ISIEINDIA

Post Graduation Program in

ELECTRIC VEHICLE DESIGN

Get the whole picture

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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.

Our Mission

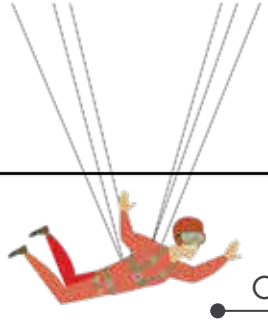
Enabling career success in the Automotive Industry

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

Our Vision

A world with skilled automotive ecosystem

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



250+
City Learner Base

Why ISIEINDIA

300%
Highest Salary Hike

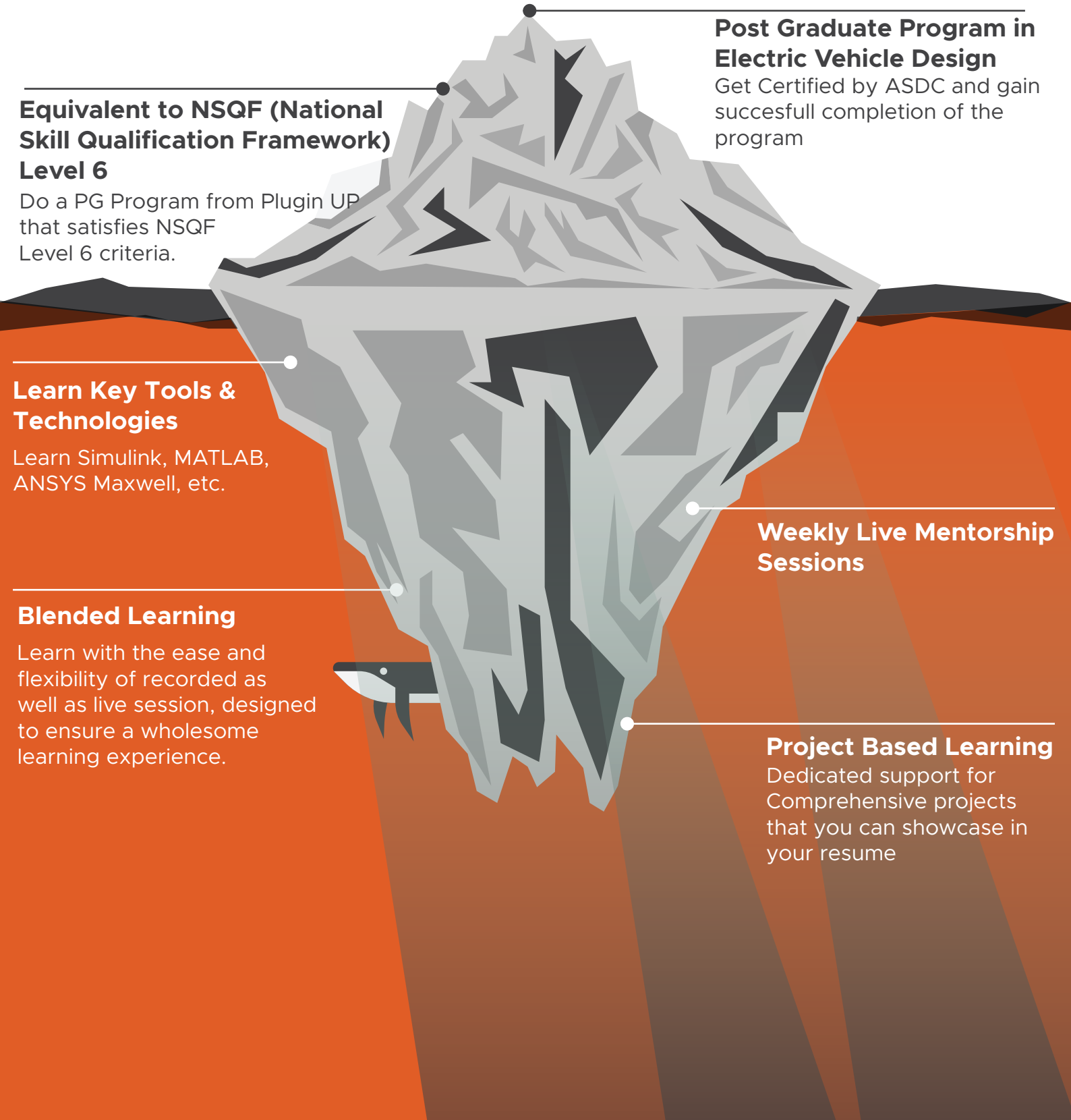
60%
Average Salary Hike

300+
Hiring Partners

1+ Million
Learners

350+
Industry Experts

Program Highlights



Post Graduate Program in Electric Vehicle Design
Get Certified by ASDC and gain succesfull completion of the program

Equivalent to NSQF (National Skill Qualification Framework) Level 6
Do a PG Program from Plugin UP that satisfies NSQF Level 6 criteria.

Learn Key Tools & Technologies
Learn Simulink, MATLAB, ANSYS Maxwell, etc.

Weekly Live Mentorship Sessions

Blended Learning
Learn with the ease and flexibility of recorded as well as live session, designed to ensure a wholesome learning experience.

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
accenture

Boris Fabris
Automotive Design Consultant

Priya Parameswarappa
Buisness System Manager
SIEMENS

Manish Kumar
Assistant Manager, R&D
TVS

Rahul Bollini
R&D Consultant for Li-Ion Battery
ISIE INDIA

Ketan Kumar Jangra
Assistant Manager
JBM Group

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

Course Orientation
0 Week

Learn 6 Specializations
1 Week to 36 Weeks

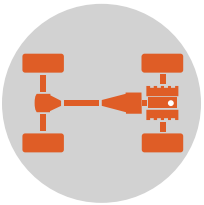
6 Major Projects
01 Project Per Specialization

Placement Drive
37 Weekst to 44 Weeks

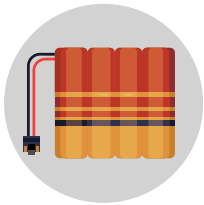
Electric Machine Design
4 Units, 6 Weeks

ElectricVehicle Safety and Crashworthiness
4 Units, 6 Weeks

Design Aerodynamics
4 Units, 6 Weeks



Powertrain Design And Selection
4 Units, 6 Weeks

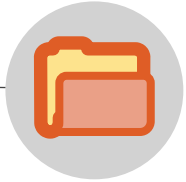


Energy Storage System
4 Units, 6 Weeks

Homologation & Testing
4 Units, 6 Weeks

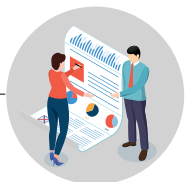
27 Assignment
Every week to analyse the performance

16 Case Study
To analyse the learning performance

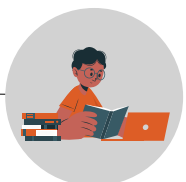


6 Mini Projects
To get the significant, immediate result of learning

04 Live Sessions
Monthly Live Sessions with Industry Experts



6 Assessments
Every alternative week to analyse the performance



Online Classes
200+ Hours of Online Learning

Post Graduation Program in Electric Vehicle Design

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 WEEK

UNIT 2. DESIGNING HOOD

1. Software Interface – NX CAD – Basics
2. NX CAD – Curves and Sketches
3. NX CAD – Surfacing
4. NX CAD – Assembly
5. Surfacing in CATIA
6. Hood Design – Design Parameters
7. Creating Model
8. Model Geometry Study – Draft Analysis
9. Section Modulus
10. Fender Design
11. Expert Lecture (Live)

1 WEEK

UNIT 3. AUTOMOTIVE SAFETY

1. Automobile Safety System – Crash Safety
2. Roll Over Protection
3. Field View – Windshield Material
4. Windshield Area
5. Roof Design – Impact Test
6. Material Used
7. Prepare Master Section
8. Expert Lecture (Live)

1 WEEK

UNIT 4. DOOR DESIGN

1. Side Doors – Body Side
2. Side Doors

3 DAYS

3. Back Door
4. Release Drawing – Intro to GD
5. Drawing Release
6. Expert Lecture (Live)

4 DAYS

PROJECT 1: BLDC MOTOR DESIGN

By using Motor-Cad Software Design Tools , Design & submit 2D Axial & Radial Motor with Specific Stator, Rotor, Winding Pattern , Winding Material Parameters. And Draw Torque , Back Emf, current losses , BH Steel Curves for the same

2 WEEK

MODULE 2 : ELECTRIC VEHICLE SAFETY AND CRASHWORTHINESS

UNIT 1. BASIC OF HYPERMESH

1. Basic of FEA
2. Introduction to HyperMesh
3. Hypermesh UI
4. 1 D Meshing
5. 2D Meshing
6. Car Door Handle Meshing
7. BIW Arm Meshing
8. LH Inboard Cross Member
9. Expert Lecture (Live)

1 WEEK

UNIT 2. INTRODUCTION TO LS-DYNA

1. Introduction to LS-Prepost
2. Create a LS-DYNA input deck for Front Bumper Impact
3. LS-DYNA input deck for a ball impacting a plate
4. Rear under Run Protection Device of Heavy Vehicle
5. Expert Lecture (Live)

1 WEEK

UNIT 3. VEHICLE CRASHWORTHINESS

1. Modal Analysis
2. Composite Material Analysis
3. Explicit Analysis
4. Vehicle Crash Safety
5. Occupant Injury Criteria
6. Regulations and Global NCAP
7. Linear Vs Non Linear
8. Static Vs Dynamic
9. Expert Lecture (Live)

1 WEEK

UNIT 4. SEAT BELT ANALYSIS

1. Seatbelt Anchorage Test
2. CG and Seatbelt Component Analysis
3. Post Processing of Seatbelt Anchorage Test
4. Luggage Retention and H1H2 Tests in Seat
5. Head Impact Analysis
6. Expert Lecture (Live)

1 WEEK

PROJECT 2: OPTIMIZE THE DESIGN OF A CHASSIS FOR DIFFERENT DEFORMATION

Propose the different amendments in design of a chassis of a vehicle and perform deformation tests for all the proposed models and choose the most safe design.

2 WEEK

MODULE 3 : DESIGN AERODYNAMICS

UNIT 1. INTRODUCTION

1. Introduction of CFD?
2. What is CFD?
3. CFD Process
4. CFD Pre Requisites
5. Introduction to Fluid Dynamics – Basics of Flow
6. Basic Terminologies
7. Aerodynamics Equation
8. Area and Drag Coefficient
9. Expert Lecture (Live)

1 WEEK

UNIT 2. CALCULATING FRONTAL AREA

1. Area Calculation
2. Approximation Method
3. Expert Lecture (Live)

1 WEEK

UNIT 3. DRAG CALCULATIONS

1. Introduction to FEM
2. FEM Processed Geometry Types
3. 2D Simulation Geometry
4. 2D Simulation Meshing
5. Expert Lecture (Live)

1 WEEK

UNIT 4. DRAG SIMULATIONS

1. Solver Setup
2. 2D Simulation Results
3. Finding Drag Coefficient
4. 3D Process
5. 3D Geometry
6. Expert Lecture (Live)

1 WEEK

PROJECT 3: CFD ANALYSIS OF DIFFERENT 4 WHEELERS

Perform the CFD analysis of 3 different 4 wheelers available in the market of same segment, perform the changes in current designs and compare the results before and after Design iteration.

2 WEEK

MODULE 4 : POWERTRAIN DESIGN AND SELECTION

UNIT 1. INTRODUCTION

1. Vehicle Coordinate System
2. Powertrain Equation
3. Aero Calculation – Drag Equation
4. Drag Coefficient
5. Drag Calculation
6. Expert Lecture (Live)

1 WEEK

UNIT 2. COMPONENT SELECTION

1. Tire Construction and Specification
2. Wheel Rolling without Slipping
3. Wheel Dynamics ROLL vs SLIP vs SKID
4. Contact Patch
5. Hysteressis Loss
6. Tyre Parameters
7. Motor Selection – Calculating Parameters
8. Power Calculation
9. Torque Calculation
10. Gearbox Selection
11. Motor Characteristics
12. Expert Lecture (Live)

1 WEEK

UNIT 3. MOTOR

1. PE and Motor Control
2. Basic Understanding of Motor
3. SRM Motor

3 DAYS

4. Introduction of BLDC Motor
5. Control Principles
6. Motor for EV
7. Regenerative Braking
8. Motor Control
9. Motor Control Quadrant
10. AC Motor Control
11. Asynchronous vs Synchronous Motor
12. Expert Lecture (Live)

4 DAYS

UNIT 4. MOTOR SIMULATION

1. Motor Modelling and Design – Introduction
2. Motor Geometry
3. Add Winding and Material
4. Simulating E Magnetics
5. Model Based Simulation
6. Motor Geometry
7. Add Winding and Material
8. Expert Lecture (Live)

1 WEEK

PROJECT 4: RETROFITMENT OF A 2 WHEELER

Design the CAD model of a Retrofitted 2 wheeler after performing all the Load calculations.

2 WEEK

MODULE 5 : ENERGY STORAGE SYSTEM

UNIT 1. CELL TYPES AND CHARACTERISTICS

1. History of Battery pack
2. First rechargeable battery
3. Li-ion battery introduction and working
4. Comparison of different cells
5. Different chemistries in Li-ion cell
6. Battery parameter and performance Characteristics
7. Battery pack designing and cell calculation
8. Why li-ion battery die ?
9. Sulphation in lead acid battery
10. Internal resistance of li-ion battery
11. Battery charging protocols
12. Self-discharges in Li-ion battery
13. FAQ regarding batteries
14. Best conditions for operation of batteries
15. Expert Lecture (Live)

1 WEEK

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

3 DAYS

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)

4 DAYS

UNIT 3. BMS DESIGN AND ARCHITECTURE

1. Why BMS
2. BMS Functionality
3. Sensing Voltage
4. Sensing Current
5. Sensing Temperature
6. High Voltage Contactor
7. Isolation Circuit
8. Thermal Control
9. SOC of Cell
10. Energy and Power of Cell
11. OCV and SOC of Cell
12. Linear Polarization
13. Finding RC Values
14. Hysteresis Voltage
15. Enhanced Self Correcting Model
16. Cell Testing and Coulombic Efficiency
17. Temperature and OCV
18. Matlab Cell Model – Simulation

5 DAYS

19. Data Based Cell Simulation
20. Physics based Model
21. Simulating EV
22. Simulating constant power and voltage
23. Battery Simulation
24. Expert Lecture (Live)

2 DAYS

UNIT 4. BATTERY THERMAL MANAGEMENT AND ITS SIMULATION

1. What is BTMS?
2. Types of BTMS
3. Heat vs Temperature
4. Cell Heat Map (1C and 3C)
5. Thermal Paste Cooling
6. Phase Changing Material
7. Heat Exchanger
8. Preliminary Definitions
9. Microscale Thermal Model
10. Boundary Condition
11. Peltier Coefficient
12. Transfer of Heat at Boundaries
13. Change in Parameter Values
14. Gradient Transfer Fnc
15. Heat Generation Terms
16. Irreversible Heat Generation
17. Joule Heating
18. Heat Flux Terms
19. Expert Lecture (Live)

1 WEEK

PROJECT 5 : PERFORMANCE ESTIMATION OF BATTERY PACK UNDER DIFFERENT DRIVE CYCLE

Designing the battery pack in MATLAB Simulink and performing simulation for thermal and Different Drive cycles. Estimating the performance and battery life cycle.

2 WEEK

MODULE 6 : HOMOLOGATION AND TESTING

UNIT 1. INTRODUCTION TO REGULATIONS

1. Vehicle Categories
2. BOV vs EV
3. CMVR 1989 and AIS Committee
4. FVSS
5. EEC/ECE
6. Whole Vehicle Type Approval
7. Homologation for Export
8. Type of Test Tracks
9. Hardware in Loop (HIL)
10. Driving Cycle
11. Expert Lecture (Live)

1 WEEK

UNIT 2. STATIC TESTS

1. CMVR Physical Verification
2. Tire Depth
3. Vehicle Weight

2 DAYS

4. Horn Installation
5. Rear View Mirror
6. Tell Tales Test
7. External Projection
8. Wheel Guard
9. Foot Control Arrangements
10. Angle and Dimensions Measurement
11. Requirement of Temporary Cabin
12. Expert Lecture (Live)

5 DAYS

UNIT 3. DYNAMIC TESTS

1. Vehicle Preparations
2. Pass-by-Noise
3. Gradeability
4. Instruments Calibration
5. Turning Circle Test
6. Steering Effort
7. Cooling Performance
8. Brake Test
9. Range Test
10. Energy Consumption Test
11. Maximum Speed
12. Acceleration Test
13. Expert Lecture (Live)

1 WEEK

UNIT 4. VEHICLE COMPONENT TESTING & HYBRID VEHICLE RETROFITMENT AND CHARGING

1. Component Testing – Horn Test
2. Safety Glass Test
3. Windscreen Test
4. Rear View Mirror Test
5. Hinges and Latches Test
6. Demist and Defrost Test
7. Field of Vision Test
8. Powertrain Component Test – Motor Power
9. Max 30 minutes power
10. Battery Safety Criteria
11. EMI-EMC
12. Hybrid Vehicle Test – M and N Category
13. Hybrid Retro fitment Kit
14. Electric Kit for Conversion
15. Charging System– AC Charging
16. DC Charging
17. Expert Lecture (Live)

1 WEEK

PROJECT 6 : 2-W TESTING BY ARAI

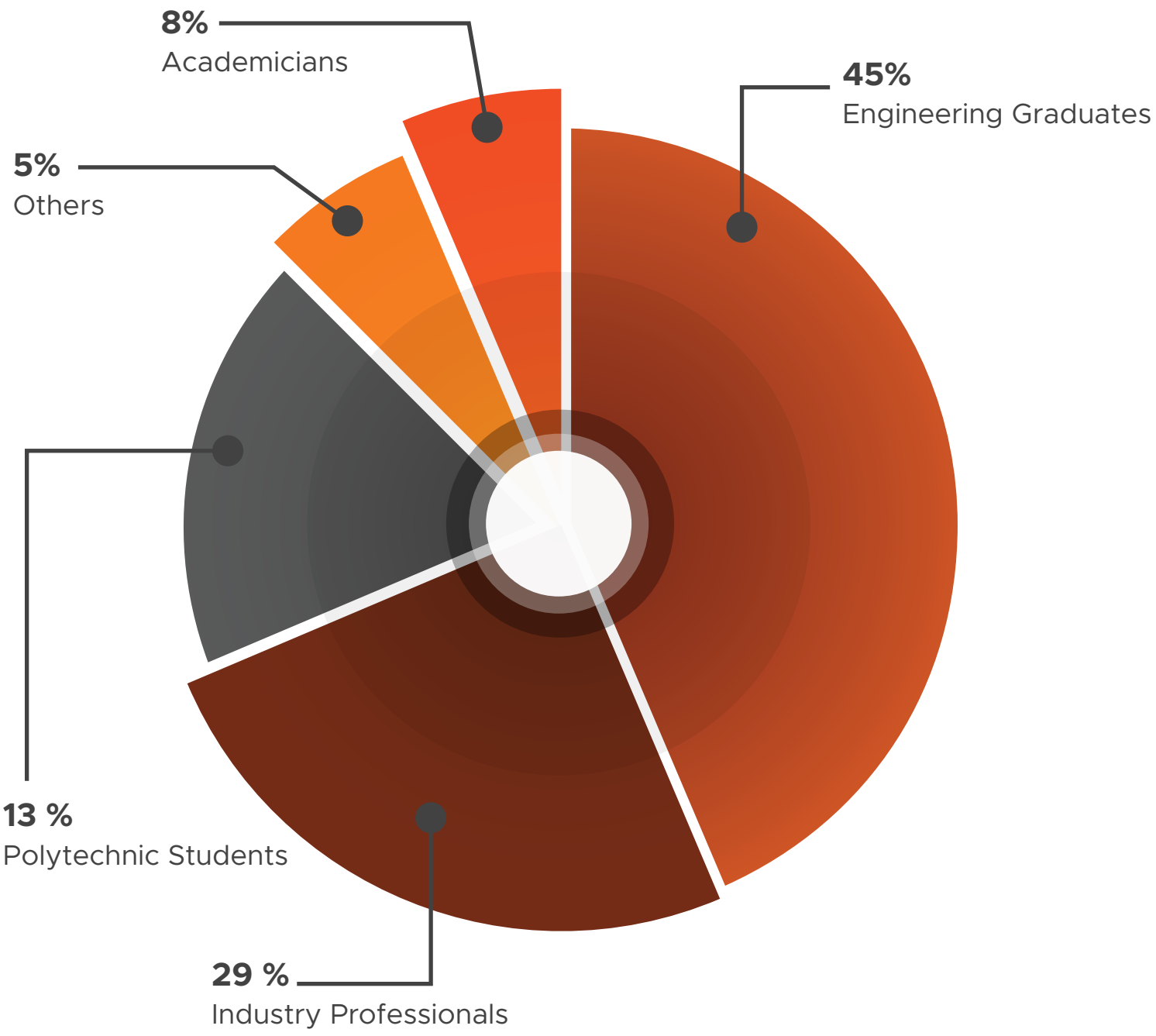
Students will make able to make real time project report on ARAI Testing of 2W EV. Complete process of EV Testing and their expected outcomes.

2 WEEK

Note: The curriculum and projects are subject to change as per the industry experts.

Meet the Class

OUR LEARNER'S COMES FROM



Career Support

Interview Preperation

Pre-recorded content on topics such as

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

Profile Builder

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

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

Industry Readiness Assesments

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

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

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

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

1+ Million
Learners

INR 11 LPA
Highest Salary Package

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.

HERO ELECTRIC The smart move | BOSCH | ASHOK LEYLAND | LARSEN & TOUBRO | ETO The Good Move

ATHER | amazon.com | Ansys | Mahindra | Cummins

KPMG | IndianOil | MG | MICHELIN | NISSAN

Program Details and
Admission Process

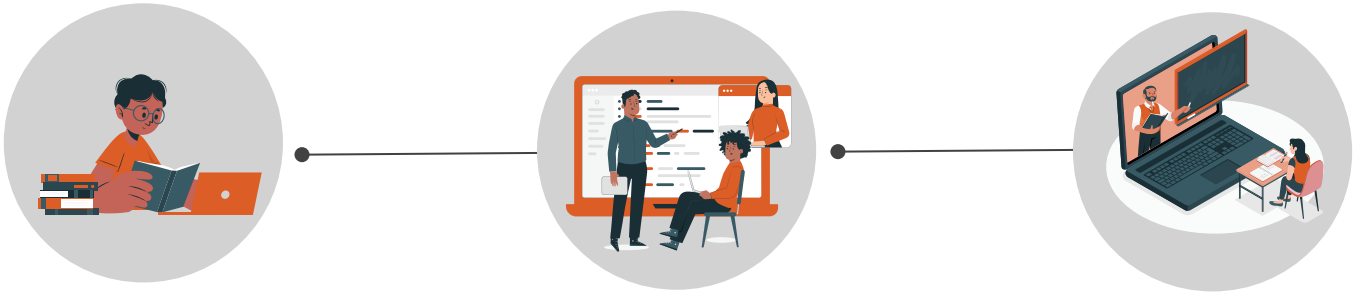
PROGRAM DURATION AND FORMAT
09 Months | Online | Live

PROGRAM FEES
Starting at INR 4000/month* or INR 72000/-

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

7-8 HOURS
Assignments and projects

4 Live Session
Once in a week

FOR FURTHER INFORMATION CONTACT

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