



GOVERNMENT OF TAMILNADU
DIRECTORATE OF TECHNICAL EDUCATION, CHENNAI-25

STATE PROJECT COORDINATION UNIT
(Established under Canada India Institutional Cooperation Project)

CURRICULUM

Course Name	ELECTRIC VEHICLE BATTERY CHARGING TECHNICIAN
Course Code	EE/2020/008
Course Duration	40 Hours
Minimum Eligibility Criteria and Pre-requisites (if any)	10 th /+2 /ITI/Diploma/Graduates
Course Objectives	Training module has been designed for the participants to <ul style="list-style-type: none"> Understand the concept of Electric Vehicle Engineering. Understand the concept of Electric Vehicle Charging System. Types and Configuration of EV Charger Layout of Storage Batteries Function of various components of charging station
Course Outcomes	At the end of training, the trainees will be able to <ul style="list-style-type: none"> Explain the concept of Electric Vehicle Charging System Perform installation of components in EV Charging station Read the Single Line Diagram of Battery charging circuit Troubleshoot fault in Charging system of Electric Vehicle
Expected Job Roles	EVService Technician

TEACHING AND SCHEME OF EXAMINATION						
Course Code	Course Name	Hours		Assessment Marks		Duration of Examination
				Min	Max	
EE/2020/008	ELECTRIC VEHICLE BATTERY CHARGING TECHNICIAN	Theory	16	10	20	3 Hours
		Practical	24	40	80	
		Total	40	50	100	

DETAILED SYLLABUS

Unit No	Modules	No.of.Hours	
		Theory	Practical
I	Introduction to Electric Vehicle	10 Hours	
1.1	Electric Vehicle Technology and Charging Equipment's	05	05
1.2	Basic charging Block Diagram of Charger		
1.3	Difference between Slow charger and fast charger		
1.4	Slow charger design rating - Fast charger design rating		
1.5	AC charging and DC charging		
1.6	Inboard and off board charger specification		
1.7	Type of Mode of charger Mode -2 , Mode-3 and Mode-4		
1.8	EVSE associated charge times calculation		
II	Energy Storage Solution	10 Hours	
2.1	Cell Types (Lead Acid/Li/NiMH)	05	05
2.2	Battery charging and discharging calculation		
2.3	Cell Selection and sizing		
2.4	Battery lay outing design		
2.5	Battery Pack Configuration - Battery Pack Construction		
2.6	Battery selection criteria		
2.7	High Voltage Safety consideration		
2.8	BMS – Battery Management System Introduction		
III	Components of Charging Station	20 Hours	
3.1	Type of Charging station	06	14
3.2	Selection and Sizing of charging station		
3.3	Components of charging station		
3.4	Single line diagram of charging station		
3.5	AC Pile Charger, DC Pile Charger		
3.6	EVSE Power Module selection and technical specification		
3.7	Selection of EVSE Communication Protocol (PLC / Ethernet / Modbus/ CAN Module), Communication gateway		
3.8	Selection of AC charger type-1 , type -2 and type -3		
3.9	Communication between AC charger and EV		
4.0	Selection of DC charger connector, Communication methodology chargers		
4.1	Selection sizing of Charger connector cable		
4.2	Technology Scenario		
4.3	Policies in India		
Total Theory and Practical Hours		16	24
Total hours		40	

HARDWARE REQUIREMENT

S.NO	LIST OF TOOLS /EQUIPMENTS
1	Charge Controller
2	Inverter
3	Battery
4	Tester
5	Cables, Multimeter, Crimping Tools
6	Electric Vehicle

SOFTWARE REQUIREMENT

NIL

REFERENCE BOOKS

S.NO	NAME OF THE BOOK	AUTHOR	PUBLISHER
1	Electric Vehicle Battery Systems	Sandeep Dhameja	Elsevier
2	Behaviour of Lithium-Ion Batteries in Electric Vehicles:	Gianfranco Pistoia, BoryannLiaw	Elsevier
3	An Electric Vehicle Battery Charging System	Nassar Hasan Kutkut	University of Wisconsin--Madison, 1995

ASSESSMENT AND CERTIFICATION

S.No	Criteria for assessment
1.	A trainee will be assessed based on the performance in End Examination for Theory and Practical conducted internally in the CIICP Project Polytechnic College for a duration of 3 hours
2.	A trainee must have 75% of attendance to appear for End examination in Theory and Practical.
3.	The assessment for theory part will be based on the marks scored in the end examination on the knowledge bank of questions (1 word/objective type questions)
4.	The assessment for practical part will be based on the marks scored in the end examination conducted by the CIICP Project Polytechnic and assessed by the Examiners approved by Strategic Plan Implementation Committee (SPIC) of the project polytechnic.
5.	The passing criteria for successful completion of training is every trainee should score 50% of marks in theory and practical examination.
6.	On successful completion of training, Certificate will be issued to the participants by the Directorate of Technical Education through the Project Polytechnics.

END EXAMINATION

ALLOCATION OF MARKS

S.NO	Description	Max. Marks
1.	Theory Examination	20
2.	Practical Examination	
	a)Objective and Circuit Diagram	20
	b)Procedure and Connections / Execution	20
	c)Result and Viva	20
	d) Record	20
Total Marks		100

THEORY MODEL QUESTION PAPER

EE/2020/008 ELECTRIC VEHICLE BATTERY CHARGING TECHNICIAN

(Maximum Marks: 20)

(N.B: Answer any Twenty questions)

20x1= 20 Marks

1. Write any two major components of Electric Vehicle.
2. What is the use of battery in Electric Vehicle?
3. Write the classification of battery charger.
4. Write the short notes on DC Fast Charging (DCFC).
5. What is Rectifier?
6. What is inverter?
7. Write the types of mode of charging.
8. Write any two types of Battery.
9. What is Depth of Discharge?
10. Write the unit of battery ratings.
11. What is energy efficiency in battery?
12. What is Columbic Efficiency in battery?
13. Write the short notes of Lead Acid Battery.
14. Write the short notes of lithium-ion battery.
15. Draw the simple diagram of battery cell in parallel connection.
16. Draw the simple diagram of battery cell in series connection.
17. Write the level two charging voltage range.
18. List out the Components of charging station.
19. What are the advantage of Public Charging?
20. What are the disadvantage of Home Charging?
21. Explain latest technic in EV Charging.
22. Write the formula for design of battery sizing.
23. Write the voltage range of DC fast charging.
24. List out the advantage of Level 2 Charging.
25. What are the advantage of EVs?