

**SAVITRIBAI PHULE PUNE UNIVERSITY
(Formerly University of Pune)**



**Revised Syllabus for
Certificate Course in Electric Vehicles and Charging Infrastructure
from Academic Year 2022-23 onwards**

**FACULTY: FACULTY OF SCIENCE AND TECHNOLOGY
BOARD: ENERGY TECHNOLOGY**

**Centre for Energy Studies
Savitribai Phule Pune University
Pune 411 007**

July 2022

**Savitribai Phule Pune University,
Centre for Energy Studies
Pune 411 007**

**Syllabus for Certificate course in Electric Vehicles and Charging Infrastructure
[04 credits]**

[Total 60 contact hours = 40 lectures + 20 practical, tutorials and assignments]

Unit 1 [1 credit]

EVT: Electric Vehicle Technology

1. Introduction with EV Technology
2. Types of Electric Vehicle: Hybrid Electric Vehicles, Plug-in Hybrids, Battery Electric Vehicles
3. Type of Charger - On-board & off board charging
4. Clarification & Specification Discussion: Bharat EV AC Charger (BEVC-AC001), Bharat EV DC, Charger (BEVC-DC001), DC Fast Charging

EVSE: Charging Infrastructure technical detail, design, calculation, ROI, Electric Drive and controller

1. Electric vehicle charging station
2. Electric Vehicle Supply Equipment: Different types of EV charger connectors, single-phase or three-phase socket, SAE J1773, CHAdeMO standard - DC fast charging, SAE J1772 Combo, ARAI standards
3. Personnel Protection System
4. Cords and Cables, Cable Length
5. Earthing, Lightning Protection of Electric Vehicle Charging
6. PROTECTION DESIGN
7. Residual current device (RCD)
8. Practical & hands on learning session
9. National & International EV Standard Codes - IEC applicable for EVSE

Unit: 2 [1 credit]

CSA: Charging Station Site Assessment

1. Site analysis for EV charging station
2. Choosing the location - Public charging stations
3. Site Assessment
4. Design Guidelines and Site Drawings
5. STATION LOCATION PLANNING
6. URDPFI Guidelines
7. Site Selection Considerations
8. General Site Issues
9. EVSE Typical Site Plans
10. Planning Considerations
11. Station Configuration
12. Practical & hands on learning session

Unit: 3 [1 credit]

SEV: Safety for EV Charging System

1. Charging safety
2. Electrical safety from the charging socket to the electric vehicle
3. Different aspects of electric safety
4. Electric Vehicle Charging Safety Guidelines
5. Protection against electric shock, fault protection
6. Selection and erection of electrical equipment - Isolation, switching and control
7. International Electrotechnical Commission (IEC) Standards - IEC IEC 60068-2 (1,2,14,30), IEC 61683, IEC 60227, IEC 60502 IEC 60947 part I,II, III ,IEC 61215 and more

Unit: 4 [1 credit]

ICS: Installation of EV Charging Station

1. Installing a new EV charging station, Permitting from Fire Safety's Division Municipal
2. Choosing Right Charging Station for Your Customer
3. Installing charging stations
4. Execution of work: Installation Instruction, Installing an outdoor public station, Pedestal charging station
5. Installation Procedure
6. Practical & hands on learning session

Mode of Examination: 3 hours Written test to verify the assimilation of knowledge to candidate and to assess the level of understanding.

Learning Outcomes:

After completing this course, student should be able to:

Recommended Books:

1. Electric and Hybrid Vehicles, 1st Edition, by Tom Denton, Routledge Publishers, 2016
2. Electric Vehicles: And the End of ICE age, by Anupam Singh, Adhyyan Books Publisher, 2019
3. Electric Vehicle Technology Explained, 2nd Edition, by James Larminie, and John Lowry, Wiley Publisher, 2012
4. Electric Vehicle Battery Systems, by Sandeep Dhameja, Elsevier Publisher, 2012
