

Automotive Electronics and Electric Vehicle Design (AE-EVD)

8 Days 70* hours Intensive Certified Internship

India's First ever course work based Internship on

Engine Electronics, Vehicle Electronics, Intelligent Vehicle Technologies and Electric Vehicle Design

Internship Structure

No of Days: 8

No of Hours: Total 70 (50 Training Hours) + (20 Hours on Project Assigned)

The course is divided into four diff. areas of Automotive Electronics

- **Engine Electronics**
 - Electronics in Engine systems – Various Sensors, Actuators, Fuel Injection, Emission control, NVH systems.
- **Vehicle Electronics**
 - Electronics in Vehicle systems – suspension, steering, body, chassis, safety, infotainment, comfort and convenience features.
- **Intelligent Vehicle Technologies (IVT)**
 - Electronics in Vehicle systems – Driver Assistance Systems, Connected Cars, Vehicle IoT.
- **Alternative Vehicle Propulsion**
 - Electric Vehicle, Hybrid Electric Vehicle, Battery, BMS, Electric Motor design, Charging Systems & Solar Vehicles.

Introduction

Automotive Electronics and Mechanical Systems

- Electronics Basics – Sensors, Actuators, Embedded Systems, Basic Electronic Subsystems.
- Mechanical Basics – IC Engine, Various associated components, Combustion phenomenon – SI & CI Engines, Fuel Injection Technologies.

Project Allocation

Interns will be divided into a team and assign a problem statement in which all the interns working and applying their learning from the program to bring better solution.

Engine Electronics

- Hands-On session with various petrol and Diesel engines for understanding of mechanical systems and how electronics helps in improving the same.
- Sensors used in Engine (Inlet to After Treatment)
- Working of Various Sensors
- Engine Management Systems – Overview
- Controlling sensors through microcontrollers (Arduino or PIC)
- Engine Performance Optimization using Electronics Systems
- Engine Emission Optimization techniques using Electronics Systems
- Electronic Fuel Injection Technologies
- Noise Vibration & Harness (NVH) Systems in Modern Automobiles.
- Advanced Electronics Systems – Valve train, Fuel Delivery Systems.
- Demo of Various Engine Electronics Components

Vehicle Electronics

- Introduction to Vehicle Electronics Systems
- **Safety:** Airbags – System Introduction and working
 - Automotive Safety Systems
 - Active and Passive Safety System
 - Regulatory Requirements - ABS, ESP, Air Bag Controls
- **Dynamic Suspension** – Electronic Stability Program (ESP) & Traction Control
- **Steering** – Power Steering systems
- **Breaking** – Anti Lock Breaking System (ABS)
- **Dynamic Breaking** – Electronic Break force Distribution (EBD) & EBA Systems.
- **Automatic Transmission** - Transmission Control Module (TCM) & Paddle Shifters & Dual Shift Gear Box (DSG) by Volkswagen
- Adaptive Cruise Control (ACC) Systems
- Introduction to On board Diagnostic (OBD) & DLC
- Demo of diff. systems in live as well as in simulator.

Controller Area Network (CAN) & AUTOSAR

Controller Area Network is used widely in the automotive electronics for in-vehicle controller to controller communication.

- Controller Area Network
- OSI Framework
- Understanding CAN transmission
- Understanding Data Frame

- OBD Protocols and Messages (SAE / ISO)
- Real-time generation and monitoring of CAN data frame

Intelligent Vehicle Technologies (IVT)

These systems are mainly helping drivers and providing enhanced driving experience as well as enhanced safety for passengers in current automobiles

Advanced Driver Assistance Systems

- Lane departure warning System (LDWS)
- Predictive Front Collision Warning (FCW) (Camera & Radar Based)
- Smart Key
- Blind Spot Warning
- Night Vision Camera
- Automotive Infotainment Systems

Connected Cars – Vehicle IoT

- Systems Monitoring
- Predictive Maintenance
- Smart Driving Assistance
- Driver Safety Systems
- Emergency Systems
- Future Scope of the Technology.

Hands-on**

- Sensor interface and sensor interface and signal conditioning circuits
- IC Engine Simulator
- ABS Design
- Vehicle Electrical System
- PWM controls
- PID closed loop control
- Cruise Control system
- CAN based feature implementation

Alternative Vehicle Propulsion

- Hybrid Vehicle Technologies
- Hybrid Electric Vehicles (HEV)
- Electric Vehicle Technologies (EV)
 - Electric Motor Design
 - Various Modern Battery Technologies
 - Battery management System
 - Battery chargers and how it is designed
 - Battery Pack design

- Understanding Electrical Wiring and various other layouts.

- Introduction to Solar Powered Vehicle
- Introduction to Battery Powered Vehicle

Project Presentation

Solution/Project presentation – Peer to Peer learning Day – Learn from your other fellow participants about the projects they are working on and vice versa.

- Best Teams will be selected and awarded “Winners” with prizes.
- Best Students who perform well throughout the Program will get “Best Intern Award” and certificate of Excellence.

Hands-on Lab

Participants will get a chance watch demo and also do disassemble and assemble of various Automotive Electronics components and Engines.

Note: Expertshub has all rights to change the structure of the program based upon expert’s availability, equipment’s availability & lab conditions available at host institutions without prior notification to anybody.

*no of hours mentioned are calculated by both class room training & the time student spend outside the class room for their project work.

**Based on hardware systems and experts availability.

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