Hybrid & Electric Vehicle

1 Introduction : why EV?
Why EV?
Why HEV?
Why PHEV?
Hybridisation Ratio Architectures of HEV Comparison of IC & EV

2 Batteries
Battery Parameters
Lithium Batteries
Metal- Air Batteries
Hybrid Batteries Super- Capacitors
Comparison b/w Hybrid batteries & super-capacitors
C-rates

3 Vehicle Modelling
Duty Cycles
Vehicle Model
Vehicle Performance
EV Powertrain Component Sizing Vehicle Efficiency

4 Minor Project Discussion

5 Battery Thermal Management

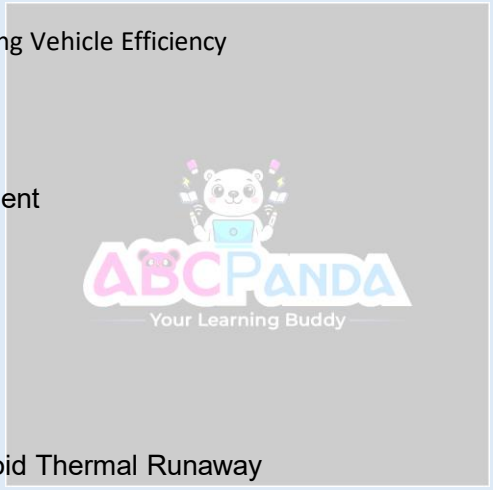
Thermal Runaway

Cooling Systems

Active Cooling

Passive Cooling

Safety Systems in EV to avoid Thermal Runaway



6 Motors & Control Systems

Types of Motors Motor Configurations

Asynchronous Motors
Synchronous : Permanent Switch Reluctance Motors
Axial Flux Motors
Motor Torque & Power Characteristics
Motor Efficiency
Control Systems

7 Battery Pack Design & Calculations (Major Project)

8 Battery Management System in EV
Background
Battery Management Systems
Basic Functions of BMS Topology of BMS

9 Battery Charging

Charging Standards
Wireless Power Transfer
Solar – Charging Case Study