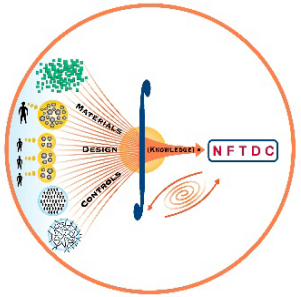
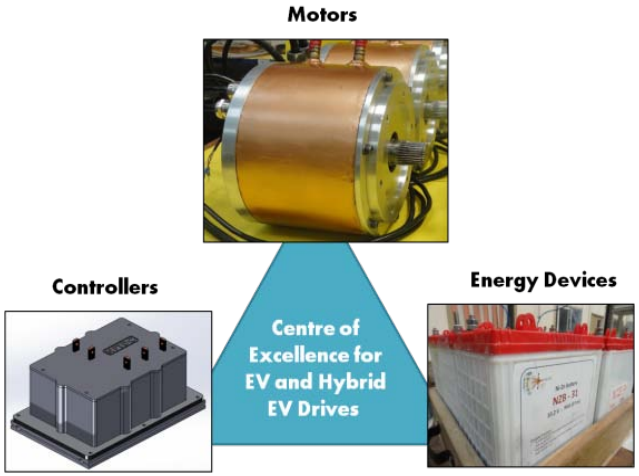
Nonferrous Materials Technology Development Centre



Intensive Training cum Certification Course on EV Technology

1st Batch: 18th & 19th Jan 2019
2nd Batch: 15th & 16th Feb 2019
3rd Batch: 15th & 16th Mar 2019



Nonferrous Materials Technology Development Centre
An autonomous R & D Centre
P.O.Kanchanbagh, Hyderabad - 500 058 , INDIA
Tel:+91-40-24182335, Fax:+91-40-24340592

About NFTDC

- NFTDC is an autonomous and self financing R & D institution dedicated to development of advanced materials, innovative processes on one hand and mechanical design, analysis, electronics, instrumentation and control leading to systems development & integration on the other.
- NFTDC is an unique Technology Centre, in that it is a multi disciplinary knowledge domain based institution which enables the centre to undertake complex technology development endeavours as interdisciplinary projects involving both knowledge creation (scientific know-why) and knowledge integration (technical knowhow).
- NFTDC has state of art facilities in design, advanced manufacturing, product development and pilot production together with advanced testing & characterization facilities.

About Course: Objectives of this course is to

- provide participants with intensive learning of basic concepts together with rich practical experience in traction motor drive system and energy devices.
- serve as a comprehensive and practical guide for Design, Development, and Prototyping of Electric Motor drive system for EV.
- provide insight into technical challenges in the development of EV Motors and Controllers.
- The course draws from years of work & experience of NFTDC in EV systems and is multidisciplinary in nature.
- Format of the course consists of lectures, tutorials, demonstrations, facility visits, assignments .

Minimum Pre-requisites

- Engg Degree in EEE/ECE/Mechanical (allied streams)
- Participants are advised to review their undergraduate subjects before attending the course.
- Course shall not cover basic electrical concepts.

Course Fee:

Rs. 30000 + 18% GST= Rs. 35400/-

(inclusive of Lodging, Boarding)

Discount of 5% on course fees, if **3 or more participants are from same Company/ institution. (Discounted fees: **Rs. 28500+18% GST= Rs. 33630/-)**

Course Duration- 2 days

Batch Size : 20 max.

To Register visit:

https://www.nftdc.res.in/

Payment Method (Cheque/DD/Online Transfer)
Cheque/DD in favour of- **NFTDC**
Account name: **Nonferrous Materials Technology Development Centre (NFTDC)**
Bank-**Canara Bank, Kanchanbagh Branch Hyderabad**
Account no.:**1849201000310**
RTGS /IFSC Code:**CNRB0001849**
Contact no- **040-24182335**

Course Content

System Level Thinking

- ✓ System Architecture
- ✓ Drive Cycle

Motor Development

- ✓ Traction Motors vs Industrial Motors
- ✓ Torque speed curves, Efficiency vs Speed curves
- ✓ EV Motor types and its Application segment
- ✓ For IM, BLDC, Syn-Rel, SRM
  - o Electromagnetic Design and Simulation
  - o Thermal Analysis and Thermal Management
  - o Structural Analysis (Static & Dynamic)
  - o Manufacturing Process
  - o Motor Testing

Basics of Controller Development (**)

- ✓ Overview of Controllers- Block Diagram
- ✓ Controller Architecture and its Application
- ✓ Hardware Design
  - o Inverter Design (Power Device Selection)
  - o DC Link Capacitor Selection
  - o Gate Drive Circuits
  - o Sensors- Voltage, Current, Temp, Speed
  - o Microprocessor and other peripheral circuits
  - o Thermal Management of Controllers
- ✓ Basics of Control Algorithms
  - o Motor Modelling and Simulation
  - o Scalar, Vector, DTC, FOC
  - o Testing (SIL, PIL, HIL)
- ✓ Case studies- IM/BLDC/Syn Rel Controller

Energy Devices

- ✓ Energy Demand & Battery Sizing
- ✓ PbA, Ni-X and Li Batteries
- ✓ Capacitors
- ✓ Fuel Cells

**** Course will be taught at Basic Level for Mech Stream & at Intermediate level for EEE/ICE/ECE Stream candidates**

Course Schedule

Day 1		
9.00 hrs	9.30 hrs	Registration
9.30 hrs	10.30 hrs	System Level Thinking
10.30 hrs	11.15 hrs	Drive Cycle & System Architecture
11.15 hrs	11.30 hrs	Tea Break
11.30 hrs	12.30 hrs	Motors (Session I)
12.30 hrs	13.30 hrs	
13.30 hrs	14.30 hrs	Lunch Break
14.30 hrs	15.30 hrs	Motors (Session II)
15.30 hrs	16.15 hrs	
16.15 hrs	16.30 hrs	Tea Break
16.30 hrs	18.30 hrs	Practical + Tutorial Tour of CoE, NFTDC

Day 2		
9.00 hrs	9.30 hrs	Controllers (Session I)
9.30 hrs	10.30 hrs	
10.30 hrs	11.15 hrs	
11.15 hrs	11.30 hrs	Tea Break
11.30 hrs	12.30 hrs	Controllers (Session II) + Practical + Tutorial
12.30 hrs	13.30 hrs	
13.30 hrs	14.30 hrs	Lunch Break
14.30 hrs	15.30 hrs	Energy Devices (Session I)
15.30 hrs	16.15 hrs	
16.15 hrs	16.30 hrs	Tea Break
16. 30 hrs	17.30 hrs	Energy Devices (Session II)
17.30 hrs	18.15 hrs	
18.15 hrs	18.30 hr	Conclusion / Certificates

Course Outcomes: will enable participants to

- Describe electric vehicle design considerations and performance requirements of different vehicle system (e2w/e3w/e4w/E-Bus).
- Identify, define, select & size key subsystems and components.
- Define torque/power vs speed curves for motors and its application to electric vehicles.
- Identify and understand vital components and basic circuitry of Motor Controller.
- Understand basics of Motor Control Algorithm and testing process.
- Realize the importance of thermal management of Motors, Controllers and Energy Devices.
- Understand fundamental electrochemistry of energy device operation and performance requirements for electric vehicle applications.

Who should take this course?

- Professionals from Mech/EEE/ICE/ECE (including all allied streams) Application Engineers, Design Engineers, Project Managers, Consultants who are working in or shifting to EV powertrain development.
- Doctoral Candidates in the domain of Electrical Machines, Power Electronics, Instrumentation and Control, Automotive technology seeking awareness and exposure to EV Application space
- Individuals seeking to enhance their knowledge and understanding of EV drive system.