a 2.5-year (i.e., 5 regular semesters) full-time M.Tech. programme for working professionals, which provides maximum flexibility. Furthermore, upskilling working professionals through a degree programme that does not compromise on the quality of the programme is also important. The program's goal is to impart and foster knowledge in electric vehicle research and development, as well as cutting-edge approaches to shaping the future of energy. Broad areas include, but are not limited to: Power Electronics, Drives, Sensors, Energy Storage, Chargers and Charging Infrastructure, Safety, Product Design, Renewable Energy, and so forth. A group of faculty members from IIIT Ranchi, Tata Technologies Ltd., IITs, NITs, foreign universities, industry, and R&D organisations will coordinate this program. The maximum number of seats per year under this programme is 25. Classes will be offered in an offline or online mode, depending upon the work location of candidates.





The class timings will be in the evenings and weekends, typically to be decided by the course instructors. It will not be mixed with regular students. Selection of candidates is based on an interview. Candidates must be currently employed in the industry or organization, and must have 2 years of work experience at the time of application. Candidates must provide a no-objection certificate or letter from their employer at the time of interview.



ABOUT THE INSTITUTE

The Indian Institute of Information Technology Ranchi, also known as IIIT Ranchi, was established in 2016 by the Ministry of Education, Government of India as an Institute of National Importance under an Act of Parliament. The institute is funded and managed by the government of India, the government of Jharkhand, and industry partners represented by Tata Technologies Limited, Tata Consultancy Services, and Central Coalfields Limited under the Public Private Partnership (PPP) model. At present, IIIT Ranchi is operating from its temporary premises at Science & Technology Campus, Nakum, Ranchi and JUPMI Campus, Dhurwa, Ranchi, till its new campus is made operational at Kanke, Ranchi. IIIT Ranchi is one among the 21 IIITs across India, with a vision to contribute to the IT world through education and research, entrepreneurship and innovation. The Institute is governed by the Board of Governors, which consists of eminent personalities from government, industry, and academia.

Currently, the Institute offers admissions to B.Tech. and B.Tech.(Hons) programmes in Electronics and Communication Engineering, Computer Science and Engineering, Electronics and Communication Engineering with Specialization in Embedded Systems and Internet of Things, Computer Science and Engineering with Specialization in Data Science and Artificial Intelligence, M.Tech. programmes in Computer Science and Engineering with Specialization of Data Science and Artificial Intelligence, Electronics and Communication Engineering with Specialization of Embedded Systems and Internet of Things, and Ph.D. programmes in various fields.

The honourable Director of IIIT Ranchi, Prof. Vishnu Priye, is looking forward to focusing on multidisciplinary fields that can extend the availability and usefulness of technology and its environment to our society and industry directly. He promotes various research activities by the faculty members and students. In the academic year 2022–23, IIIT Ranchi starts admissions to its first batch of four Executive M.Tech. programmes for working professionals, i.e., Computer Science and Engineering with specialisation in Data Science and Artificial Intelligence; Electronics and Communication Engineering with Specialization in Embedded Systems and Internet of Things; Autonomous Connected Electric Vehicles; and Design Thinking and Innovation. The programmes will be run in collaboration with renowned industries in India. Through this academic-industry collaboration programme, IIIR Ranchi researchers help industrial scientists identify current research that might be useful for the design and development of innovative processes and potential products. The institute will admit 25 students for each specialization.

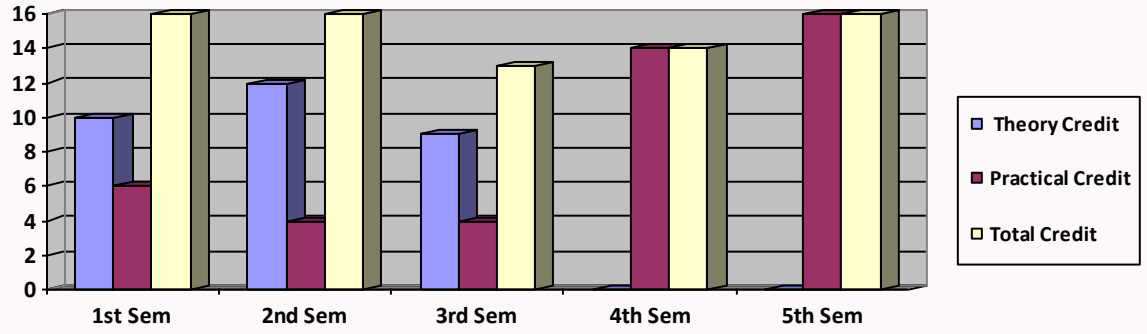
PROGRAMME HIGHLIGHTS

- The degree awarded will be M.Tech.
- The programme is run in collaboration with IIIT Ranchi and Tata Technologies Ltd.
- Experienced faculty from IIIT Ranchi/IIT/NIT, industry experts from Tata Technologies Ltd., and researchers from R&D, will take the classes.
- Interested candidates may do their internship/project work at Tata Motors.
- State-of-the-art laboratories equipped with the latest equipment (hardware and software) are being used.
- The course curriculum is based on industry requirements and job oriented and is framed by academic and industry experts.
- A research-driven programme with close links to industry.
- Depending on the geographical distribution of candidates, classes will be offered either offline or online.
- Options for in-person examinations, evaluations, and labs.
- Candidates must be physically present at the institute for a week at the end of the semester. They have to complete all lab experiments and examinations physically.
- If candidates desire, they can participate in campus placement.
- Candidates will be alumni of IIIT Ranchi.

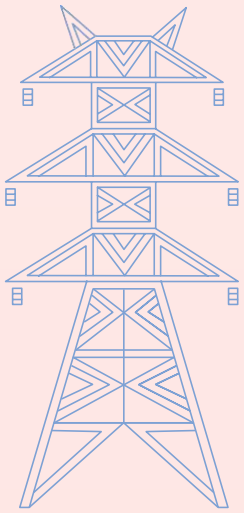
OVERVIEW OF CURRICULUM

The curriculum has been finalised under the meticulous supervision of the honourable Director, IIIT Ranchi, and other eminent experts from various academic and industrial backgrounds. The curriculum is designed to provide a foundation of core courses spanning topics in electrical, electronics, and mechanical engineering and many electives spanning niche topics. A list of core and elective courses is provided below. Additional electives may be added in subsequent semesters to cater to the emerging trends and requirements in industry.

Semester-wise Credit Distribution



The programme has three components in the curriculum, i.e., 1. theory courses; 2. laboratory courses; and 3. M.Tech. thesis/project work. A minimum of 70 credits must be earned to award the degree. Typically, students have to do 75 credits of coursework (theory + lab + 28 credits of thesis work) and an industrial internship. Please see https://iiitranchi.ac.in/syllabi.aspx to get an idea of the curriculum.



Core Courses

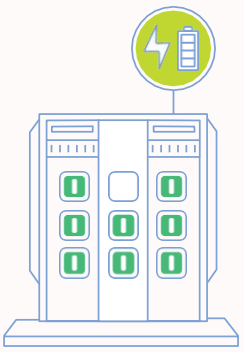
- Introduction to Automobile Engineering
- Hybrid Electric Vehicle
- Advance Power Electronics and Control
- Electric Vehicle Motor and Controller
- Energy Storage Systems
- Battery Management Systems
- Charging Infrastructure: Battery Charging, Protection, and Sizing
- Autonomous, Connected Vehicles

Elective Courses

- Wireless Sensor Networks
- Machine Learning
- Embedded System Design
- Wireless Power Transfer Technologies
- IoT Sensors & Actuator
- Solar Photovoltaic Energy Conversion Systems
- Data Analytics and Visualization
- Intelligent Transportation System
- IoT Architecture & Computing
- Computer Vision for Automated Electric Vehicles

Other elective courses to be taken from NPTEL/MOOCs/SWAYAM/COURSERA or any other online platform as determined by the committee.

Laboratories Courses



- Introduction to Automobile Engineering Lab
- Hybrid Electric Vehicle Lab
- Advance Power Electronics and Control Lab
- Electric Vehicle Motor and Controller Lab
- Energy Storage Systems and Battery Management System Lab
- Charging Infrastructure: Battery Charging, Protection and Sizing Lab
- Autonomous, Connected Vehicles Lab

In each semester, one or two labs will be conducted through simulation software, and the others will be hardware labs. However, students will perform some lab experiments at Tata Motors.

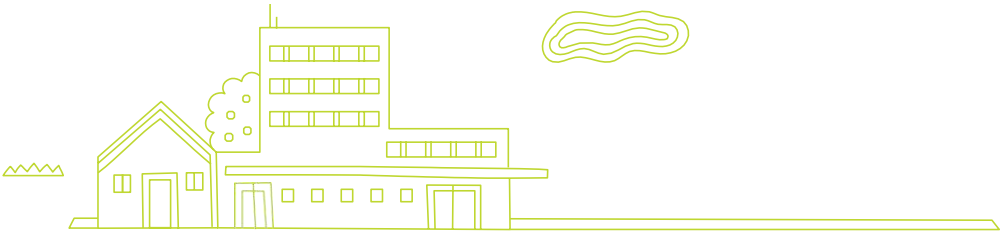
M.Tech. Thesis/Project Work

Students will do their projects in their own industry, at Tata Technologies Limited or at IIIT Ranchi. The student individually works on a specific topic approved by the head of the division. During the project, each candidate will have a guide from IIIT Ranchi and Tata Technologies Limited, who is familiar with this area of interest. The student can select any topic that is relevant to the area of electric vehicle technology. The topic may be theoretical or include case studies. At the end of the semester, after completing the work to the satisfaction of the supervisor and review committee, a detailed report should be prepared and submitted to the head of the department. The students will be evaluated based on the report submitted and the viva-voce examination by a panel of examiners.

RESOURCE PERSONS

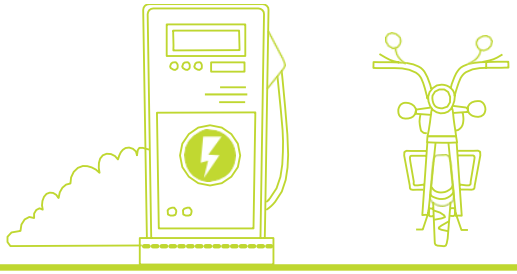
- Subject Matter Expert - IIIT Ranchi Faculty
- Industry Expert - Tata Technologies Ltd.
- Industry Expert - Electric Vehicles - Industries
- Researchers - Electric Vehicles- R&D Organizations
- Faculty Expert - Electric Vehicles - IIT/NIT/Foreign University

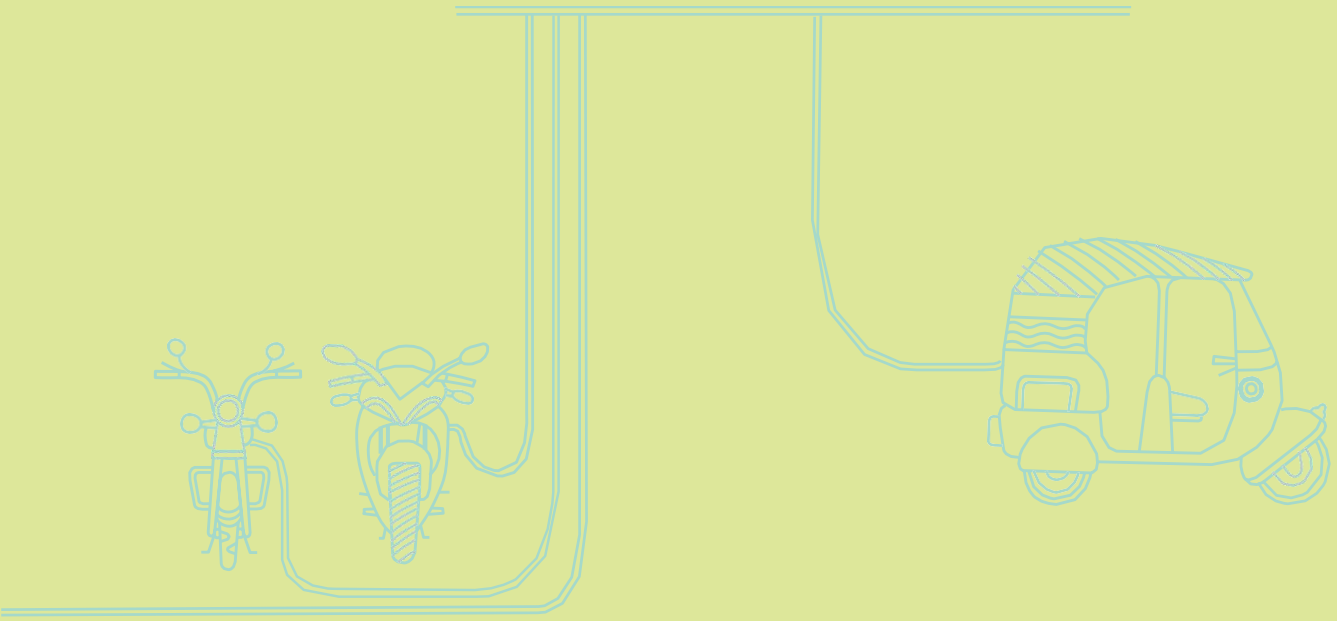
Each semester from I to III, two courses will be taught by IIIT Ranchi faculty subject matter experts and one course will be taught by an industry expert from Tata Technologies Ltd. The other courses will be taught by an expert external faculty member from academia and/or industry.



CAREER PROSPECTS

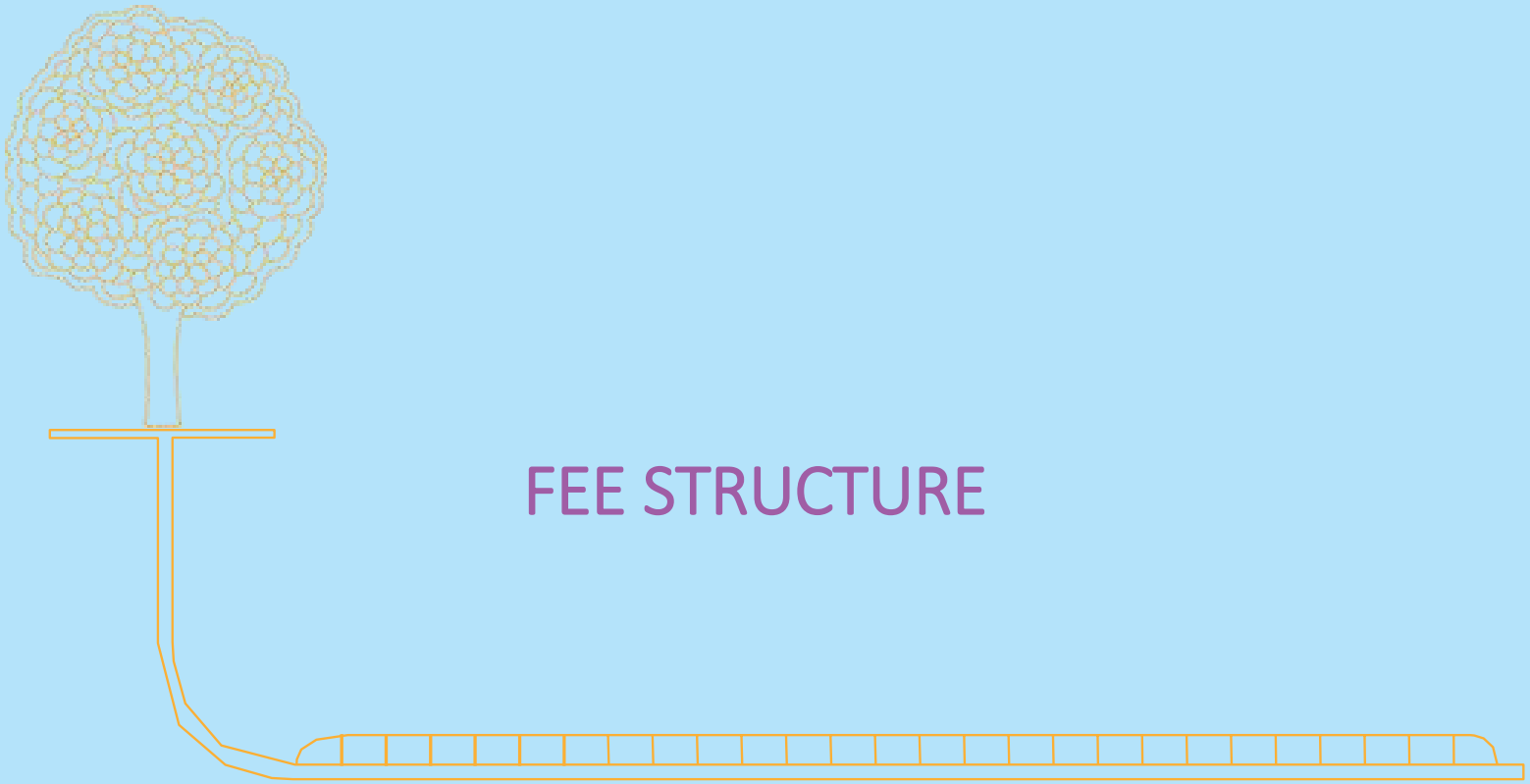
Candidates can find excellent job opportunities in consulting companies, manufacturing companies, engineering & construction companies, NGOs, steel and power-based industries, energy industries, and private firms. Graduates can also work as policymakers or research and development engineers in the public sector.





ELIGIBILITY CRITERIA

- A candidate should have a BE/B.Tech. in Electronics and Communication Engineering, Electrical and Electronics Engineering, Electrical Engineering, Instrumentation and Control Engineering, Automobile Engineering, Aeronautical Engineering, Mechanical Engineering, and other relevant equivalent degrees.
- The qualifying CGPA is 6.00 on a 10 point scale or 55% aggregate marks in BE/B.Tech.
- A minimum of 2 years of work experience after BE/B.Tech.
- A candidate should be currently working in an industry or organization.
- A self-sponsored candidate should be an owner of a company with an annual turnover of Rs. 10 lakhs.



FEE STRUCTURE

Semester Fees

Tuition Fees: Rs. 1,50,000.00

Institute Fees: 15,000.00

Additional Fees (One Time Payable)

Caution Deposit (Refundable after Completion of Course): 20,000.00

Alumni Membership Fee: 2,000.00

ADMISSION PROCEDURE

The interested candidates please click on the link below for admission to the Executive M.Tech. Programme in Autonomous, Connected Electric Vehicles.

https://forms.gle/4s7X2s4dZEAb1hVw7

The selection will be based on the interview. Reservation policy is not applicable for this executive program. The category of admission is full-time, sponsored by the industries, established institutes, R&D organizations, national laboratories, etc.

IMPORTANT DATES

BEGINNING OF ONLINE APPLICATION PROCESS
20th October 2022

A

B

APPLICATION DEADLINE
30th November 2022

ANNOUNCEMENT OF PROVISIONAL SHORTLISTED CANDIDATES
10th December 2022

C

D

DATE FOR INTERVIEW
20th – 22nd December 2022

DECLARATION OF RESULT
24th December 2022

E

F

FEE PAYMENT DEADLINE
2nd January 2023

DATE OF WAITLISTED CANDIDATES ADMISSIONS
4th January 2023

G

H

REGISTRATION AND ORIENTATION
5th January 2023

CONTACT US

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Autonomous Connected Electric Vehicle

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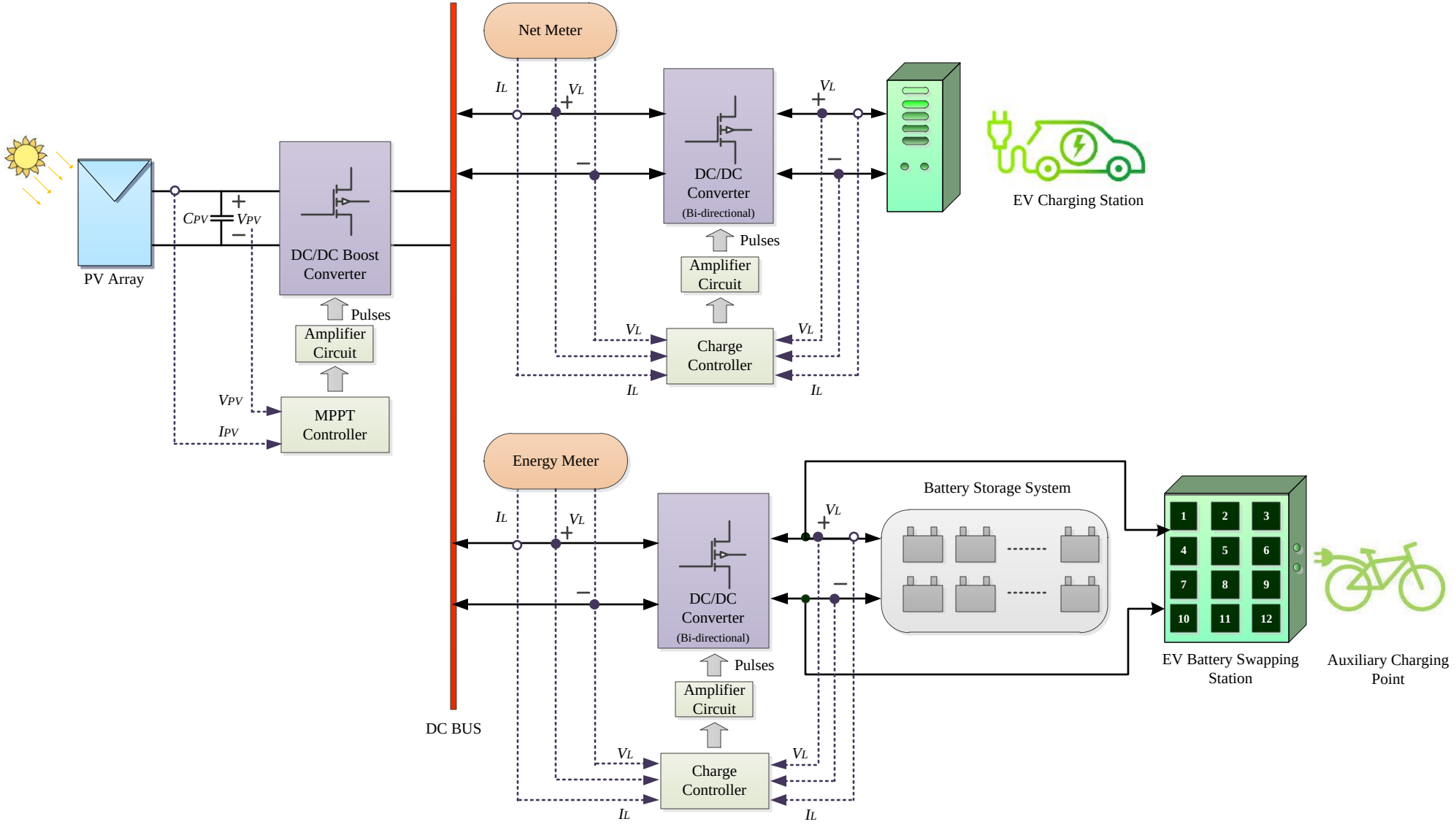
Ongoing Research in Electric Vehicles at IIIT Ranchi



A research group at IIIT Ranchi is currently working on electric vehicle charging infrastructure. The above figure shows a general schematic of a solar photovoltaic based electric vehicle charging infrastructure (i.e., off-grid) with battery storage.

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Established in 2016 by Ministry of Education, Government of India, vide ACT, 2017