

INDIAN INSTITUTE OF TECHNOLOGY MANDI



PLACEMENT BROCHURE

23-24

(M.TECH)

ELECTRIC TRANSPORTATION

ABOUT US:

The MTech. in Electric Transportation is being jointly offered in the SCEE and SMME .This program at IIT Mandi is designed to train students for state-of-the-art practices in area of Electric Mobility to generate new knowledge by engaging in cutting-edge research to serve as a valuable resource for industry and society.

The program structure is planned in an application-oriented manner through specialized core-courses with a significant hands-on practicum component, research and development (R&D) oriented advanced-level courses and project work.



OBJECTIVES OF THE PROGRAM

- **Fundamental Concepts:** Students should be taught the fundamental concepts related to electric transport, including the basic principles of electricity, energy storage, and electric motors.
- **Vehicle Components:** Students should learn about the various components of an electric vehicle, including the battery, electric motor, charger, and power electronics.
- **Charging Infrastructure:** Students should be familiar with the different types of charging infrastructure available for electric vehicles, including home chargers, public charging stations, and fast chargers.
- **Course Projects:** Incorporating research into course projects can help students gain a deeper understanding of the current state of the electric transportation industry and the latest innovations.
- **Systems Design Projects:** Systems design projects can be longer-term projects that allow students to explore a specific aspect of electric transportation in more depth.
- **Focus on Emerging Technologies:** Focusing on emerging technologies in the EV industry can provide students with valuable skills and knowledge that will make them more employable.

Courses

Core:

- ▶ Power Electronic Applications in Electric Transportation
- ▶ Electrical Machine and Drives in Electric Transportation
- ▶ Vehicle Design and Dynamics
- ▶ Modeling, Simulation and Control of HEV
- ▶ Embedded Systems and IoT for E-Transportation
- ▶ Energy Storage Technologies

Laboratory courses:

- Power Electronics and Electrical Drives
- Vehicle Design and Control
- Embedded Systems and IoT for E-transportation
- Energy Storage Technologies

Discipline elective:

- Special electrical machine
- Nonlinear stability and control
- Nonlinear Analysis And Control of Power Electronic Converters
- Practicum on Digital Control of Power Electronics and Drives
- Mechanical Vibrations
- Design Of Energy Systems
- Finite Element Methods

Project:

- Winter project (System Design)
- Post Graduate project (3rd & 4th Sem.)

LABS



Power electronics Lab



Electrical Machines Lab



Advanced Electric Drives Lab



Digital Control Lab



Special Electrical Machines Lab



Electric Vehicles and Reliability Research Lab

Students Project: (Winter Project)

- Simulation of optimum energy dissipation distribution through regenerative braking and frictional braking
- Design of coupling for receiving power from engine and motor for hybrid power trains
- Retrofitting of Three-wheeler.
- Control of PMSM based multi-wheel drive EV
- Control of SRM for EV application.
- Battery parameter modeling for EV charging applications
- Designing of on-board charger for EVs
- EV-chargers design , analysis and implementation
- An Integrated Power Electronic Interface EV Drive Trains
- Predictive air-conditioner control for electric buses with passenger amount variation forecast
- Life cycle assessment of EV and its comparison with conventional and hydrogen vehicles.
- Embedded Software Challenges for Electric Vehicles
- Prediction via AI/ML of gear change in an EV bike using bio signals as well as terrain data
- EV Chargers-Aiming for PFC with reduced sensor count
- Characterization of battery pack for E- scooter
- Selection and Testing of light weight materials for EV batteries

Students Project (Post Graduate Project)

- Predictive and Learning based optimal control and battery analytics in series parallel hybrid power train
- Control of PMSM based multi-wheel drive EV
- Control of SRM for EV application.
- Battery parameter modeling for EV charging applications
- Designing of on-board charger for EVs
- EV-chargers design , analysis and implementation
- Predictive air-conditioner control for electric buses with passenger amount variation forecast
- State-of-Charge Estimation of Lithium-Ion Batteries in Battery Management System of Electric Vehicle
- Embedded Software Challenges for Electric Vehicles
- EV Chargers-Aiming for PFC with reduced sensor count
- Characterization of battery pack for E- scooter
- Predictive and learning-based optimal control and analytics of Motor in Series-Parallel Hybrid Power Train

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