

Post G<u>raduation P</u>rogram in EV INTELLIGENT SYSTEM

GET FREE IPAD



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Offer Valid Till 22nd Oct, 2022

412 492

What a whale!!



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About ISIEINDIA

With more than 1 Million+ learners in 20+ countries. ISIEINDIA, is a leading global edtech company for professional and higher education offering industry-relevant programs in blended and purely online modes across technology domains. Our Programs are Industry oriented to enhance the technical skill sets and to create a sustainable career path for learners.

Enabling career success in the Automotive Industry

Our

Our

Vision

As India's largest professionals and engineering students learning company and a global footprint in **Mission** 20+ countries, we're on a mission to make professionals around the globe proficient and future-ready.

A world with skilled automotive ecosystem

To create sustainable training platform leading to provide an opportunity to the every member of automotive workforce.





300+ Hiring Partners

Program Highlights

Equivalent to NSQF (National Skill Qualification Framework) Level 6

Do a PG Program from Plugin UP that satisfies NSQF Level 6 criteria. **Post Graduate Program in Electric Vehicle Design** Get Certified by ASDC and gain

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succesfull completion of the program

Learn Key Tools & Technologies

Learn Simulink, MATLAB, ANSYS Maxwell, etc.

Blended Learning

Learn with the ease and flexibility of recorded as well as live session, designed to ensure a wholesome learning experience. Weekly Live Mentorship Sessions

Project Based Learning

Dedicated support for Comprehensive projects that you can showcase in your resume

Faculty and Industry Experts

G Leela Mohan Rao Associate Software Engineer

Boris Fabris Automotive Design Consultant

Priya Parameswarappa Buisness System Manager

Manish Kumar Assistant Manager, R&D

Rahul Bollini R&D Consultant for Li-Ion Battery

Ketan Kumar Jangra Assistant Manager

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ISIEINDIA Learning Experience

Student Support Team

- We have a dedicated Learner Support Team for handling your queries via email or callback request.
- This support is available from Monday to Saturday between 09:00 AM to 07:00 PM

Expert Feedback

- Personalized expert feedback on assignments and projects
- Regular live sessions by experts to clarify concept related doubts

Industry Networking

- Live Sessions by expert on various industry topics.
- One-on-one discussion and feedback sessions with industry mentors

Industry Mentor

- Receive unparalleled guidance from industry mentors, teaching assistants and graders
- Receive one-on-one feedback on submissions and personalised feeback on improvements

Q&A Forum

- Timely doubt resolution by industry experts and peers
- 100% expert-verified responses to ensure quality learning

Learning Path

Post Graduate Program in EV Intelligent System

COURSE CURRICULUM

MODULE 1: ELECTRIC MACHINE DESIGN & INDUSTRY PROSPECTS

UNIT 1. ABOUT EV INDUSTRY AND MARKET STUDY

- 1. Coming of EV in 19th Century
- 2. Golden Era of EV
- 3. Coming of New Era in EV
- 4. EV Market and Sales
- 5. Components; Trends and Growth
- 6. HEV Architecture Parallel Hybrid
- 7. Series Hybrid
- 8. Series Parallel
- 9. Fuel Cell EV
- 10. Selection on Motors, their Size and Types
- 11. Transmissions
- 12. Hub Motor
- 13. Battery Performance Index : Battery
- 14. Expert Lecture (Live)

1.5 WEEK

UNIT 2. EV ARCHITECTURES AND TYPES

- 1. Construction of Electric Vehicles-EV
- 2. Construction of Hybrid Vehicle-HEV and Types
- 3. Complete Vehicle System Modelling & Drive Cycle Simulation- Using Ricardo Ignite
- 4. Type of Drive Train
- 5. Selection of Drive Train
- 6. Expert Lecture (Live)

UNIT 3. POWERTRAIN SELECTION

- 1. Vehicle Coordinate System
- 2. Powertrain Equation
- 3. Drag Equation
- 4. Drag Coefficient
- 5. Drag Calculation
- 6. Tire Constrcution and Specification
- 7. Wheel Rolling without Slipping
- 8. Wheel Dynamics ROLL vs SLIP vs SKID
- 9. Contact Patch
- 10. Hysteressis Loss
- 11. Tyre Parameters
- 12. Calculating Parameters
- 13. Power Calculation
- 14. Torque Calculation
- 15. Gearbox Selection
- 16. Motor Characteristics

2 WEEK

1.5 WEEK

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UNIT 4. MODEL BASED SIMULATIONS-DRIVE CYCLE AND TRANSMISSION EFFICIENCY

- 1. Basics of EV, EV/HEV Powertrain & Introduction to MATLAB for Automotive
- 2. Basic GUI for MATLAB
- 3. Discrete and Dynamic Systems
- 4. Powertrain Blockset and Examples
- 5. Vehicle modelling 1
- 6. Vehicle modelling 2
- 7. Expert Lecture (Live)

MODULE 2 : ELECTRIC MOTORS AND DRIVE METHODS

UNIT 1. MOTOR TYPE FOR EV

- 1. Introduction of DC Motor
- 2. Working Principle
- 3. Types of DC Motor and Calculation
- 4. Speed Control Methods
- 5. Intro and Its Types
- 6. Rotating Mangnetic Field
- 7. Working Principle
- 8. Power Flow Diagram
- 9. Performance Characterstics
- 10. Speed Control Techniques
- 11. VF Control Technology
- 12. Rotor Resistance Control Method
- 13. Working Principle and Calculation of BLDC and PMSM Motor
- 14. Expert Lecture (Live)

1.5 WEEK

UNIT 2. MOTOR SELECTION

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- 1. Calculating Parameters
- 2. Power Calculation
- 3. Torque Calculation
- 4. Gearbox Selection
- 5. Motor Characteristics
- 6. Expert Lecture (Live)

UNIT 3. MOTOR DESIGN PARAMETER

- 1. Basic of Magnetics
- 2. Maxwells Equation
- 3. Magnetic Circuit
- 4. Electro Motive Force
- 5. Flux Linkage and Inductance
- 6. Magnetic Energy
- 7. Electromagnetic Force and Torque
- 8. Electromagnetic Flux and Excitation Current
- 9. Winding Introduction
- 10. Single Layer Winding
- 11. Double Layer Winding
- 12. Rotating Magnetic Field
- 13. Sample Problem 2 Winding Design
- 14. Phase and Line EMF
- 15. Sample Problem 3 Motor Winding
- 16. PMSM Motor Magnetic Properties
- 17. PMSM Motor Magnetic Circuit
- 18. PMSM Motor Torque Equation
- 19. Expert Lecture (Live)

1 WEEK

1 WEEK

UNIT 4. CONTROLLER ARCHITECTURE AND COMMUNICATION

- 1. PE and Motor Control
- 2. Basic Understanding of Motor
- 3. SRM Motor
- 4. Introduction of BLDC Motor
- 5. Control Principles
- 6. Regenerative Braking
- 7. Motor Control
- 8. Motor Control Quadrant
- 9. Ac Motor Control
- 10. Asynchronous vs Synchronous Motor
- 11. Expert Lecture (Live)

UNIT 4. MODEL BASED SIMULATION- MOTOR MAX POWER AND ENERGY CONSUMPTION

- 1. Introduction
- 2. Motor Geometry
- 3. Add Winding and Material
- 4. Simulating E Magnetics
- 5. Torque Speed Curve
- 6. Efficiency and Drive Cycle
- 7. Thermal Solution
- 8. Expert Lecture (Live)

MODULE 3 : POWER UNIT DESIGN AND SAFETY

UNIT 1. CELL TYPES AND CHARACTERISTICS

- 1. History of Battery Pack
- 2. Types of Energy Storage System
- 3. Why Lithium Cells?
- 4. Lithium Cell Working
- 5. Battery Terminologies
- 6. Lithium Chemistry
- 7. Lithium Cell Construction
- 8. Lihtium Cell Failures
- 9. OCV and SOC of cell
- 10. Linear Polarization
- 11. Hysteresis Voltage
- 12. ESC Model of Cell
- 11. Cell Testing and Simulation ESC Model
- 12. Expert Lecture (Live)

UNIT 2. BATTERY PACK DESIGN AND CELL SORTING

- 1. Energy Consumption Calculation
- 2. Calculating Battery Pack Size
- 3. Cell Load Characteristics
- 4. Battery Pack Capacity and Voltage
- 5. Nickel Strip Selection
- 6. Bus Bar Bonding
- 7. Tab Bonding
- 8. Cell to Cell Gap

1 WEEK

1. WEEK

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- 9. Spot Welding vs Laser Welding
- 10. Performance Design and Safety Layer
- 11. Safety Layer Design
- 12. Cell Assembly Model
- 13. Battery Case Design Principles
- 14. Battery Case Design Model
- 15. Battery Pack Component Packaging
- 16. Expert Lecture (Live)

UNIT 4. BMS DESIGN AND ARCHITECTURE

- 1. Why BMS?
- 2. BMS Functionality
- 3. Sensing Parameters
- 4. High Voltage Contactor
- 5. Isolation Circuit and Thermal Control
- 6. SOC, Cell Energy and Power
- 7. Expert Lecture (Live)

UNIT 5. CONSTRUCTIONAL AND FUCTIONAL SAFETY

UNIT 6. MODEL BASED SIMULATION - RANGE CALCULATIONS

1. WEEK

MODULE 4 : ELECTRIC VEHICLE COMMUNICATION AND DIAGNOSTICS

UNIT 1. EMBEDDED SYSTEM IN ELECTRIC VEHICLE

- 1. Introduction to Embedded Systems
- 2. Domains of Automotive Embedded Systems
- 3. What is CAN Communication?
- 4. CAN Protocol
- 5. IOT & Autonomous Vehicle

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- 6. Case study- Tesla Car
- 7. Expert Lecture (Live)

UNIT 2. VEHICLE CONTROL UNIT ARCHITECTURE

- 1. Introduction to Mathematical Model
- 2. Model Based Development using Mathematical Modelling
- 3. MBD Technology
- 4. Testing Automotive Control System
- 5. Expert Lecture (Live)

UNIT 3. CELL TYPES AND CHARACTERISTICS

- 1. Introduction to Micro Controller
- 2. Micro Controller
- 3. Prerequisite of Python
- 4. Basics of Python
- 5. Coding on Python
- 6. Numpy
- 7. Regressions

1 WEEK

1 WEEK

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- 8. Introduction of AI
- 9. Al Applications
- 10. Expert Lecture (Live)

1 WEEK

UNIT 4. VEHICLE DIAGNOSTICS & TROUBLESHOOTING

MODULE 5 : ELECTRIC VEHICLE COMMUNICATION AND DIAGNOSTICS CONNECTED TECHNOLOGY

UNIT 1. EVSE SYSTEMS AND TYPES

- 1. Introduction to EVSE
- 2. Safety of EVSE Infra
- 3. Sites & Maps
- 4. Related Technology
- 5. Expert Lecture (Live)

UNIT 2. EV CHARGING CONNECTER

- 1. SAE & IEC Type 1 Connectors
- 2. IEC62196 Connector
- 3. SAEJ1172 & CCS Connectors
- 4. Expert Lecture (Live)

UNIT 3. INTRODUCTION TO CHARGER

- 1. Introduction to Bharat AC & DC Charger
- 2. CHAdeMO Connector
- 3. Communication Protocol
- 4. Charging Methods and Algorithm
- 5. Expert Lecture (Live)

1 WEEK

UNIT 4. COMMUNICATION PROTOCOL

- 1. OSI Introduction
- 2. Layered Architecture 01
- 3. Layered Architecture 02
- 4. Expert Lecture (Live)

UNIT 5. OCPP AND CSMS INTRODUCTION

- 1. OCPP and CSMS Introduction
- 2. Benefits of OCPP
- 3. SOAP and JSON
- 4. Functions of OCPP
- 5. Expert Lecture (Live)

UNIT 6. CHARGER TECHNOLOGIES

- 1. Charger Technologies
- 2. Intro to Power Electronics Devices
- 3. Switch Configurations
- 4. Turn Off Mechanism and Harmonics
- 5. AC Charging Levels
- 6. Expert Lecture (Live)

UNIT 7. ADAS SYSTEM

1 WEEK

1 WEEK

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UN	IT 3. VEHICLE CONNECTED TECHNOL	DGY	
1.	Intro to Charging Levels and Modes		
2.	DC Charging Levels		
3.	Charging Modes		
4.	Charging Modes Case Study		
5.	Charging Levels and Modes		
6.	Fast Charging Intro		
7.	Fast Charger Safety		
8.	DC Charging - Region wise spread		
9.	DC Connectors		IVEEN
10.	Tesla Supercharger		
11.	Tesla Supercharger Billing & Connectors		
12.	Mega Chargers		
13.	Smart Grid		
14.	Definitions 01		
15.	Definitions 02		
16.	Smart Grid Features		
17.	V2G Technology		
18.	Expert Lecture (Live)		

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Post Graduate Program in EV Designing PROJECTS

PROJECT 1: POWERTRAIN EFFICIENCY OF AN EV

For a given electric vehicle create a mathematical model in order to simulate for the optimal efficiency of the system. Calculate and modify for an optimal efficiency or Wh/km energy consumption of the powertrain system.

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1 WEEK

PROJECT 2: BATTERY PACK MANAGEMENT AND DAQ

For a given performance criteria and charge and discharge cycle/ temperature profile of the battery pack choose a suitable management strategy for the system, and create the communication model for BMS with other components and data gathering system

PROJECT 3: VCU AND COMMUNICATION

Perform a complete simulation of vehicle control unit/ electronic control unit for communication between high voltage components and loop. This is a model based simulation to understand the complete data gathering and communication system for an EV at vehicular level.

1 WEEK

Meet the **Class**

OUR LEARNER'S COMES FROM

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Career Support

Interview Preperation

Pre-recorded content on topics such as

- Problem solving approach
- Approaching guesstimates
- Domain specific interview question bank and much more

Industry Readiness Assesments

Industry oriented tests which are pre--pared and validated by domain esperts.

- Detailed reports
- Industry readiness score
- Identifying strengths and helping aid in self-improvement plan for key skills

Career Mentorship Sessions

Get personalised career advice through 1-1 sessions with industry experts

- Goal setting for better employment results
- Industry Readiness Assessment report discussion

Profile Builder

An easy to use Resume, Linedin and Cover Letter prepration tool.

- Resume Score
- Realtime recommendations to improve
- Match your resume to the JD and check fitment
- Linkedin Profile Review

Personalised Industry Session

90-minute sessions over the weekend by leading industry experts

- Session categories: Career, Technical and Communication
- Doubt resolution
- Develop proof of concept and apply theoretical concepts in real world
- Assess skill levels
- Peer Networking
- Classroom element
- Business communication sessions and much more

INR 11_{LPA} Highest Salary Package

22

300% Highest Salary Hike 60% Average Salary Hike

Our Alumni's Work's at

ISIEINDIA has a network of over 250+ companies who look to recruit graduates from our programs. Some of these well-known companies include.

	BOSCH	ASHOK LEYLAND	C LARSEN & TOUBRO	ETO The Good Move
() ATHER	amazon.com	/ \nsys	Mahindra	cummins
KPMG	इंडियनऑयल IndianOil		MICHELIN	NISSAN

Program Details and Admission Process

PROGRAM DURATION AND FORMAT 09 Months | Online | Live

PROGRAM FEES

Starting at INR 11,111/month* or INR 99,999/-

ELIGIBILITY

Bachelor's Degree with 50% or equivalent passing marks.

PROGRAM START DATE

Please refer to the website for program start dates.

MONTHLY COMMITMENT (31-34 hours/month)

20-22 HOURS Asynchronous learning time

ISIEINDIA

7-8 HOURS Assignments and projects

4 Live Session Once in a week

FOR FURTHER INFORMATION CONTACT

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COMPANY INFORMATION

ISIEINDIA E-210, Second Floor, Block E Noida-201301