

ELECTRIC VEHICLE SYSTEMS ENGINEERING

Live+ Online Training & Certification Program



Next Batch Starting from **21st Feb 2022**

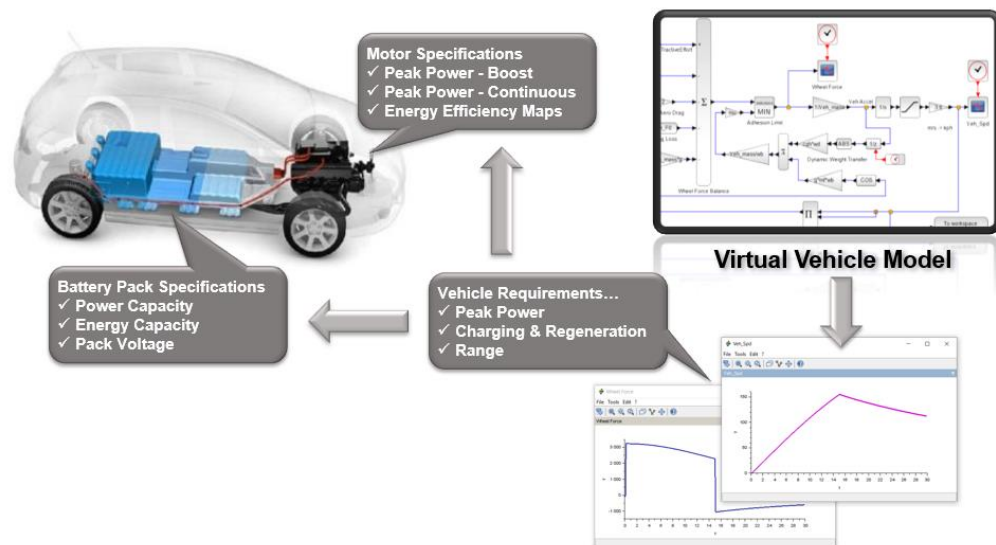
This training program will provide you with knowledge of the EV subsystem basics, their functions, technical specifications and most importantly, you will learn how to do modeling and integrate sub-system by using tool including Excel and Scilab.

UNIQUE HANDS-ON MODELING FOR PRODUCT DEVELOPMENT

Program will begin with basic understanding of the sub-systems (Battery, Motor, Charger, BMS, Controller, etc.) particularly the governing laws of the physics and then move on to the modeling of these sub-systems using Excel and Scilab.

What will you learn here?

- ✓ Learn modeling of individual in-vehicle sub-systems
- ✓ Integration of sub-models into full EV functional models
- ✓ Simulate Driver, Ambient and Road impact on EV performance
- ✓ Understand physical sub-systems- Motor, Battery, Controllers, etc.
- ✓ Build learning of important technical specifications and performance
- ✓ Modeling impact of changing design specifications



Program Uniqueness



Industry Valued Certification
Joint Certification with **ASDC**
on completion



Hands-on Modeling
Practice sessions
using Excel & Scilab



Live Online Delivery + Video Recordings
Join & learn from anywhere, also
2 months of content access



Global EV Experts
Trainers worked on global
EVs platforms



Easy time outside work
Theory + Modeling sessions in
evenings on alternate weekdays

PROGRAM SCHEDULE

Week	Module	#	Theory Topic	Duration			Modeling Topic
				Theory	Live Modeling	Total	
Week 1	1. EV Technologies & Integration Aspects	1	Need of Electrical Vehicles	01:30	00:00	01:30	
		2	Traction Motors & Regeneration	01:00	00:30	01:30	Simple motor model in SciLab
3		Battery - Unit cell and Pack	00:45	00:45	01:30	Excel pack sizing and SciLab pack model	
Week 2		4	Power electronics and power converters	01:00	00:30	01:30	Integrating battery and motor model
		5	Vehicle systems & dynamics	01:00	00:30	01:30	Simple vehicle model in SciLab
Week 3	2. Energy Management & Control	6	Basics of control systems & control strategies	01:00	00:30	01:30	Modeling PID in SciLab
		7	Battery Management System	01:00	00:30	01:30	Modeling SoC and cell voltage compensations
		8	Vehicle Controllers	01:00	00:30	01:30	Modeling regeneration control
		9	System Functional Safety	01:00	00:30	01:30	ASIL calculations using Excel
		-	Live Support Session	00:00	02:00	02:00	
Week 4	3. Systems Engineering using Virtual Modeling	10	System modelling techniques	01:00	00:30	01:30	Integrating full vehicle model
		11	RCA & FMEA	01:00	00:30	01:30	Risk assessment using Excel
Week 5		12	Vehicle Specs from Requirements	00:45	00:45	01:30	Vehicle specifications from vehicle model
		13	Total Cost of Ownership	00:45	00:45	01:30	Simple TCO model using Excel
Week 6	4. Mapping Customer Usage, Regulations, and Policies	14	OEM sourcing and technical selection process	01:30	00:00	01:30	
		15	Customer like data collection	00:45	00:45	01:30	Data collection and pre-processing
-		Live Support Session	00:00	02:00	02:00		
Week 7	5. Infrastructure Dependencies	16	Duty cycles from measured data	00:45	00:45	01:30	Constructing duty cycle from raw measured data
		17	Mapping customer usage to failure modes	01:30	00:00	01:30	Data analysis for driver behaviour & failure modes
		18	EV regulations and policy landscape	01:30	00:00	01:30	
		19	Charging, grid liability & mix	01:30	00:00	01:30	
		20	Charging protocols and telematics	01:30	00:00	01:30	
		21	High voltage safety	01:30	00:00	01:30	
		-	Live Support Session	00:00	02:00	02:00	
	Evaluation	Final Exam - MCQ based Assessment				01:00	
		Mini Project Reviews				02:30	

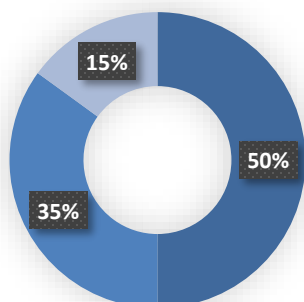
21 Theory + Modeling sessions
Each session of 1.5-hour
In evening **at 19:00 (IST)**

3 Live Support sessions
Each session of 2-hour
Every other Saturday **at 15:00 IST**
Hands-on modeling and simulation practices using Excel & Scilab

4 Assignments
1 Final assessment
1-hour online e-proctored MCQ based exam

Certification after course completion based on-

- Assignment
- Mini Project
- Final assessment



Evaluation Criteria

- Mini-Project work
- MCQ based assessment
- Assignments

Our Trainers:



Mr. Rahul Bagdia

MD, pManifold EV Academy

Academics: Dual Masters in Robotics & Control from University of Michigan, Ann Arbor, US

20+ years of extremely diverse global experience in various industries like energy & utilities, electric vehicles, health & life sciences, banking & finance and education. Has worked with Government of India for Electric Vehicle Program Management Cell in areas of policy making, EV infrastructure development, distribution networks and power generation. He has been instrumental in supporting Policy and Technical Standards Development for Electric Vehicles for various countries.



Mr. Vikrant Vaidya

CEO, pManifold EV Academy

Academics: Master in Energy Systems Engineering from University of Michigan, Ann Arbor, US

20+ years of experience in vehicle development & integration - IC Engine, Hybrid Electric as well as Battery Electric Vehicles - for global platforms of Tata Motors, General Motors, Jaguar-Land Rover and Groupe PSA's upcoming BEV for emerging markets. Expertise in product development through powertrain-vehicle integration, model-based controller development and powertrain-in-vehicle calibration. A recruiter & technical trainer for 10+ years & has three records of the invention in hybrid powertrain, battery controls & repurposing.



Mr. Vikrant Garud

Master Trainer
pManifold EV Academy

Academics: Masters in Automotive Materials and Manufacturing, ARAI Academy Pune

7+ years of experience as a Researcher, Author cum eminent academician. Expertise in advanced and Smart automotive materials and working on implementation of it for various automotive applications. Have worked on various projects of CVRDE and VRDE, published 20+ research articles in the field of various automotive applications. Also, listed in FISITA's world database of experts and part of editorial board member of Elsevier since last 3 years.

Program Formats:

- Self Paced
- Live Online
- Customized

Eligibility:

- Working Professionals, Consultants, Researchers
- Students pursuing master degree in engineering
- EV (2W, 3W) OEMs and Manufacturers
- Automobile experts
- EV enthusiasts, etc.

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About Us:

pManifold EV Academy:

A knowledge share vertical of 'pManifold Business Solutions PVT LTD', is working globally to build EV System skills among practitioners, EV enthusiasts, academia's, etc. Providing a wide range of live online, hybrid, and self paced training programs in product development to planning aspects, etc. It is also working at organizational (B2B) level to deploy customized training programs.

ASDC:

ASDC is the first Sector Skill Council of India in Automobile sector and is founded to build a sustainable skill development ecosystem to ensure adequate availability of quality workforce to meet the automotive industry requirements. Currently, ASDC is working curriculum development, Standardisation, Training of trainers as well as certification.