ISIE Drive Your Dreams® INDIA
IMPERIAL SOCIETY OF INNOVATIVE ENGINEERS

PG DIPLOMA
ELECTRIC VEHICLE ENGINEERING®

Industry Partner: MG

Certified By: ASDC AUTOMOTIVE SKILLS DEVELOPMENT COUNCIL; SMEV SOCIETY of MANUFACTURERS of ELECTRIC VEHICLES

ABOUT PGD in EV ENGINEERING®

PGDEV (Post Graduate Diploma in Electric Vehicle Engineering®) is 1 year full time program. It is joint initiative of ISIEINDIA and ASDC to upskill fresh graduates and working professionals who want to make successful career in EV.

The lectures will be provided on our Online platform, which can be accessed at any time as per the convenience. On each weekend a Live doubt clearing session will be conducted, to help you gain better understanding of the subject along with mini project and case study.

We at ISIEINDIA believe that any lesson learnt is not useful unless you get to apply it in real time. Thus we have placed mini projects, in-plant hands on training and project through out the course to help you get a proper understanding of the subject. The mini project will be briefed at the beginning of the subject and by the end of it you would have to submit the project. Apart from the mini projects you will also be provided with a major project that you would have to submit at the end of the course.

KEY HIGHLIGHTS

- Placement Assistance
- Live Industrial Projects
- Industry Oriented Curriculum
- Industrial Experts
- No Cost EMI
- Globally Valid Certificate
- Live Doubt Sessions
- Learn as per Convenience

ASSOCIATED PARTNERS

Industry Partner

MG MOTORS INDIA

Certification Partner

ASDC AUTOMOTIVE SKILLS DEVELOPMENT COUNCIL

Industry Support Partner

SMEV SOCIETY of MANUFACTURERS of ELECTRIC VEHICLE

One Year Post Graduate Diploma in Electric Vehicle Engineering®
A Joint initiative by ISIEINDIA, ASDC and MG Motor

Each Tri-mester is of 12 weeks followed by ASDC Assessment and Certification
Mode of classes for Theory and Practical's - Online

Tri-mester I

S. No.	Course Code	Course Name	Teaching Scheme			Credit
			L	T	P	C
1.	PGDEV-1	Fundamentals of EV & HEV	3	0	0	3
2.	PGDEV-2	Electric Machines Design and Industry Prospects	2	0	2	3
3.	PGDEV-3	Battery Design & Modelling	2	0	2	3
4.	PGDEV-4	BMS & BTMS	2	0	2	3
5.	PGDEV-5	Mini Project -I			4	2
6.	PGDEV –E1	Elective Course (List A)	2	0	0	2
		Total	11	0	10	16
		Total Academic Engagement & Credits	21 Hours			16

Tri-mester II

S. No.	Course Code	Course Name	Teaching Scheme			Credit
			L	T	P	C
1.	PGDEV-6	Design Aerodynamics	2	0	2	3
2.	PGDEV-7	Vehicle Dynamics and Traction System	3	0	0	3
3.	PGDEV -8	EV Control Methods	2	0	2	3
4.	PGDEV-9	EV Charging	3	0	0	3
5.	PGDEV-10	Homologation and Testing	3	0	0	3
6.	PGDEV-11	Mini Project	0	0	4	2
7.	PGDEV- EII	Elective Course –II (List A)	2	0	0	2
		Total :	15	0	8	16
		Total Academic Engagement & Credits	23 Hours			16

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Tri-mester III

S. No.	Course Code	Course Name	Teaching Scheme			Credit
			L	T	P	C
1.	PGDEV- 12	Hands on Training In Plant / COE -EV (6 Weeks -10 Weeks)	0	0	0	12
	PGDEV-13	Project	0	0	0	6
		Total	0	0	0	18
		Total Academic Engagement & Credits				18
Course Total Credits						50

Elective Subjects

S. No.	Name of Course
1.	Embedded Systems in Electric Vehicle
2.	Communication Systems & Vehicle Diagnostics
3.	AI & IOT for EV
4.	Automotive Safety
5.	ADAS Systems & Connected Vehicles

Tri-mester I

Tri-mester 1, candidate will gain knowledge on EV/ HEV Fundamentals, electric machines, BMS, BTMS, Battery Design and Modelling along with an elective mini project. Electrical machines, is the central part of the EV Architecture. The machines are responsible to convert the electrical energy to mechanical energy and vice versa. The course thus starts with the same context of learning about the electrical machines - their design, selection, working, heat generation, etc. In this the industry grade softwares will be used to perform the design and simulation of the product.

Subsequently, when the electrical machine is designed and we know about its energy consumption, it is now important to know about the battery pack. In this the battery pack design, cell sorting, cell selection, etc becomes important to understand. The course attendees will be able to design the battery pack on their own.

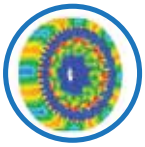
Once the cell has been sorted and arranged, it becomes really important to control the cell charge, discharge and thermal rates, as lithium being sensitive to temperatures might catch fires, thus comes the part of designing the battery management system, and thermal management system with design of the themal solution for battery pack.

06 SUBJECTS | **21** HOURS/ WEEK | **16** CREDITS

SUBJECTS

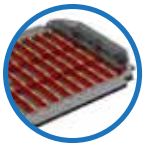
1. Fundamentals of EV and HEV
2. Electric Machines Design and Industry Prospects
3. Battery Design and Modelling
4. BMS and BTMS
5. Elective Subject
6. Mini Project 1

PROJECTS/ HANDS ON



Motor Design and Simulation

Perform the calculation for different types of motor on the basis of motor efficiency, motor power, electromotive force parameter for all the three different types of motors. Perform the calculation for selection of motor for the products already existing in the market, defining the design criteria and references based on consumer requirements.



Battery Pack Design and Model

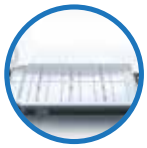
Model a battery pack as per the desired range of the electric vehicle given. The model needs to be verified under the MIL test for range as per the cycle provided.

Powertrain Component Selection

Selection of Powertrain Components in order to achieve optimum performance as per the problem statement given, and perform the simulation of energy consumption of the vehicle.

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.



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.

Tri-mester II

Now that the knowledge about electrical machines is there, this Tri-mester will follow the integration of the components, and vehicle design and safety. The tri-mester starts with aerodynamic simulation of the design. Perform the aerodynamic efficiency of the design, using the simulation in softwares for design of different vehicle types.

While we are talking about design, it is also very important to know about the dynamics of the vehicle. The dynamic stability of the vehicle needs to be maintained in order to have better efficienct and safety. This cannot be achieved without the involvement of control methods in electric vehicle, controlling the motor output and various other parameters using traction control, vehicle control unit, CAN communications etc.

The charger also plays an important role in all this and can be considered as an extension of the vehicle. The charger design, configuration and selection is also necessary for the system. This is then followed by the homologation and testing. Where all the standards regarding vehicle testing and approvals are conducted.

07 SUBJECTS | **23** HOURS / WEEK | **16** CREDITS

SUBJECTS

1. Design Aerodynamics
2. Vehicle Dynamics and Traction System
3. EV Control Methods
4. EV Charging
5. Homologation and Testing
6. MiniProject
7. Elective Subject

PROJECTS/ HANDS ON

Aerodynamic Simulation
Simulate aerodynamics study of the vehicle and look for ways to improvize the design of EV.

Vehicle Crash Simulation
Crash Simulation for understanding passenger safety in a vehicle. And study about the crash-worthiness of vehicle along with seat belt and airbag analysis.

EV Charging Setup
Selection of suitable charging system based on the calculation parameter such as charging time taken by battery with same input supply, Load calculation for grid.

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.

EV Architecture Design
Perform the MIL simulation of a complete EV Architecture with all the components designed and selected by you. This subject vehicle will be an already existing 4 wheeled EV product in the market with customer requirements and needs statement given.

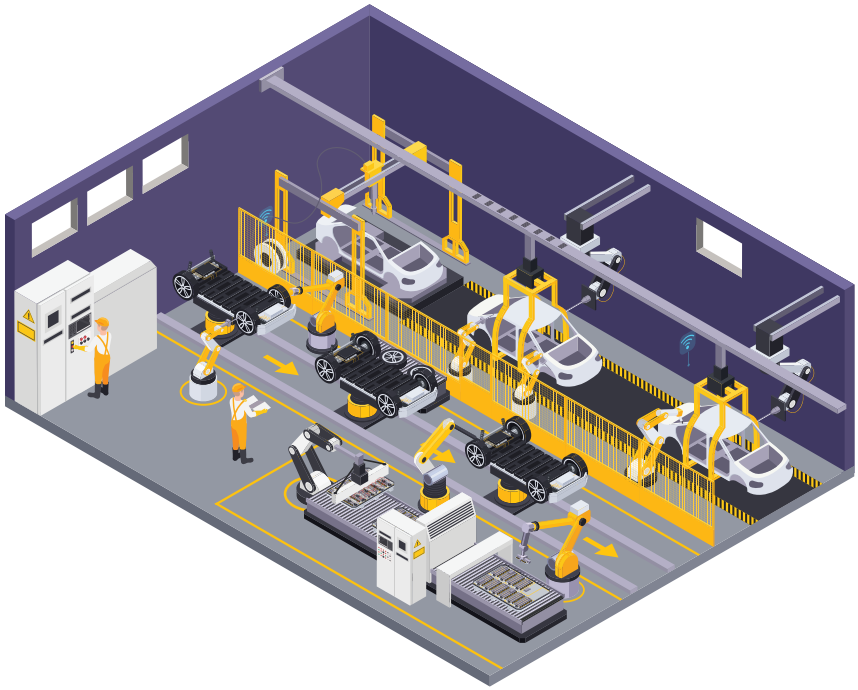
Tri-mester III

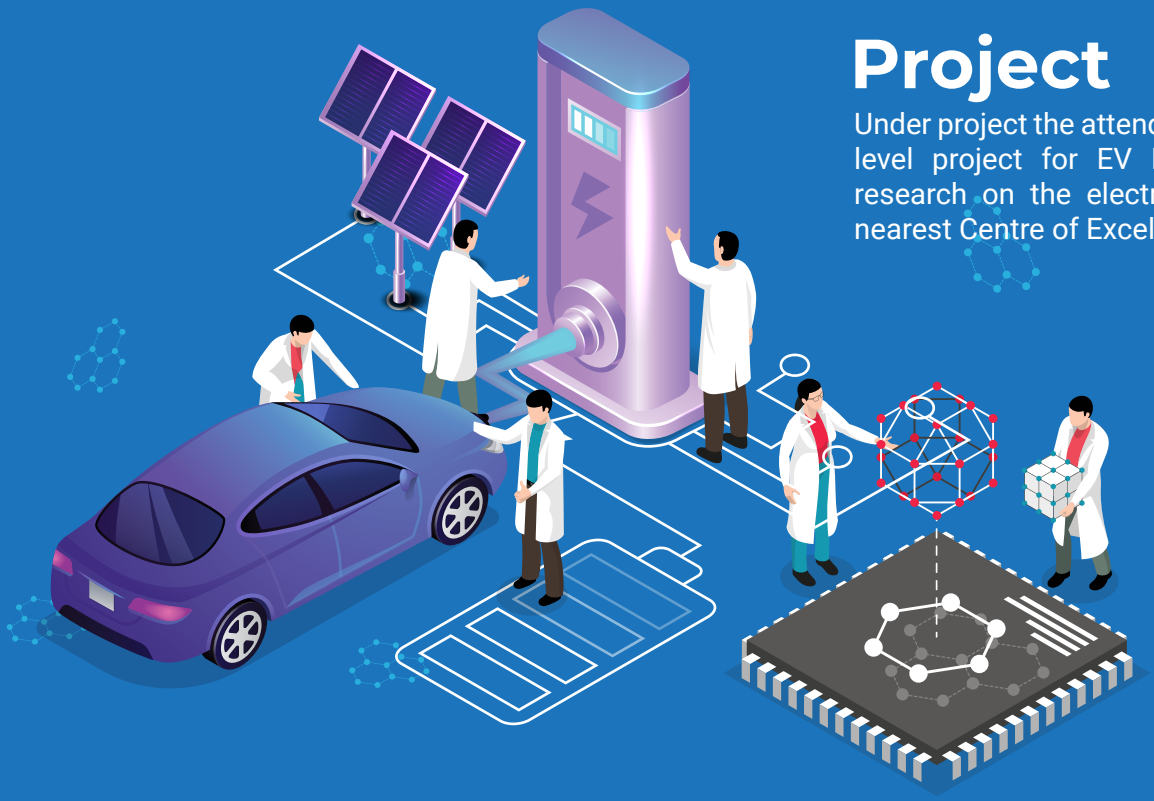
With the knowledge of the whole vehicle the participants will now move on to the final Tri-mester, where they would have to participate in a major project, in development of an electric vehicle or new research related to the same. Along with the project the attendee will have to also undergo the internship/ training in the industry. The training and project will run simultaenously where projects can also be a part of training.

Hands on Training

(In Plant/ COE)

The industrial training subject will involve the attendee getting exposure of electric vehicle development and production either by working as an intern with the Electric Vehicle Industry associated with us or by working at our nearest centre of excellence facility.





Project

Under project the attendee will be working on R&D level project for EV Development, performing research on the electric vehicle component at nearest Centre of Excellence of ISIEINDIA.

ELIGIBILITY

Fresh Graduates/ Post Graduates

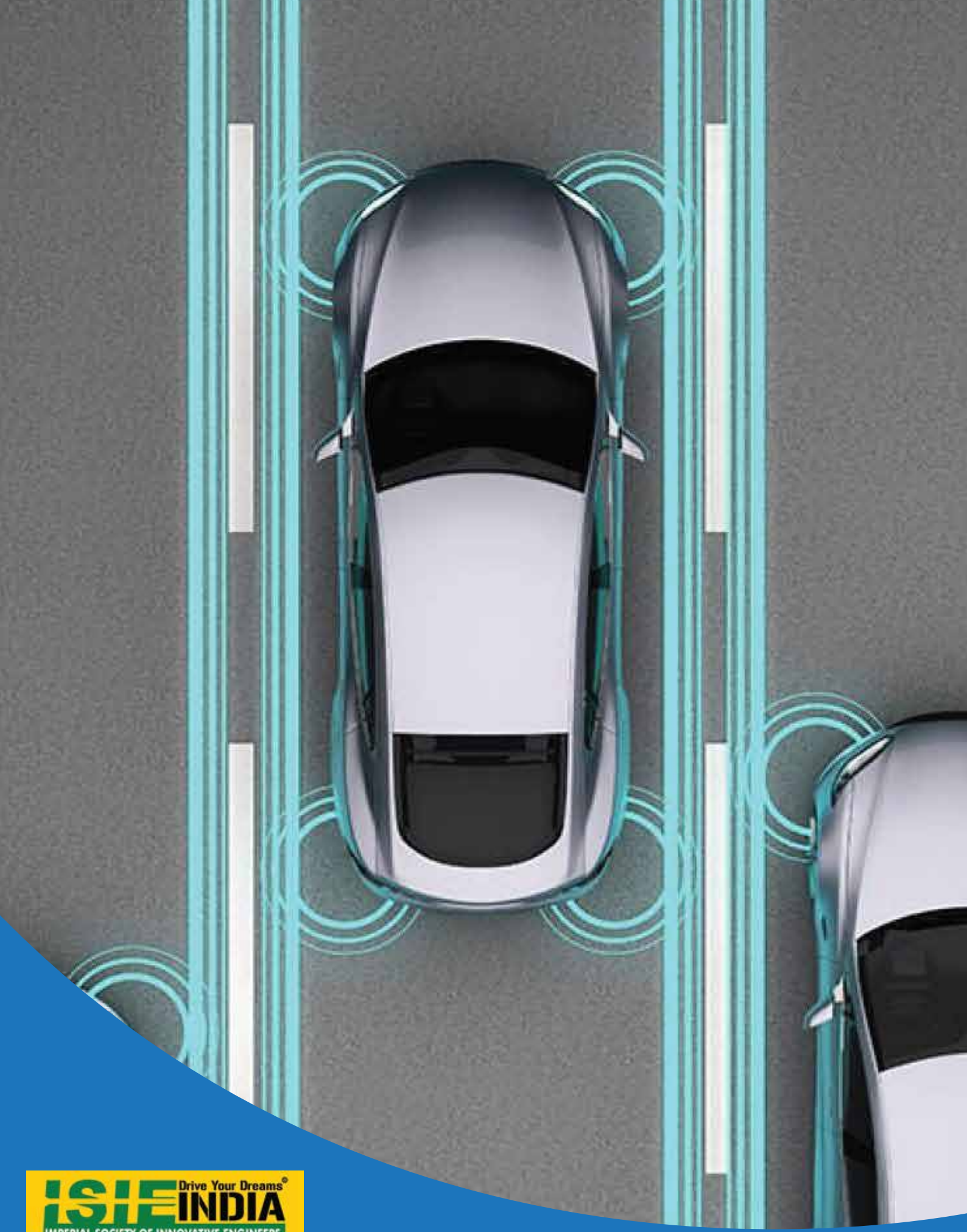
Industry Professionals

Diploma Holders with 3 years of Experience

CERTIFICATE

ISIEINDIA GLOBAL CERTIFICATE

ASDC CERTIFICATE



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National Youth Award Winner 2015-16, Ministry of Youth Affairs, GOI

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