

Ezenith Education Internships

India's Biggest Internships
60 Hours of Extensive Knowledge Transfer
Learn from the best R&D Experts in the Industry
Minimum 20 Hrs of Practical Experience

Day
1

- IC Engines Basics-Working, Construction, Design Features.
- Engine Subsystems – Valvetrain, Fuel Injection, Intake & Exhaust Manifolds, Turbocharging & Supercharging
- Energy consumption for cycles.
- Limitations with Present Technology- Fuel shortage, Mechanical efficiency

Hybrid & Electric Vehicle Systems:

- Transportation Electrification- History, Need and Motivation.
- Economic and Environmental Impacts.
- Electric Drive Vehicle Technologies –HEV, PHEV, EV and fuel cell.
- Types of Hybrid Topologies- Series, Parallel, Combined.
- Various Components in a Hybrid and Electric Vehicle.
- HEV/ EV Topologies and Power flow diagrams with example.
- Charge sustaining strategies – Regenerative Braking, KERS, Start-Stop.

Day
2

- Types of batteries – Pb Acid, Li-Po & Metal Air
- Architecture- Cells, Modules & Packs
- Battery Charging & Discharging Cycles
- Use of Batteries in Hybrid Powertrain
- Battery Modelling & Management System(BMS)
- Alternative Energy Storage – Photovoltaic cells, Super-Capacitors, Fuel Cell
- Demonstration Session-on experience on Battery Packs and BMS.

Day
3

- Electric Motors- AC/DC Motors/ Generators
- Brushed DC Motor/ Brushless DC Motor- Torque Characteristics
- Synchronous and Asynchronous AC Motor- Torque Characteristics
- Reluctance Machines, Actuators & Capacitors
- DC-AC & AC-DC Convertors
- Practical design calculation session on batteries and motors

INTERNSHIP ON HYBRID AND ELECTRIC VEHICLES.

Day
4

- Motors selection parameters
- Controls Systems in HEVs- ECU Architecture, Sensors & Actuators
- Control Strategy
- Torque Distribution
- ABS/ESP Interaction
- Basics on Motor Control & Regeneration Algorithms
- Regulatory Requirement & Certifications
- Certification Requirement for HEV systems
- Practical session - Simulation on electronic circuits and motor drivers
- Basic parameters, specification involved in Designing of E-Bike

Day
5

- Transmission and Power Couplings- AMT, Dual Clutch, CVT
- Shift Quality Parameters
- Converters
- Architecture Development of HEVs and EV's:
- System Integration -Dynamics-Topology Selection & Modelling, Braking, Safety
- Range / Power conflict
- Regenerative Braking System
- Thermal Management for Motors & Batteries:
- Thermal Issues & Functions of Thermal Management System
- Technologies for Thermal management Air Cooling, Liquid Cooling
- Direct Refrigerant Cooling, Thermos Electric Module
- Existing HEV and EVs Architecture
- Toyota Hybrid Synergy Drive
- Hero Electric
- Mahindra E20
- Ather Energy

Day
6

- Modelling & Simulation
- Model and library creation
- Analytical & Mathematical Calculations & Modelling of HEVs
- Practical session on Building of E-Bike

Day
7

- "Industrial Project Review"
- **Interview Skill's and Further Career Development Q&A**
- Resume Writing & Interview Tips – What the Industry Looks For?
- Certification & Closing Ceremony.

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