LEARNING OUTCOME BASED VOCATIONAL CURRICULUM

JOB ROLE: Electric Vehicle Service Assistant
(QUALIFICATION PACK: Ref. Id. ASC/Q1435)

SECTOR: AUTOMOTIVE

Grade: 9 and 10

PSS CENTRAL INSTITUTE OF VOCATIONAL EDUCATION

Shyamla Hills, Bhopal- 462 002, M.P., India

http://www.psscive.ac.in

Gandhiji's Talisman

I will give you a talisman. Whenever you are in doubt or when the self becomes too much with you, apply the following test:

Recall the face of the poorest and the weakest man whom you may have seen and ask yourself if the step you contemplate is going to be of any use to him. Will he gain anything by it? Will it restore him to a control over his own life and destiny? In other words, will it lead to Swaraj for the hungry and spiritually starving millions?

Then you will find your doubts and your self melting away.

M K Gandhi

LEARNING OUTCOME BASED VOCATIONAL CURRICULUM

JOB ROLE: Electric Vehicle Service Assistant

(QUALIFICATION PACK: Ref. Id. ASC/Q1435)

SECTOR: AUTOMOTIVE

PSS CENTRAL INSTITUTE OF VOCATIONAL EDUCATION
Shyamla Hills, Bhopal- 462 002, M.P., India
http://www.psscive.ac.in

LEARNING OUTCOME BASED CURRICULUM

Automotive- Electric Vehicle Service Assistant

FEBRUARY, 2023

http://www.psscive.ac.in

Published by:
Joint Director
PSS Central Institute of Vocational
Education, NCERT, Shyamla Hills, Bhopal

PATRON
Dr. DINESH PRASAD SAKLANI,
Director, National Council of Educational Research and Training (NCERT), New Delhi

Dr. DEEPAK PALIWAL
Joint Director
PSS Central Institute of Vocational Education, Bhopal

COURSE COORDINATOR
Prof. Saurabh Prakash. Head
Engineering and Technology Department,
PSSCIVE, Bhopal

FOREWORD

The Pandit Sunderlal Sharma Central Institute of Vocational Education (PSSCIVE) a constituent of the National Council of Educational Research and Training (NCERT) is spearheading the efforts of developing learning outcome based curricula and courseware aimed at integrating both vocational and general qualifications to open pathways of career progression for students. The curriculum has been developed for the vocational education programme introduced under the Centrally Sponsored Scheme of *Samagra Shiksha* of the Ministry of Education (erstwhile, Ministry of Human Resource Development) and is aligned to the National Skill Qualifications Framework (NSQF). The curricula for vocational courses are being developed under the project approved by the Project Approval Board (PAB) of '*Samagra Shiksha'*, which is an overarching programme for the school education sector extending from pre-school to Grade 12.

It is a matter of great pleasure to introduce this learning outcome based curriculum as part of the vocational training package for the job role of "Electric Vehicle Service Technician". The curriculum has been developed for the secondary students of Grades 9 and 10 and is aligned to the National Occupation Standards (NOSs) for the job role. The curriculum aims to provide children with employability and vocational skills to support occupational mobility and lifelong learning. It will help them to acquire specific occupational skills that meet employers' immediate skill needs. The teaching-learning is to be done through interactive sessions in classrooms, practical activities in laboratories or workshops, projects, field visits, etc. and professional experience is to be provided through on-the-job training.

The curriculum has been developed and reviewed by a group of experts and their contributions are greatly acknowledged. The utility of the curriculum will be judged by the qualitative improvement that it brings about in teaching-learning. The feedback and suggestions on the content by the teachers and other stakeholders will be of immense value to us in bringing about further improvement in this document.

Prof. Dinesh Prasad Saklani
Director
National Council of Education Research & Training

PREFACE

India today stands poised at a very exciting juncture in its saga. The potential for achieving inclusive growth are immense and the possibilities are equally exciting. The world is looking at us to deliver sustainable growth and progress. To meet the growing expectations, India will largely depend upon its young workforce. In order to fulfil the growing aspirations of our youth and the demand of skilled human resource, the Ministry of Education (MoE), Government of India introduced that aims to provide for the diversification of educational opportunities so as to enhance individual employability, reduce the mismatch between demand and supply of skilled manpower and provide an alternative for those pursuing higher education. For spearheading the scheme, the PSS Central Institute of Vocational Education (PSSCIVE) was entrusted the responsibility to develop learning outcome-based curricula, student workbooks, teacher handbooks and e-learning materials for the job roles in various sectors.

The PSSCIVE firmly believes that the vocationalisation of education in the nation need to be established on a strong footing of philosophical, cultural and sociological traditions and it should aptly address the needs and aspirations of the students besides meeting the skill demands of the industry. The curriculum, therefore, aims at developing the desired professional, managerial and communication skills to fulfil the needs of the society and the world of work. In order to honour its commitment to the nation, the PSSCIVE has initiated the work on developing learning outcome-based curricula with the involvement of faculty members and leading experts in respective fields. It is being done through the concerted efforts of leading academicians, professionals, policy makers, partner institutions, Vocational Education and Training experts, industry representatives, and teachers. The expert group through a series of consultations, working group meetings and use of reference materials develops a National Curriculum.

The success of this curriculum depends upon its effective implementation, and it is expected that the managers of vocational education programme, vocational educators, vocational
teachers/trainers, and other stakeholders will make earnest efforts to provide better facilities,
develop linkages with the industry or world of work and foster a conducive learning environment for the students for effectively transacting the curriculum and to achieve the learning outcomes as per the content of the curriculum document.

DR. DEEPAK PALIWAL
Joint Director
PSS Central Institute of Vocational Education

ACKNOWLEDGEMENTS

On behalf of the team at the PSS Central Institute of Vocational Education (PSSCIVE) we are grateful to the members of the Project Approval Board (PAB) of Samagra Shiksha and the officials of the Ministry of Education (MoE), Government of India for the financial support to the project for development of curricula.

We are grateful to the Director, NCERT for his support and guidance. We also acknowledge the contributions of our colleagues at the National Council of Educational Research and Training (NCERT), National Skill Development Corporation (NSDC), Automotive Skill Development Council (ASDC) for their academic support and cooperation in the development of Qualification file and curriculum.

We are grateful to Prof. Saurabh Prakash, Course Coordinator for his untiring efforts and contribution to the development of this learning outcome-based curriculum. The contribution made by Mr. Ankit Singh Chauhan (Assistant Professor), Department of Engineering Technology in composing of the material is duly acknowledged.

The suggestions and editorial support provided by Mr Vinod K Soni, Computer Operator and Mr. Manoj Darwai, (Assistant Professor), Department of Engineering Technology is also duly appreciated and acknowledged.

PSSCIVE Team

CONTENTS

1. COURSE OVERVIEW

COURSE TITLE: Automotive- Electric Vehicle Service Assistant

The present curriculum of Electric Vehicle Service Assistant job role is related to NSQF level-3. This course fulfils the needs of the students willing to learn activities relating to the Electric Vehicle Service Assistant job role. Any student/ entrepreneur willing to start an Automobile Service Centre can acquire the desired competencies with the help of this curriculum. Automobile or Automotive Engineering has gained recognition and importance ever since Electric vehicles capable for transporting passengers has been in vogue. Now due to the rapid growth of auto component manufacturers and automobile industries, there is a great demand for Electric Vehicle Service Assistant. Electric Vehicle Engineering is one of the most challenging careers in the field of engineering with a wide scope.

COURSE OUTCOMES: On completion of the course, students should be able to:

- Identify the principal components of a computer system
- Identify and control hazards in the workplace that pose a danger or threat to their safety or health, or that of others.
- Demonstrate self-management skills.
- Demonstrate the ability to provide a self-analysis in context of entrepreneurial skills and abilities.
- Demonstrate the knowledge of the importance of green skills in meeting the challenges of sustainable development and environment protection.
- Communicate effectively with the customers
- Enquire and understand customer queries related to vehicle type, model, specifications,
- Identify features of different elements of engineering such as mechanical, electrical, electronic, software and safety engineering,
- Assist in repairing and servicing electric vehicles such as cars, trucks, motorcycles, scooters etc
- Describe the working principle and the mechanism of vehicle chassis and Battery Management System (BMS).
- Identify the electrical systems, motor transport rules and regulations, workshop tools.

COURSE REQUIREMENTS: The learner should have the basic knowledge of science.

COURSE LEVEL: This is a beginner level course. On completion of this course, a student can take up an Intermediate level course for a job role in Automotive sector, such as **Electric Vehicle Service Assistant L4** in Class XI and Class XII.

COURSE DURATION: 400 hrs

Class 9	: 200 hrs
Class 10	: 200 hrs
TOTAL	**: 400 hrs**

2. SCHEME OF UNITS

This course is a planned sequence of instructions consisting of Units meant for developing employability and vocational competencies of students of Class 9 and 10 opting for vocational subject along with general education subjects. The unit-wise distribution of hours and marks for Class 9 is as follows:

CLASS 9			
Units		**No. of Hours for Theory and Practical 200**	**Max. Marks for Theory and Practical 100**
Part A	**Employability Skills**		
	Unit 1: Communication Skills-I	20	10
	Unit 2: Self-management Skills-I	10	
	Unit 3: Information and Communication Technology Skills-I	20	
	Unit 4: Entrepreneurial Skills-I	15	
	Unit 5: Green Skills-I	10	
		75	**10**
Part B	**Vocational Skills**		
	Unit 1: Introduction of Electric Vehicle and its Type	05	30
	Unit 2: Major Components and System of Electric Vehicles	20	
	Unit 3: Workshop and Tools	20	
	Unit 4: Routine Service and Repair of an Electric Vehicle	40	
	Unit 5: Heath Safety and Equipment	10	
		95	**30**
Part C	**Practical Work**		
	Practical Examination	06	15
	Written Test	01	10
	Viva Voce	03	10
		10	**35**
Part D	**Project Work/Field Visit**		
	Practical File/Student Portfolio	10	10
	Viva Voce	05	05
		15	**15**
Part E	**Continuous and Comprehensive Evaluation (CCE)**		
	Total	**5**	**10**
	Grand Total	**200**	**100**

The unit-wise distribution of hours and marks for Class-10 is as follows:

CLASS 10			
Units		**No. of Hours for Theory and Practical 200**	**Max. Marks for Theory and Practical 100**
Part A	**Employability Skills**		
	Unit 1: Communication Skills-II	20	10
	Unit 2: Self-management Skills-II	10	
	Unit 3: Information and Communication Technology Skills-II	20	
	Unit 4: Entrepreneurial Skills-II	15	
	Unit 5: Green Skills-II	10	
		75	**10**
Part B	**Vocational Skills**		
	Unit 1: Routine Service and Repair of 2/3 Wheeler Electric Vehicle	25	30
	Unit 2: Routine Service and Repair of Four-Wheeler Electric Vehicle.	25	
	Unit 3: Routine Service and Repair Heavy Commercial Electric Vehicle	25	
	Unit 4: Optimize Resource Utilization	10	
	Unit 5: Innovations & Developments in Electric Vehicles	10	
		95	**30**
Part C	**Practical Examination**	06	15
	Written Test	01	10
	Viva Voice	03	10
		10	**35**
Part D	**Project Work/Field Visit**		
	Practical File/Student Portfolio	10	10
	Viva Voce	05	05
		15	**15**
Part E	**Continuous and Comprehensive Evaluation (CCE)**		
	Total	**5**	**10**
	Grand Total	**200**	**100**

3. TEACHING/TRAINING ACTIVITIES

The teaching and training activities have to be conducted in classroom, laboratory/ workshops and field visits. Students should be taken to field visits for interaction with experts and to expose them to the various tools, equipment, materials, procedures and operations in the workplace. Special emphasis should be laid on the occupational safety, health and hygiene during the training and field visits.

CLASSROOM ACTIVITIES

Classroom activities are an integral part of this course and interactive lecture sessions, followed by discussions should be conducted by trained vocational teachers. Vocational teachers should make effective use of a variety of instructional or teaching aids, such as audio-video materials, colour slides, charts, diagrams, models, exhibits, hand-outs, online teaching materials, etc. to transmit knowledge and impart training to the students.

PRACTICAL WORK IN LABORATORY/WORKSHOP

Practical work may include but not limited to hands-on-training, simulated training, role play, case based studies, exercises, etc. Equipment and supplies should be provided to enhance hands-on learning experience of students. Only trained personnel should teach specialized techniques. A training plan that reflects tools, equipment, materials, skills and activities to be performed by the students should be submitted by the vocational teacher to the Head of the Institution.

FIELD VISITS/ EDUCATIONAL TOUR

In field visits, children will go outside the classroom to obtain specific information from experts or to make observations of the activities. A checklist of observations to be made by the students during the field visits should be developed by the Vocational Teachers for systematic collection of information by the students on the various aspects. Principals and Teachers should Identify the different opportunities for field visits within a short distance from the school and make necessary arrangements for the visits. At least three field visits should be conducted in a year.

4. ASSESSMENT AND CERTIFICATION

Upon successful completion of the course by the candidate, the Central/ State Examination Board for Secondary Education and the respective Sector Skill Council will certify the competencies.

The National Skills Qualifications Framework (NSQF) is based on outcomes referenced to the National Occupation Standards (NOSs), rather than inputs. The NSQF level descriptors, which are the learning outcomes for each level, include the process, professional knowledge, professional skills, core skills and

responsibility. The assessment is to be undertaken to verify that individuals have the knowledge and skills needed to perform a particular job and that the learning programme undertaken has delivered education at a given standard. It should be closely linked to certification so that the individual and the employer could come to know the competencies acquired through the vocational subject or course. The assessment should be reliable, valid, flexible, convenient, cost effective and above all it should be fair and transparent. Standardized assessment tools should be used for assessment of knowledge of students. Necessary arrangements should be made for using technology in assessment of students.

KNOWLEDGE ASSESSMENT (THEORY)

Knowledge Assessment should include two components: one comprising of internal assessment and second an external examination, including theory examination to be conducted by the Board. The assessment tools shall contain components for testing the knowledge and application of knowledge. The knowledge test can be objective paper based test or short structured questions based on the content of the curriculum.

WRITTEN TEST

It allows candidates to demonstrate that they have the knowledge and understanding of a given topic. Theory question paper for the vocational subject should be prepared by the subject experts comprising group of experts of academicians, experts from existing vocational subject experts/teachers, and subject experts from university/colleges or industry. The respective Sector Skill Council should be consulted by the Central/State Board for preparing the panel of experts for question paper setting and conducting the examinations.

The blue print for the question paper may be as follows:

Duration: 3 hrs Max. Mark: 30

		No. of Questions			
S.No.	**Typology of Question**	**Very Short Answer (1 mark)**	**Short Answer (2 Marks)**	**Long Answer (3 Marks)**	**Marks**
1.	Remembering – (Knowledge based simple recall questions, to know specific facts, terms, concepts, principles, or theories; identify, define or recite, information)	2	1	2	10
2.	Understanding – (Comprehension – to be familiar with meaning and to understand conceptually, interpret, compare, contrast, explain, paraphrase, or interpret information)	1	2	2	11
3.	Application – (Use abstract information in concrete situation, to apply knowledge	0	1	1	05

	to new situations: Use given content to interpret a situation, private an example, or solve a problem)				
4.	High Order Thinking Skills – (Analysis & Synthesis – Classify, compare, contrast, or differentiate between different pieces of information; Organize and/ or integrate unique pieces of information from a variety of sources)	0	1	0	02
5.	Evaluation – (Appraise, judge, and/or justify the value or worth of a decision or outcome, or to predict outcomes based on values)	0	1	0	02
	Total	**3x1=3**	**6x2=12**	**5x3=15**	**30 (14 questions)**

SKILL ASSESSMENT (PRACTICAL)

Assessment of skills by the students should be done by the assessors/examiners on the basis of practical demonstration of skills by the candidate, using a competency checklist. The competency checklist should be developed as per the National Occupation Standards (NOSs) given in the Qualification Pack for the Job Role to bring about necessary consistency in the quality of assessment across different sectors and Institutions. The student has to demonstrate competency against the performance criteria defined in the National Occupation Standards and the assessment will indicate that they are 'competent', or are 'not yet competent'. The assessors assessing the skills of the students should possess a current experience in the industry and should have undergone an effective training in assessment principles and practices. The Sector Skill Councils should ensure that the assessors are provided with the training on the assessment of competencies.

Practical examination allows candidates to demonstrate that they have the knowledge and understanding of performing a task. This will include hands-on practical exam and viva voce. For practical, there should be a team of two evaluators – the subject teacher and the expert from the relevant industry certified by the Board or concerned Sector Skill Council. The same team of examiners will conduct the viva voce.

Project Work (individual or group project) is a great way to assess the practical skills on a certain time period or timeline. Project work should be given on the basis of the capability of the individual to perform the tasks or activities involved in the project. Projects should be discussed in the class and the teacher should periodically monitor the progress of the project and provide feedback for improvement and innovation. Field visits should be organised as part of the project work. Field visits can be followed by a small-group work/project work. When the class returns from the field visit, each group might be asked to use the information that they have gathered to prepare

presentations or reports of their observations. Project work should be assessed on the basis of practical file or student portfolio.

Student Portfolio is a compilation of documents that supports the candidate's claim of competence. Documents may include reports, articles, photos of products prepared by students in relation to the unit of competency.

Viva voce allows candidates to demonstrate communication skills and content knowledge. Audio or video recording can be done at the time of viva voce. The number of external examiners would be decided as per the existing norms of the Board and these norms should be suitably adopted/adapted as per the specific requirements of the vocational subject. Viva voce should also be conducted to obtain feedback on the student's experiences and learning during the project work/field visits.

CONTINUOUS AND COMPREHENSIVE EVALUATION

Continuous and Comprehensive Evaluation (CCE) refers to a system of school-based evaluation of students that covers all aspects of student's development. In this scheme, the term `continuous' is meant to emphasize that evaluation of identified aspects of students `growth and development' is a continuous process rather than an event, built into the total teaching-learning process and spread over the entire span of academic session. The second term `comprehensive' means that the scheme attempts to cover both the scholastic and the co-scholastic aspects of students' growth and development. For details, the CCE manual of Central Board of Secondary Education (CBSE) or the guidelines issued by the State Boards on the procedure for CCE should be followed by the Institutions.

5. UNIT CONTENTS

CLASS 9

Part A: Employability Skills

S.No.	Units	Duration (hrs)
1.	Communication Skills – I	20
2.	Self-management Skills – I	10
3.	Information and Communication Technology Skills-I	20
4.	Entrepreneurship Skills – I	15
5.	Green Skills – I	10
	Total	**75**

UNIT 1: COMMUNICATION SKILLS – I

Learning Outcomes	Theory (08 hrs)	Practical (12 hrs)	Duration (20 hrs)
1. Demonstrate the knowledge of importance, elements and perspectives in communication	1. Introduction to communication process 2. Importance of communication 3. Elements of communication 4. Perspectives in communication 5. Effective communication	1. Role play on the communication process 2. Group discussion on the importance of communication and factors affecting perspectives in communication 3. Charts preparation on elements of communication 4. Asking students to write statements exemplify the use of the 7Cs (i.e. Clear, Concise, Concrete, Correct, Coherent, Courteous and Complete) for effective communication	02
2. Demonstrate the knowledge of verbal communication	1. Verbal communication 2. Types of verbal communication 3. Advantages and disadvantages of verbal communication 4. Public speaking	1. Role play of a phone conversation 2. Chart preparation on types of verbal communication 3. Group discussion on advantages and disadvantages of verbal communication 4. Delivering a speech and practicing public speaking by using 3P's	02
3. Demonstrate the knowledge of non-verbal communication	1. Non-verbal communication 2. Importance of non-verbal communication 3. Types of non-verbal communication 4. Visual communication	1. Role plays on non-verbal communication 2. Group discussion and demonstration of Do's and Don'ts to avoid body language mistakes 3. Group discussion on three methods of communication	02
4. Demonstrate the knowledge of basic writing skills	1. Writing skills: Parts of speech 2. Using capitals 3. Punctuation 4. Basic parts of speech	1. Reading paragraphs and sentences and identifying parts of speech 2. Constructing and writing sentences by using parts of speech 3. Identifying nouns by guessing the name, place, animal, and thing	02
5. Describe the parts and types of sentences	1. Writing skills: Sentences 2. Parts of a sentence 3. Types of objects 4. Types of sentences – Active and Passive 5. Types of sentences, according to their	1. Framing and writing sentences using direct and indirect objects 2. Writing a paragraph using active and passive voice 3. Writing different types of sentences (i.e., declarative,	02

	purpose 6. Paragraphs	exclamatory, interrogative and imperative)	
6. Demonstrate the knowledge of pronunciation basics	1. Pronunciation Basics 2. Speaking correctly 3. Phonetics 4. Types of sounds	1. Pronouncing words and identifying vowels, diphthongs and consonants 2. Practicing the pronunciation of words	02
7. Demonstrate how to greet and introduce self	1. Greetings and Introductions 2. Greetings 3. Types of greetings 4. Introducing yourself and others	1. Role-play on Formal and informal greetings 2. Role-play on introducing someone 3. Practice and discussion on how to greet different people.	02
8. Answer questions that others ask about you	1. Talking about self 2. Filling a form	1. Practicing introducing yourself and 2. Practicing filling of forms 3. Role-play on Self Introduction	02
9. Asking questions according to a situation	1. Asking questions 2. Need for asking questions 3. Method for asking questions	1. Framing and writing questions (using Who, Where, When, What, Why and How) 2. Framing and writing questions (based on purpose of the question) 3. Discussing and guessing the personality using framed questions	02
10. Use the correct question words to ask open-ended and close-ended questions	1. Asking questions 2. Types of questions 3. Framing questions	1. Framing and writing open-ended and close-ended questions. 2. Group practice on framing questions 3. Identifying open-ended and closed-ended questions.	02
Total			**20**

UNIT 2: SELF-MANAGEMENT SKILLS – I			
Learning Outcome	**Theory (07 hrs)**	**Practical (03 hrs)**	**Duration (10 hrs)**
1. Describe the meaning and importance of self-management	1. Introduction to self-management and its components 2. Self-awareness 3. Self-confidence 4. Self-motivation 5. Positive thinking 6. Self-control 7. Problem solving 8. Personal hygiene and	1. Group discussion on self-management skills 2. Performing activities to know how much aware are you about yourself. 3. Chart preparation on components of self-management	01

	grooming 9. Team work 10. Time management 11. Goal setting		
2. Identifying strength and weakness analysis	1. Identifying strength and weakness 2. Knowing yourself 3. Strength and Weakness analysis 4. Difference between interests and abilities	1. Group discussion on aim and goal in life 2. Perform a strength and weakness analysis 3. Group discussion on interests and abilities	01
3. Build self-confidence	1. Self–confidence 2. Qualities of self-confident people 3. Building self-confidence	1. Role play on building self-confidence 2. Performing activities on building confidence through positive words	02
4. Building the concept on positive thinking	1. Positive thinking 2. Positive thinking and its importance 3. How to keep your thinking positive?	1. Story-telling 2. Role-play on following the class rules 3. Practicing saying positive words 4. Making a list of steps involved in self-reflection) on how you will follow positive attitude practices 5. Home activity on helping others, community service and social work	02
5. Describe the concept and aspects of personal hygiene	1. Personal hygiene 2. Three steps of personal hygiene • Care • Wash • Avoid 3. Essential steps of handwashing	1. Role-play on following personal hygiene steps 2. Discussion and follow up on personal hygiene practices	02
6. Follow the guidelines for dressing and personal grooming	1. Grooming 2. Grooming and its importance 3. Guidelines for dressing and grooming – clothes, hair, face	1. Role play on dressing and grooming standards 2. Self-reflection on dressing and grooming well	02
Total			**10**

UNIT 3: INFORMATION AND COMMUNICATION TECHNOLOGY SKILLS – I

Learning Outcome	Theory (06 hrs)	Practical (14 hrs)	Duration (20 hrs)
1. Explain the role of Information and Communication Technology (ICT) in day-to-day life and the workplace	1. Introduction to Information and Communication Technology (ICT) 2. ICT at workplace 3. ICT at home	1. Group discussion on past, present, and future use of ICT 2. Preparations of posters on applications of ICT	02
2. Differentiate between the ICT tools and use of mobile apps	1.ICT tools smartphones and tablets I 2.Smartphones 3.Tablets 4.TV and Radio 5.Application or apps	1. Performing activities to get familiar with mobile devices	02
3. Differentiate between smartphones and tablets	1. ICT tools -smartphone and tablets II 2. Mobile device layout 3. Basic features of a mobile device 4. Home screen of mobile device 5. Basic gestures used	1. Performing activities to get familiar with the mobile device – use and applications of mobile devices	02
4. Describe the parts of computer and the computer peripherals	1.Parts of a computer and peripherals 2.Parts of a computer 3.Input devices 4.Output devices 5.Peripherals devices and their functions 6.Central Processing Unit (CPU) 7.Understanding Random Access Memory (RAM) and Read Only Memory (ROM) 8.Motherboard 9.Ports and connections	1. Chart preparation on components of a computer 2. Group activity on connecting devices to a computer	02
5. Demonstrate basic computer operations	1. Basic computer operations 2. Computer hardware and software 3. Starting a computer 4. Log in and log out 5. Shutting down computer 6. Using the keyboard 7. Using a mouse	1. Group activity on use of computer 2. Group practice on using the keyboard	02
6. Perform basic file computer operations	1. Performing Basic file operations 2. Need to perform basic file operations. 3. Files and folders -creating a file and using text editor Ubuntu	1. Group practice on creating a file.	02

7. Demonstrate the knowledge of internet and networking	1. Communication and Networking -Basics of Internet 2. Use of the Internet 3. Connecting to the Internet • Types of connection • Bandwidth • Internet browser	1. Group discussion on the uses of the internet	02
8. Perform internet browsing	1. Communication and Networking – Internet Browsing 2. World Wide Web 3. Web page 4. Web browsers	1. Group practice on web browsing	02
9. Apply the knowledge of communication networking	1. Communication and Networking – Introductions to E-Mail 2. How does the E-mail work? 3. Email Id or address 4. Advantages of E-mail	1. Group discussion on using E-mail and its advantages	01
10. Create an Email account	1. Communication and Networking – Creating an E-mail account 2. Creating an E-mail account 3. Steps to open an E-mail account on Gmail	1. Group practice on creating and operating an e-mail account	01
11. Write an Email	1. Communication and Networking – Writing an E-mail 2. Writing an E-mail 3. Attaching a file to an E-mail 4. Managing folders	1. Group practice on writing an e-mail with attachments	01
12. Reply an Email	1. Communication and Networking – Receiving and Replying to an E-mail 2. Receiving Email 3. Replying to an Email 4. Forwarding Email 5. Deleting Email	1. Group practice on receiving and replying to an e-mail.	01
Total			**20**

UNIT 4: ENTREPRENEURSHIP SKILLS – I

Learning Outcome	Theory (06 hrs)	Practical (09 hrs)	Duration (15 hrs)
1. Describe the concept of Entrepreneurship skills	1. What is Entrepreneurship? 2. Entrepreneurship 3. Enterprise	1. Group activity on guessing the Entrepreneur	04

2. Describe the role of entrepreneurship	1. Role of Entrepreneurship 2. Economic development 3. Social development 4. Improved standard of living 5. Optimal use of resources 6. More benefits at lower prices - products and services at competitive prices	1. Group discussion on "A world without Entrepreneurs" 2. Role-play on roles of entrepreneurship	03
3. Describe the qualities of a successful entrepreneur	1. Qualities of a successful entrepreneur 2. Patience 3. Positivity 4. Hardworking 5. Confidence 6. Open to trial and error 7. Creativity and innovation	1. Role-play on appearing for an interview 2. Group activity on interactions with entrepreneurs	02
4. State the characteristics of entrepreneurship	1. Distinguishing characteristics of entrepreneurship and wage employment 2. Characteristics of entrepreneurship 3. Wage employment 4. Benefits of entrepreneurship	1. Group activity on identifying characteristics of enterprise 2. Discussion on advantages of entrepreneurship over wage employment	03
5. Identify the type of business activity	1. Types of business activities 2. Product business 3. Service business 4. Hybrid business	1. Group activity on identifying different types of products and services	01
5. Differentiate between the product, service, and hybrid businesses	1. Product, Service, and Hybrid Businesses 2. Types of product-based business 3. Manufacturing businesses 4. Trade businesses	1. Poster making on business activities around us	01
5. Describe the entrepreneurship development process	1. Entrepreneurship Development Process 2. Steps of starting a business • Idea generation • Getting money and material • Understanding customer needs • Improving product/ service	1. Group activity on Make-and-Sell business	01
Total			**15**

UNIT 5: GREEN SKILLS – I			
Learning Outcome	**Theory (07 hrs)**	**Practical (03 hrs)**	**Duration (10 hrs)**
1. Demonstrate the knowledge of society and environment	1. Society and Environment 2. Natural resources 3. Renewable and Non-renewable resources	1. Group activity on listing the factors influencing the environment	05

	4. Types of pollutions 5. Climate change 6. Harmful radiation 7. Natural disaster 8. Saving the environment: What can you do? 9. Reduce, reuse and recycle 10. Actions for saving the environment	2. Group activity on listing the steps one can take to save the environment	
2. Describe the meaning and importance of conserving natural resources	1. Conserving natural resources 2. Soil conservation 3. Water conservation 4. Energy conservation 5. Food conservation 6. Forest conservation	1. Group discussion on various ways of conserving natural resources	02
3. Describe the meaning and scope of sustainable development and green economy	1. Sustainable Development and Green Economy 2. Sustainable Development 3. Sustainable Development 4. Goals (SDGs) 5. Green growth 6. Green economy 7. Components of green economy 8. Skill development for the green economy 9. Green skills 10. Green jobs 11. Green projects	1. Group discussion on importance of green skills 2. Poster making on importance of green economy	03
Total			**10**

PART B: Vocational Skills

S. No.	Units	Duration (Hrs.)
1.	Unit 1: Introduction of Electric Vehicle (EV) and its Type	10
2.	Unit 2: Major Components and System of Electric Vehicle	20
3.	Unit 3: Workshop and Tools	15
4.	Unit 4: Routine Service and Repair of an EV	40
5.	Unit 5: Heath Safety and Equipment	10
	Total	**95**

Unit 1: Introduction of Electric Vehicle and its Type			
Learning Outcome	**Theory (07 hrs)**	**Practical (03 hrs)**	**Duration (10 Hrs)**
1. Identify the importance and role of electric vehicle.	1. Introduction and history of electric vehicles	1. Identify the Electric Vehicles in your city. 2. Note down the name of EV manufacturer.	02
2. Demonstrate the social and environment impact of electric vehicle	1. Social and environmental importance of electric vehicles.	1. Identify the components of EV 2. List the advantages and disadvantages of EVs over other vehicles.	02
3. Describe the role of EV Service Assistant.	1. Duties of EV Service Assistant.	1. List the duties of EV service assistant.	01
4. Identify the Job opportunities of an EV service assistant.	1. Jobs in different section on EV sector.	1. List the job opportunities in EV sector.	02
5. Demonstrate the Indian EV manufacturing market.	1. Scenario of Indian EV manufacturing market. 2. Policies and schemes by Indian Govt. (PLI and fame 1)	1. List the important EV manufacturer in India. 2. Identify the different products and model in EV.	02
6. List the various types of EV's and different products/ models manufactured by Original Equipment Manufacturers (OEMs)	1. Various types of EV's and different products/ models manufactured by Original Equipment Manufacturers (OEMs)	1. List the different EVs model manufactured by OEMs 2. Identify the local assembler of EV	01
Total			**10 Hrs**

Unit 2: Major Components and System of Electric Vehicles			
Learning Outcome	**Theory (06 hrs)**	**Practical (12 hrs)**	**Duration (20 Hrs)**
1. Describe the working principle of EV	1. Basic working principle of EV,	1. Make a line drawing of working of EV.	05

2. Demonstrate the major components and its working, interconnections of various systems of an EV.	1. Major components of EV: - 1. Traction battery pack 2. DC-DC Converter, DC-AC converter and AC-DC converter 3. Charge Port 4. Onboard charger 5. Electric motors 6. Power invertor 7. Charging ports 8. Controller 9. Auxiliary batteries 10. Thermal system(cooling) 11. Transmission system 12. Regenerative Braking System	1. Identify the components of EV 2. Note down the given specification and technical details of components used in EV 3. Compare the model of Electric vehicle's specification between different components (two-wheeler, etc. 4. Draw a diagram for transmission system of EV.	10
3. Demonstrate the basic Electric terminology used in EV.	1. Fundamental terms, laws and principles used in electricity used in EV (Ohms, current, voltage, resistance, series and parallel circuit, power calculation).	1. Perform the practical based on electric terms, laws and principles used in EV (Ohms, current, voltage, and resistance, power calculation, parallel and series circuits).	03
4. Describe various symbols, units and terms used in wiring diagrams associated with electrical/ electric systems/ components of an EV.	1. Various electrical and electronic signals such as electrical inputs, outputs, voltage, pulse width modulation, digital signal (including infra-red and fiber optics) etc.	1. Demonstrate and label the wiring diagrams associated with electrical/ electric systems/ components of an EV.	02
Total			**20Hrs**

Unit 3: Workshop and Tools			
Learning Outcome	**Theory (05 hrs)**	**Practical (10 hrs)**	**Duration (15 Hrs)**
1. Demonstrate the hand and cutting tools for Workshop.	1. Importance and use of insulated hand tools (open end spanners, double end ring spanners, socket spanners with accessories, T spanners, Screw Drivers, Hammers, Files, Mallet, Pliers, Bench Vice etc.)	1. Identify and label different insulated tools. 2. Perform the practical work in lab by using hand and cutting tools.	03
2. Identify the various types of the measuring	1. Role of measuring tools and its type.	1. Identify and label the measuring tools.	03

tools used in EV workshop.	-Introduction and uses of measuring tools - Scale, Calipers (Internal and outer), Micrometer, Vernier Caliper, Feeler Gauge, Dial Gauge with accessories, Tachometer, Air pressure gauge, Compression Tester, Vacuum Tester, Multi-meter, clamp meter etc.	2. Perform the practical work in lab using measuring tools (Scale, Calipers (Internal and outer), Micrometer, Vernier Caliper, Feeler Gauge, Dial Gauge with accessories, Tachometer, Air pressure gauge, Compression Tester, Vacuum Tester, Multi-meter, clamp meter etc.).	
3. Describe the working of Electric tools.	1. Role of electric/Power Tool and its types used in EV - Introduction and uses of Power tools (Electric Gun, Grinder (Bench), Hand Drill machine, Air hoses blower etc.), use of Power Tools	1. Identify the power/ electric tools in EV. 2. Demonstrate the power tools used in EV.	03
4. Identify about machine tools and material used in workshop.	1. Role of machine Tools (Pullers, Torque Wrench, Dry Face holder, Drifts, Dies and tapes, Magnet Center Holder, etc.)	1. Operate the different types of machine tools. 2. List of material used in workshop.	03
5. Demonstrate the Diagnostic tool service equipment's	1. Role of Diagnostic Tools, Procedure to connect Diagnostic Tools 2. Introduction and uses of Service Equipment's with safety measures.	1. List the activities need to perform for preparing an EV for fault identification and repairing work. 2. Describe five safety rules for electrical work on HV systems before starting the work.	03
Total			**15Hrs**

Unit 4: Routine Service and Repair of an EVs			
Learning Outcome	**Theory (10 hrs)**	**Practical (30 hrs)**	**Duration (40 Hrs)**
1. Identify about the importance of maintenance schedule.	1. Introduction to maintenance in EV 2. Types of maintenance (Periodic maintenance, schedule maintenance,	1. Fill the check list of routine maintenance schedule. 2. Draw the flow chart of service layout for Electric vehicle Maintenance.	05

	breakdown maintenance etc.)		
2. Identify various sources of information available for assessing service and repair requirements of the EV.	1. Various sources of information available for assessing service and repair requirements of the EV.	1. Demonstrate how to support and electric vehicle service technician during diagnosing faults in the sub assembly, electric and electronic components of EV. 2. Operate to support an EV service assistant during checking of the EV for service and repair requirements.	10
3. Identify standard schedule and check list recommended by the OEM / auto components and auto manufacture for servicing of EV.	1. Standard schedule provides by the OEM	1. Assist OEMs with technical assistance via OEM technical information /assistant portals by providing demonstrations on the use of a computer and online applications	05
4. Describe Standard Operating Procedure (SOP) for receiving vehicles, opening job card, allocation of work. invoicing vehicle delivery handling complaints	1. Basic principle of SOP for Automobile Industry 2. Describe the organization/ professional code of ethics and standards of practice	1. Demonstrate how to perform routine service repairing and maintenance activities on the various system, aggregate of an EV as per as SOP	05
5. Identify various of faults and its repairing procedure.	1. Basic Initial faults in EV. 2. Symptoms of technical faults their causes and rectification procedure in EV.	1. Checking the initial faults in EV such as battery charge, battery water, break oil, gear oil, coolant level if fitted in the vehicle.	10
6. Identify the importance of HV (**High Voltage**) activity being conducted around workstation prior to commencement of work.	1. The importance of HV (High Voltage) activity being conducted around workstation prior to commencement of work.	1. Elaborate ways to work on the HV systems which do not require isolation, troubleshooting and replacing parts on the active HV system.	05
Total			**40 Hrs**

Unit 5: Health and Safety Equipment			
Learning Outcome	**Theory (02 hrs)**	**Practical (03 hrs)**	**Duration (05 Hrs)**
1. Demonstrate the safety consideration for Electric Vehicles	1. Different type of safety aspects. 2. Electric safety 3. Functional safety 4. Battery charging safety, chemical safety / explosion hazards 5. Vehicles maintenance and operation training	1. Make a list of safety aspect and safety tools.	02
6. Demonstrate the Personal Protective Equipment (PPE)	1. Introduction and requirement of Personal Protective Equipment (PPE) in workshop	1. Demonstrate the Personal protective Equipment Kit. 2. Functions of the different service equipment's used in workshop with safety Precautions. 3. Demonstrate the correct way of wearing and removing PPE such as face masks, hand gloves, face shields, PPE suits, etc.	03
Total			05 Hrs

CLASS 10

Part A - Employability Skills

S.No.	Units	Duration (hrs)
1.	Communication Skills – II	20
2.	Self-management Skills – II	10
3.	Information and Communication Technology Skills – II	20
4.	Entrepreneurial Skills – II	15
5.	Green Skills – II	10
	Total	**75**

UNIT 1: COMMUNICATION SKILLS – II			
Learning Outcome	**Theory (12 hrs)**	**Practical (08 hrs)**	**Duration (20 hrs)**
1. Demonstrate the knowledge of various methods of communication	1. Methods of communication 2. Communication process and elements	1. Role-play on communication process 2. Group discussion on the effects of elements of communication cycle.	05
2. Describe the types of verbal communication	1. Verbal communication 2. Types of verbal communication 3. Advantages and disadvantages of Verbal communication 4. Mastering Verbal communication	1. Role-play of a telephonic conversation 2. Chart preparation on types of verbal communication 3. Group discussion on the advantages and disadvantages of verbal communication 4. Group activity on delivering a speech and practicing public speaking.	02
3. Demonstrate the knowledge of non-verbal communication	1. Non-verbal communication 2. Importance of Non–verbal communication 3. Types of non-verbal communication 4. Visual communication	1. Role plays on non-verbal communication 2. Group discussion and practice on how to avoid body language mistakes 3. Group discussion on three methods of communication	02
4. Describe the communication cycle and importance of feedback	1. Communication cycle and importance of feedback 2. Feedback 3. Types of feedback 4. Importance of feedback	1. Role play on providing feedback 2. Group activity on constructive feedback	02

5. Identify the barriers to effective communication	1. Barriers to Effective communication 2. Effective communication 3. Barriers to effective communication • Physical barriers • Linguistic barrier • Interpersonal barriers • Organizational barriers • Culture barriers 4. Ways to overcome barriers to effective communication	1. Role play on barriers to effective communication 2. Group activity on overcoming barriers to effective communication 3. Chart preparation on barriers to effective communication	04
6. Demonstrate the knowledge of parts of speech	1. Writing skills – Parts of speech 2. Capitalization 3. Punctuations 4. Basics of parts of speech 5. Supporting parts of speech • Article • Conjunctions • Prepositions • Interjections	1. Reading paragraph and sentences and identifying parts of speech 2. Group activity on sentence construction 3. Identifying nouns by guessing the name, place, animal, or thing	03
7. Write sentences	1. Writing Skills - Sentences 2. Parts of sentence 3. Types of objects 4. Types of sentences • Active • Passive 5. Paragraphs	1. Making sentences using direct and indirect objects 2. Writing a paragraph using active and passive voice 3. Framing different types of sentences (i.e., declarative, exclamatory, interrogative and imperative)	02
Total			**20**

UNIT 2: SELF-MANAGEMENT SKILLS – II			
Learning Outcome	**Theory (05 hrs)**	**Practical (05 hrs)**	**Duration (10 hrs)**
1. Apply stress management techniques	1. Stress management 2. Stress and Stress management techniques 3. Management technique 4. Ability to work independently 5. Emotional intelligence	1. Role Play on avoiding stressful situation 2. Activity on listing stressful situations and discussing the stress management techniques like yoga, deep	02

		breathing exercises etc.	
2. Identify strengths and weaknesses of self	1. Self-Awareness – Strength and Weakness Analysis 2. Knowing yourself 3. Strength and weakness analysis 4. Techniques for identifying strengths and weaknesses 5. Difference between interests and abilities	1. Group discussion on aim and goal in life 2. Perform a strength and weakness analysis 3. Group discussion on interests and abilities	02
3. Demonstrate the knowledge of self-motivation	1. Self-Motivation 2. Types of motivation 3. Qualities of self-motivated people 4. Building self–motivation	1. Group discussion on staying motivated 2. Activity on listing the ways to motivate oneself	02
4. Set SMART goals	1. Self-Regulation – Goal Setting 2. Goals and Setting SMART goals 3. How to set goals • Specific • Measurable • Achievable • Realistic • Time bound	1. Group activity on setting SMART goals 2. Writing long- term and short-term goals 3. Activity on listing the ways to surely set SMART goals	02
5. Demonstrate the knowledge of time management	1. Self-Regulation – Time Management 2. Time management and its importance 3. Example and non-example of time management 4. Four steps for effective time management • Organise • Prioritise • Control • Track 5. Tips for practicing the four steps of effective time management	1. Preparing a list of activities to practice time management 2. Discussion on how to manage time to reach school on time	02
Total			**10**

UNIT 3: INFORMATION AND COMMUNICATION TECHNOLOGY SKILLS – II			
Learning Outcome	**Theory (08 hrs)**	**Practical (12 hrs)**	**Duration (20 hrs)**
1. Perform basic computer operations	1. Basics computer operations 2. Computer hardware and software 3. Starting a computer 4. Shutting down a computer 5. Using keyboard 6. Using a mouse • Roll over or hover • Point and click • Drag and drop • Double click	1. Demonstration on use of computers 2. Group activity on using the keyboard	12
2. Apply basic file operations	1. Performing basic file operations 2. Basic File Operations 3. Files and folders • Creating a file • Creating a folder	1. Practice of creating a folder	02
3. Demonstrate computer care and maintenance	1. Computer care and Maintenance 2. Importance of care and maintenance of computers 3. Basic tips for taking care of devices • Cleaning computer devices • Preparing maintenance schedule for computers • Taking backup data • Scanning and cleaning viruses • Removing SPAM files	1. Group activity on preparing a chart on care and maintenance of computer	03
4. Describe the importance of maintaining computer security and privacy	1. Computer security and privacy 2. Computer security deals with protecting computer • Reasons for security breach • Threats to computer • Protecting your data	1. Group activity on preparing an infographic chart on computer security and privacy	03
Total			**20**

UNIT 4: ENTREPRENEURIAL SKILLS – II			
Learning Outcome	**Theory (06 hrs)**	**Practical (09 hrs)**	**Duration (15 hrs)**
1. Describe the meaning of entrepreneurship	1. Entrepreneurship and society 2. Activities of entrepreneurs: • Fulfil customer needs • Use local materials • Help society • Create job • Share wealth • Lower price product	1. Group work on finding the problems in school campus and turning them into business opportunities	05
2. Identify the qualities and functions of an entrepreneur	1. Qualities and functions of an entrepreneur 2. Qualities of an entrepreneur	1. Activity on self-assessment of entrepreneurial qualities 2. Brainstorming on solving a problem in their area 3. Taking an interview of an entrepreneur	03
3. Demonstrate the myths and realities about Entrepreneurship	1. Misconceptions and myths about entrepreneurship	1. Group activity on identifying everyday heroes 2. Activity on interviewing the entrepreneurs 3. Group activity on making items and selling to someone	04
4. Demonstrate entrepreneurship as a career option	1. Entrepreneurship as a career option 2. Meaning of career • Ways of earning a living • Self-employment 3. Wage employment 4. Entrepreneur career process • Enter • Survive • Grow	1. Brainstorming on entrepreneurship as a life option 2. Group discussion on the power of entrepreneurship	03
Total			**15**

UNIT 5: GREEN SKILLS – II			
Learning Outcome	**Theory (07 hrs)**	**Practical (03 hrs)**	**Duration (10 hrs)**
1. Demonstrate the knowledge of green skills	1. Sustainable Development 2. Importance of sustainable development 3. Problems related to sustainable development 4. Sustainable development Goals 5. Sustainable development initiatives 6. Sustainable process	1. Group activity on creating garden in the school or planting tree saplings 2. Group discussion on "How to prevent wastage"	05
2. Describe the role of self in sustainable development	1. Our role in sustainable development 2. Our role towards Sustainable Development • Quality education • Clean water and sanitation • Affordable and clean energy • Decent work and economic growth • Reducing inequalities • Creating sustainable cities and communities • Responsible consumers and producers • Protect life below water • Protect life on land	1. Group discussion on conservation and protection of environment 2. Group activity on organizing an art project using waste	05
Total			**10**

Part B: Vocational Course

S. No.	Units	Duration (Hrs.)
1.	Unit 1: Routine Service and Repair of 2/3 Wheeler	25
2.	Unit 2: Routine Service and Repair of Four-Wheeler Electric Vehicle.	25
3.	Unit 3: Routine Service and Repair Heavy Commercial of Electric Vehicle	25
4.	Unit 4: Optimize Resource Utilization	10
5.	Unit 5: Innovations and Development in Electric Vehicle	10
	Total	**95**

Unit 1: Routine Service and Repair of Two and Three EV			
Learning Outcome	**Theory (5 hrs)**	**Practical (20 hrs)**	**Duration (25 Hrs)**
1. Demonstrate the various components of a 2/3-wheeler EV.	1. Various components /aggregates and the manufacturer's specifications of a 2/3-wheeler EV.	1. Identify and label the various components of a 2/3-wheeler EV. 2. Park a 2/3-wheeler EV in the workshop's designated service/repair work.	02
2. Identify basic technology used, functioning and interconnections of various systems and components of a 2/3-wheeler EV.	1. Basic technology used, functioning and interconnections of various systems and components of a 2/3-wheeler EV.	1. Identify and read how to factory reset the EVs (related to software and information display). 2. Diagnosing faults with service technician in the sub-assemblies and electrical/ electronic components of a 2/3-wheeler EV.	03
3. Demonstrate the Types of tools and equipment used in different processes of a 2/3-wheeler EV maintenance.	1. Types of tools and equipment used in different processes of a 2/3-wheeler EV maintenance	1. Identify and label the different types of tools and equipment used in processes of a 2/3-wheeler EV maintenance	05
4. Reading of owner's (manufacturer) and service manual	1. Owner manual 2. Service manual 3. Important instruction for operating the EV. 4. Important instruction for repair and maintenance procedure 5. Job card, features	1. Reading of owner's manual 2. Reading of service Manual and noting down the importance instruction. 3. Filling of the job card	
5. Identify different types of faults, causes, and rectification procedure and repairing work.	1. Types of faults, causes, and rectification procedure and repairing work. 2. Identify the information derived from the instructions received from service technician related to service and	1. List the activities need to perform for preparing a 2/3-wheeler EV for fault identification and repairing work. 2. List and Demonstrate with Service Technician while checking an Electric Vehicle of a 2/3-wheeler EV for service and repair requirement	12

	maintenance of a 2/3-wheeler EV. 3. Types of tools and equipment used in different processes of a 2/3-wheeler EV maintenance. 4. List the activities need to perform for preparing a 2/3-wheeler EV for fault identification and repairing work.	3. Assist to dismantle the various components of a 2/3-wheeler EV with help of Service Technician. 4. Cleaning and condition of dismantled mechanical and electrical components of a 2/3-wheeler EV. 5. Service and repairing activities on the various systems/ aggregates of a 2/3-wheeler EV. 6. Checking of the performance of a 2/3-wheeler EV/ aggregate post repair with the help of an Electric Vehicle Service Technician. 7. Demonstrate the different types of faults, causes, and rectification procedure and repairing work.	
6. Identify Health and safety measures and regulations w.r.t. Equipment and components during fault diagnosis.	1. The health and safety measures and regulations w.r.t. Equipment and components during fault diagnosis.	1. Enlist the health and safety measures and regulation	03
TOTAL			**25 Hrs**

Unit 2: Routine Service and Repair of Electric Four-Wheeler			
Learning Outcome	**Theory (5 hrs)**	**Practical (20 hrs)**	**Duration (25 Hrs)**
1. List the various components of a Four-wheeler EV.	1. Various components /aggregates and the manufacturer's specifications of a Four-wheeler EV.	1. Identify and label the various components of a Four-wheeler EV. 2. Park a Four-wheeler EV in the workshop's designated service/repair area during electrical work. -Unplug the high voltage area of EV four-wheeler	02

2. Identify basic technology used, functioning and interconnections of various systems and components of a four-wheeler EV.	1. Basic technology used, functioning and interconnections of various systems and components of a four-wheeler EV.	1. Diagnosing faults with service technician in the sub-assemblies and electrical/ electronic components of a four-wheeler EV.	03
3. Demonstrate the types of tools and equipment used in different processes of a four-wheeler EV maintenance.	1. Types of tools and equipment used in different processes of a four-wheeler EV maintenance.	1. Identify and label the different types of tools and equipment used in different processes of a four-wheeler EV maintenance.	02
4. Reading of owner's (manufacturer) and service manual	1. Owner manual 2. Service manual 3. Important instruction for operating the EV. 4. Important instruction for repair and maintenance procedure 5. Job card, features	1. Reading of Owner's Manual 2. Reading of Service Manual and noting down the importance instruction. 3. Filling of the job card	03
5. Identify different types of faults, causes, and rectification procedure and repairing work.	1. Types of faults, causes, and rectification procedure and repairing work. 2. Information derived from the instructions received from service technician related to service and maintenance of a four-wheeler EV. 3. List the activities need to perform for preparing a four-wheeler EV for fault identification and repairing work.	1. List the activities need to perform for preparing a four-wheeler EV for fault identification and repairing work. 2. List and Demonstrate with Service Technician while checking an Electric Vehicle of a four-wheeler EV for service and repair requirements. 3. Assist to dismantle the various components of a four-wheeler EV with help of Service Technician. 4. Cleaning and condition of dismantled mechanical and electrical components of a four-wheeler EV. 5. Perform service and repairing activities on the various systems/aggregates of a four-wheeler EV. 6. Checking of the performance of a four-wheeler EV/ aggregate post repair with the help of an Electric Vehicle Service Technician. 7. Demonstrate the different types of faults, causes, and rectification	12

		procedure and repairing work.	
6. Identify the Health and safety measures and regulations w.r.t. Equipment and components during fault diagnosis.	1. Explain the health and safety measures and regulations w.r.t. Equipment and components during fault diagnosis.	1. Enlist the health and safety measures and regulation	03
Total			**25 Hrs**

Unit 3: Routine Service and Repair of Heavy Commercial Electric Vehicle			
Learning Outcome	**Theory (5 hrs)**	**Practical (20 hrs)**	**Duration (25 Hrs)**
1. List the various components of a heavy commercial Electric Vehicle.	1. Various components /aggregates and the manufacturer's specifications of a heavy commercial Electric Vehicle.	1. Identify and label the various components of a heavy commercial Electric Vehicle. 2. Park heavy commercial Electric Vehicle in the workshop's designated service/repair area during electrical work.	02
2. Identify basic technology used, functioning and interconnections of various systems and components of a heavy commercial Electric Vehicle.	1. Basic technology used, functioning and interconnections of various systems and components of a heavy commercial Electric Vehicle.	1. Diagnosing faults with service technician in the sub-assemblies and electrical/ electronic components of a heavy commercial Electric Vehicle.	03
3. Demonstrate the Types of tools and equipment used in different processes of a heavy commercial Electric Vehicle maintenance.	1. Types of tools and equipment used in different processes of a heavy commercial Electric Vehicle maintenance.	1. Identify and label the different types of tools and equipment used in different processes of a heavy commercial Electric Vehicle maintenance	02
4. Reading of owner's (manufacturer) and service manual	1. Owner manual 2. Service manual 3. Important instruction for operating the EV. 4. Important instruction for repair and	1. Reading of owner's manual 2. Reading of service Manual and noting down the importance instruction. 3. Filling of the job card	03

	maintenance procedure 5. Job card, features		
5. Identify different types of faults, causes, and rectification procedure and repairing work.	1. Types of faults, causes, and rectification procedure and repairing work. 2. Identify the information derived from the instructions received from service technician related to service and maintenance of a heavy commercial Electric Vehicle. 3. List the activities need to perform for preparing a heavy commercial Electric Vehicle for fault identification and repairing work.	1. List the activities need to perform for preparing a heavy commercial Electric Vehicle for fault identification and repairing work. 2. List and Demonstrate with Service Technician while checking an Electric Vehicle of a heavy commercial Electric Vehicle for service and repair requirements. 3. Dismantle the various components of a heavy commercial Electric Vehicle with help of Service Technician. 4. Cleaning and condition of dismantled mechanical and electrical components of a heavy commercial Electric Vehicle. 5. Perform service and repairing activities on the various systems/aggregates of a heavy commercial Electric Vehicle. 6. Checking of the performance of a heavy commercial Electric Vehicle/ aggregate post repair with the help of an Electric Vehicle Service Technician. 7. Demonstrate the different types of faults, causes, and rectification procedure and repairing work.	12

6. Identify Health and safety measures and regulations w.r.t. Equipment and components during fault diagnosis.	1. Explain the health and safety measures and regulations w.r.t. Equipment and components during fault diagnosis.	1. Enlist the health and safety measures and regulation	03
Total			**25 Hrs**

Unit 4: Optimize Resource Utilization			
Learning Outcome	**Theory (4 hrs)**	**Practical (6 hrs)**	**Duration (10 Hrs)**
1. Demonstrate the ways to optimize usage of resources.	1. Optimize usage of resources and its methods.	1. Perform basic checks to Identify any spills and leaks and that need to be plugged/ stopped.	**02**
2. Identify various methods of waste management and its disposal.	1. Different categories of Waste. 2. Various methods of waste management and its disposal.	1. List the different categories of waste and Identify them for the purpose of segregation 2. Demonstrate different disposal techniques depending upon different types of waste. 3. Understand the procedure to contact OEMs for disposing waste.	**02**
3. Differentiate recyclable and non- recyclable waste	1. Differentiate between recyclable and non-recyclable waste 2. State the importance of using appropriate colour dustbins for different types of waste.	1. Make a list of recyclable and non- recyclable waste	**02**
4. Identify the common sources of pollution and ways to minimize it.	1. Source of pollution 2. Different methods to minimized the pollution, energy efficient electrical appliances and devices to ensure energy conservation	1. Assign the different ways to check if equipment/ machines are functioning as per requirements and report malfunctioning, if observed. 2. Finding the ways for efficient utilization of material and water 3. Make a list of methods to minimized the pollution	**04**
Total			**10 Hrs**

Unit 5: Innovation and Development			
Learning Outcome	**Theory (5 hrs)**	**Practical (5 hrs)**	**Duration (10 Hrs)**
1. Describe the innovation and development in Electric Vehicles.	1. The innovation and development in Electric Vehicles. • BMS technology • Increased Range • Increased Density • Decreased Cost • Innovative • Vehicle Designs • Toward Complete Electrification.	1. Visit nearest EV service centre and Identify the new technologies used in EV. 2. Make a list of battery management components.	04
2. Demonstrate the charging methods of EV batteries.	1. The charging methods of EV batteries. • Introduction • Charging • Wireless Charging • Quick Charging Charging ports	1. Identify the various list of charging methods. 2. Make a list of different levels of charging ports.	03
3. Identify the improving of battery life and battery swapping technique.	1. Battery life 2. Various types of battery technique. - Cell and battery voltages - Charge and capacity - Number of deep cycles. - Energy store - Self-discharge rates	1. Identify the battery parameters.	03
Total			**10 Hrs**

6. ORGANISATION OF FIELD VISITS

In a year, at least 3 field visits/educational tours should be organised for the students to expose them to the activities in the workplace like. Automobile show room, Automobile Fair, Different section of show room and service centre, Tele caller centre, Service centre Visit an Automobile showroom and service centre and observe the following: During the visit, students should obtain the following information from the owner or the supervisor of the showroom:

1. Activity of Automobile show room
2. Different section of show room and service centre
3. Service centre activity
4. Automobile Fair
5. Different section of showroom
6. Number of Electric Vehicle sold annually
7. Type of Electric vehicle and technology
8. Automation system
9. Denting and painting section
10. Electrical section

11. Auto electrical system

7. LIST OF EQUIPMENT AND MATERIALS

The list given below is suggestive and an exhaustive list should be prepared by the vocational teacher. Only basic tools, equipment and accessories should be procured by the Institution so that the routine tasks can be performed by the students regularly for practice and acquiring adequate practical experience.

Table of Tools and Equipment

S No.	Name of the Tools & Equipment	Specification	No.	COST	TOTAL
A. TRAINEES TOOL KIT					
1.	Safety glasses	(insulated)	08	150	**1200**
2.	Head protection	(insulated)	08	200	**1600**
3.	Safety rescue hook	4 KW (insulated)	04	5000	**20,000**
4.	Insulated Rubber mating	5KW, tension 6mpa, hardness 6.5 shoreA (insulated)	5m	2000	**10,000**
5.	Warning sign stickers		10 pack	200	**2000**
6.	Post and chain	Low polyethene (750mm) Set of 6	6	800	**4800**
7.	Face mask		20	8	**160**
8.	Electric Vehicle Kit (two-wheeler)	Two-wheeler bed kit	02	40,000	**80,000**
9.	Two-wheeler workbench		01	25,000	**25,000**
10.	DC fast Charger	15Kw	01	35,000	**35,000**
11.	Compressor	Trolley type portable air compressor single cylinder with 45 capacity Air tank, along with accessories & with working rating 1.5, pressure 7 bar	01	10,000	**10,000**
12.	Screw Drivers (Insulated)	100 mm to 300 mm (set of 5) 20cm.X 9mm. Blade, 30cm.X 9mm. Blade	03	350	**1,050**

		(insulated)			
13.	Screw Drivers	100 mm to 300 mm (set of 5) 20cm.X 9mm. Blade, 30cm.X 9mm. Blade	03	350	**1,050**
14.	Socket spanner (Insulates)	with speed handle, T-bar, ratchet and universal of 28 pieces with box, upto 32 mm set	01	2200	**2,200**
15.	Insulated Plier	15cm and 20cm	01	165	**165**
16.	Insulated monkey plier	15cm and 20cm	01	125	**125**
17.	Insulated outer inner plier	15cm and 20cm	01	130	**130**
18.	T spanner set insulated	up to 32 mm (Set of 12), complete body cover with insulator (Except Tip)	01	1425	**1425**
19.	Allen key set (Insulated)	2mm to 14mm (set of 12 pieces)	01	9500	**9500**
20.	Digital multimeter	Electronic digital multimeter	01	2000	**2000**
21.	Hammer (set of 4)	0.5 kg, .75 kg with insulated body, 1 Kg hammer, plastic hammer	03	250	**750**
22.	Oil cane	0.5 litre , plastic	01	75	**75**
23.	Tool trolley	300 litre, 680mm *900mm* 460	01	3000	**3000**
24.	Bench vice	250*120, 4 vice 12cm jaw	01	965	**965**
25.	Tyre pressure gauge	Tyre pressure gauge with holding nipple, 4-6inch, 0-14PSI	01	105	**105**
26.	Vernier caliper (electronics)	0-300 mm Least count 0.02	01	6000	**6000**
27.	Micrometer	0-25mm, *0.01m, +/- 0.03mm at 10mm	01	300	**300**
28.	Temperature gauge	0-120cc	01	850	**850**
29.	Hand tools kits		01	1200	**1200**
30.	Safety shoes	insulated	06	800	**4800**

31.	Fire extinguisher	4kg	01	3500	**3500**
32.	Air rachet	with standard accessories, 10 bar	01	9500	**9500**
33.	D.E spanner (insulated)	6 mm to 32 mm (Set of 12 both)	01	285	**285**
34.	Ring spanner (insulated)	6 mm to 32 mm (Set of 12 both)	01	280	**280**
35.	Stud remover	Set of 3	01	675	**675**
36.	Stud remover with socket handle		01	525	**525**
37.	Tap or die	complete sets BSF	01	820	**820**
38.	Torque wrench	5-35Nm	01	5000	**5000**
39.	Tubeless tyre repair kits		01	250	**250**
40.	Thread wear indicator	Thread pitch gauge metric, BSW, up to 5 inches	01	1100	**1100**
41.	4-point relay	20 mega Ohm	01	450	**450**
42.	5-point relay	30 mega Ohm	01	550	**550**
43.	Two-wheeler	Working condition including all main parts	01	60,000	**60,000**
44.	Pneumatic gun		01		
45.	Air pressure gun		01		
46.	Tappet puller		01		
47.	Tappet gauge		01		

List of cut section working model

S.No.	Name of Working Automotive Model	Quantity	Price
1.	Four wheeler Electric vehicle model	1	10,00,000
3	Old second hand cut section lead acid battery	1	2000
4	Old second hand pressure cap	1	150
5	Old second hand thermostat	1	2000
6	Old second hand disc brake	1	1000
8	Four wheelers old second hand Electric vehicle	1	5,50,000
9	working model system Electric vehicle	1	50000

Basic Tool Box

Workshop tool/equipment: drain pan, oil can, jack hydraulic, bench vice, ramp, pneumatic tool, equipment stands, etc.	Pressure indicators: oil pressure gauges, tire pressure gauges etc.	Specialty wrenches: alignment wrenches, chain wrenches, locking wrenches, lug wrenches etc.	Trim or moulding tools: carbon scrapers, gasket scrapers, scrapers, spoons etc.

Measuring equipment: Vernier, calipers, micrometer, feeler gauges, multi-metre, flow meter, temp gauge, dial gauge etc.	Other tools: hand tools, power tools, lifting and jacking equipment, tensioning equipment, brake roller tester, chassis dynamometer, suspension activation, security activator etc.	Tools for other tasks such as cleaning of vehicles, tools, equipment and workshop	Personal Protection Equipment: Gloves, dielectric safety gloves, leather over gloves, Safety Shoes, goggles, ear plugs, boiler suit, insulated rescue pole,
Workshop Safety: Fire extinguishers,	First Aid		

Consumable items: cotton waste, petrol/diesel, lubricant, grease, storage containers, air filters, oil filters, spark plugs, glow plugs etc.

- Worn out/ defective/ spurious samples: seal, gaskets, clutch plate, brake shoes, brake pads, oil filter, air cleaner etc.

Teaching Aids:

Charts, CBTs, LCD Projector and Videos.	Cleaning equipment and solutions	SOP Charts on safety norms and drills
Charts of do's and Don'ts in work area.	Audio/video on English, Hindi or local language course	Reference books
Work books	Study for Soft Skills	CBTs on working on computer
Computer system	UPS	Vehicle service manuals, vehicle hand book, job card, work order, completion material requests, Technical reference books.

8. VOCATIONAL TEACHER'S/ TRAINER'S QUALIFICATION AND GUIDELINES

Qualification and other requirements for appointment of vocational teachers/trainers on contractual basis should be decided by the State/UT. The suggestive qualifications and minimum competencies for the vocational teacher should be as follows:

S.No.	Qualification	Minimum Competencies	Age Limit
1.	Degree in Automobile Engineering /Mechanical Engineering from a recognized Institute /University, with at least 1-year work / teaching experience **OR** Diploma in Automobile	Effective communication skills (oral and written) Basic computing skills.	18-37 years (as on Jan. 01 (year)) Age relaxation to be provided as per Govt. rules.

	Engineering /Mechanical Engineering from a recognized Institute /University, with at least 2-year work / teaching experience **OR** B. Voc in Automotive Engineering/ from a recognized Institute /University, with at least 1 year work/teaching experience		

Vocational Teachers/Trainers form the backbone of Vocational Education being imparted as an integral part of Rashtriya Madhyamik Shiksha Abhiyan (RMSA). They are directly involved in teaching of vocational subjects and also serve as a link between the industry and the schools for arranging industry visits, On-the-Job Training (OJT) and placement.

These guidelines have been prepared with an aim to help and guide the States in engaging quality Vocational Teachers/Trainers in the schools. Various parameters that need to be looked into while engaging the Vocational Teachers/Trainers are mode and procedure of selection of Vocational Teachers/Trainers, Educational Qualifications, Industry Experience, and Certification/Accreditation.

The State may engage Vocational Teachers/Trainers in schools approved under the component of Vocationalisation of Secondary and Higher Secondary Education under RMSA in the following ways:

(i) Directly as per the prescribed qualifications and industry experience suggested by the PSS Central Institute of Vocational Education (PSSCIVE), NCERT or the respective Sector Skill Council (SSC)

OR

Through accredited Vocational Training Providers accredited under the National Quality Assurance Framework (NQAF*) approved by the National Skill Qualification Committee on 21.07.2016. If the State is engaging Vocational Teachers/Trainers through the Vocational Training Provider (VTP), it should ensure that VTP should have been accredited at NQAF Level 2 or higher.

* The National Quality Assurance Framework (NQAF) provides the benchmarks or quality criteria which the different organisations involved in education and training must meet in order to be accredited by competent bodies to provide government-funded education and training/skills activities. This is applicable to all organizations offering NSQF-compliant qualifications.

The educational qualifications required for being a Vocational Teacher/Trainer for a particular job role are clearly mentioned in the curriculum for the particular NSQF compliant job role. The State should ensure that teachers / trainers deployed in the schools have relevant technical competencies for the NSQF qualification being delivered. The Vocational Teachers/Trainers preferably should be certified by the concerned Sector Skill Council for the particular Qualification Pack/Job role which he will be

teaching. Copies of relevant certificates and/or record of experience of the teacher/trainer in the industry should be kept as record.

To ensure the quality of the Vocational Teachers/Trainers, the State should ensure that a standardized procedure for selection of Vocational Teachers/Trainers is followed. The selection procedure should consist of the following:

(i) Written test for the technical/domain specific knowledge related to the sector;
(ii) Interview for assessing the knowledge, interests and aptitude of trainer through a panel of experts from the field and state representatives; and
(iii) Practical test/mock test in classroom/workshop/laboratory.

In case of appointment through VTPs, the selection may be done based on the above procedure by a committee having representatives of both the State Government and the VTP.

The State should ensure that the Vocational Teachers/ Trainers who are recruited should undergo induction training of 20 days for understanding the scheme, NSQF framework and Vocational Pedagogy before being deployed in the schools.

The State should ensure that the existing trainers undergo in-service training of 5 days every year to make them aware of the relevant and new techniques/approaches in their sector and understand the latest trends and policy reforms in vocational education.

The Head Master/Principal of the school where the scheme is being implemented should facilitate and ensure that the Vocational Teachers/Trainers:

(i) Prepare session plans and deliver sessions which have a clear and relevant purpose and which engage the students;
(ii) Deliver education and training activities to students, based on the curriculum to achieve the learning outcomes;
(iii) Make effective use of learning aids and ICT tools during the classroom sessions;
(iv) Engage students in learning activities, which include a mix of different methodologies, such as project based work, team work, practical and simulation based learning experiences;
(v) Work with the institution's management to organise skill demonstrations, site visits, on job trainings, and presentations for students in cooperation with industry, enterprises and other workplaces;
(vi) Identify the weaknesses of students and assist them in up-gradation of competency;
(vii) Cater to different learning styles and level of ability of students;
(viii) Assess the learning needs and abilities, when working with students with different
abilities

(ix) Identify any additional support the student may need and help to make special arrangements for that support;

(x) Provide placement assistance

Assessment and evaluation of Vocational Teachers/Trainers is very critical for making them aware of their performance and for suggesting corrective actions. The States/UTs should ensure that the performance of the Vocational Teachers/Trainers is appraised annually. Performance based appraisal in relation to certain pre-established criteria and objectives should be done periodically to ensure the quality of the Vocational Teachers/Trainers. Following parameters may be considered during the appraisal process:

1. Participation in guidance and counselling activities conducted at Institutional, District and State level;
2. Adoption of innovative teaching and training methods;
3. Improvement in result of vocational students of Class X or Class XII;
4. Continuous up-gradation of knowledge and skills related to the vocational pedagogy, communication skills and vocational subject;
5. Membership of professional society at District, State, Regional, National and International level;
6. Development of teaching-learning materials in the subject area;
7. Efforts made in developing linkages with the Industry/Establishments;
8. Efforts made towards involving the local community in Vocational Education
9. Publication of papers in National and International Journals;
10. Organisation of activities for promotion of vocational subjects;
11. Involvement in placement of students/student support services.

9. LIST OF CONTRIBUTORS

1. Dr Gaurav Saxena, Assistant Professor Automobile Engineering, RustamJi Institute of Technology BSF ACADEMY Tekanpur, Gwalior.

2. Dr Ankit Tiwari, Assistant Professor Electrical and Electronics Engineering, MITS Gwalior

3. Mr. Kuber Singh, Consultant, Department of Mechanical Engineering, AISECT University Bhopal.

4. Mr. Uday Ganesh Paradkar, General Manager, CI Hyundai Trainer, Misrod Bhopal.

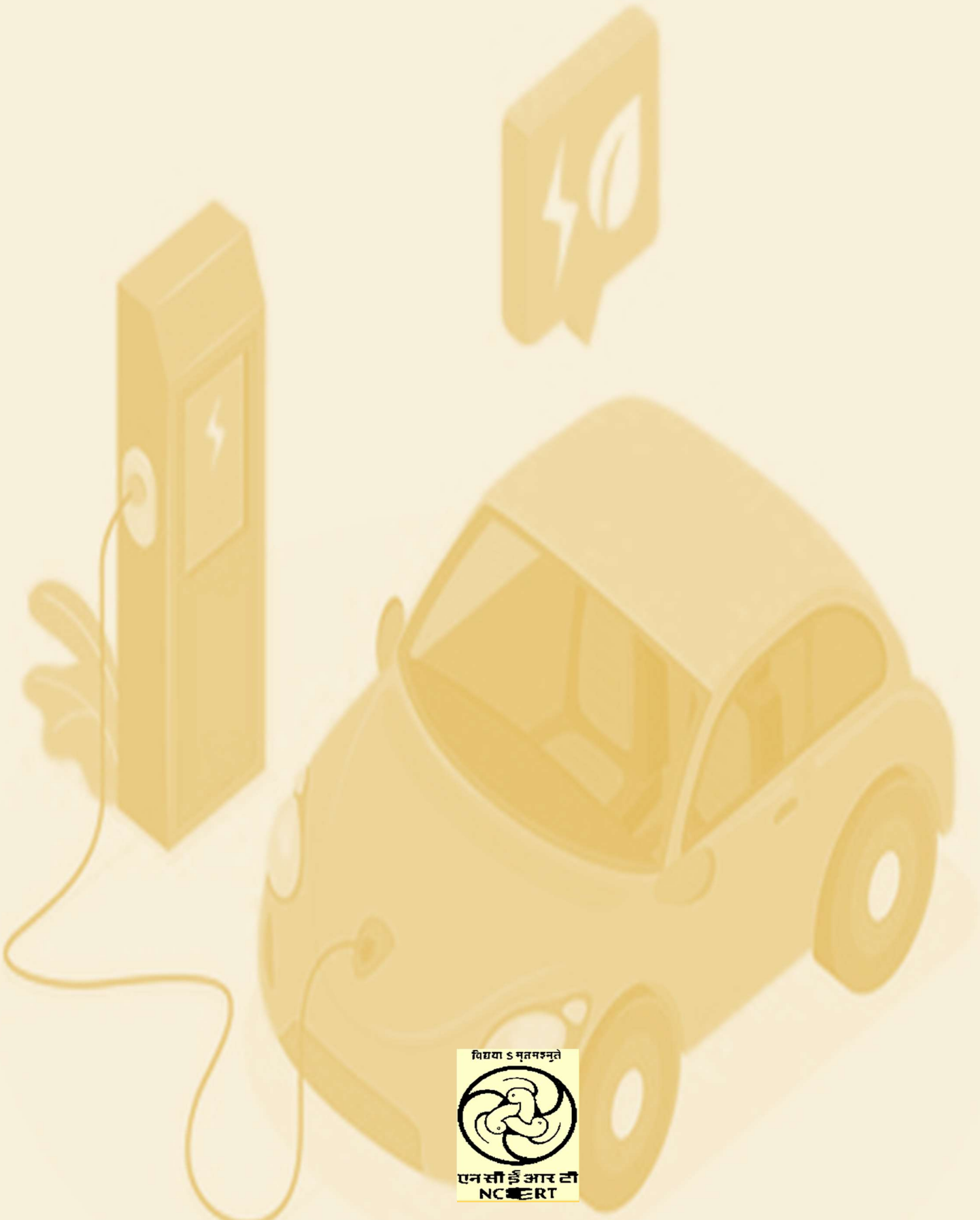
5. Mr. Manoj Darwai, Assistant Professor, DET PSSCIVE, Shymla Hills Bhopal MP 462002.

6. Mr. Sudhir Kumar Vishwakarma, Consultant CRISP, opposite Manas Bhawan, Shymla Hills Bhopal – 462002.

7. Mr. Ankit Singh Chauhan, Assistant Professor Automotive, DET PSSCIVE, Bhopal, MP-462002

Programme Coordinator Reviewer:

1. Dr. Saurabh Prakash, Head, E & T Division, PSSCIVE, Bhopal, M.P. 462002.



PSS CENTRAL INSTITUTE OF VOCATIONAL EDUCATION
Shyamla Hills, Bhopal- 462 002, M.P., India