



DEPARTMENT OF ELECTRICAL ENGINEERING

DELHI TECHNOLOGICAL UNIVERSITY

GOVERNMENT OF NCT OF DELHI

SHAHBAD DAULATPUR, BAWANA ROAD, DELHI-110042

Chargers and Charging Infrastructure (EV355)

ASSIGNMENT NO (Basics)

Course Outcomes (CO's): Students will be able to

CO1	understand the different types of Electric Vehicles (EVs) such as Battery EVs, Hybrid EVs, Fuelled EVs, Solar-Powered EVs and associated technologies.
CO2	gain a detailed understanding of various energy storage systems and also able to evaluate key parameters such as battery sizing, charging/discharging cycles, and energy storage modelling for different types of EVs.
CO3	to analyse and design EV charging infrastructure, including the differences between slow and fast chargers, the necessary design ratings for chargers, and the standards used.
CO4	design and analyse the basic requirements of a charging system, the selection of appropriate power components (e.g., Boost PFC, Boost inductor sizing), and loss calculation in chargers.
CO5	select and specify the appropriate AC (Type-1, Type-2, Type-3) and DC chargers based on type of vehicle, battery pack, and infrastructure availability.

Q1. Discuss the following:

Environmental benefits of Electric Vehicles (EVs)

Difference between Fuelled EV, Hybrid EV, and Battery EV with respect to EV architecture

Solar-Powered EVs (SPEVs)

Types of Battery

Basic block diagram of Charger

Flywheel energy storage system

Supercapacitor energy storage system

Q2. What is the role of communication between the AC charger and EVs?

Q3. How does communication methodology differ between AC and DC fast chargers?

Q4. What are the Charging Protocols? Why they are important in EV charging? Discuss the specifications of CCS2?

Q5. Discuss about Bharat DC001 charger protocol.

Q6. Write down the differences between slow charger and fast charger.

Q7. What do you understand by charging infrastructure?

Q8. How can renewable energy be integrated into EV charging? Discuss the challenges.

Q9. What are the different types of chargers used for electric vehicles, and how do they vary in terms of charging speed, compatibility, and applications?

Q10. What is the difference between Level 1 and Level 2 AC chargers in terms of topology?

Q11. What are the most common topologies for front-end AC–DC converters in a level 2 charger?

Q12. What are the most common topologies for front-end DC–DC converters in a level 2 charger?

Q13. Explain PFC boost converter topology for level 2 charges.

Q14. Explain principles, advantages, disadvantages, and applications of wireless charging.