LEARNING OUTCOME BASED VOCATIONAL CURRICULUM

JOB ROLE: SOLAR EV CHARGING ENTREPRENEUR

(QUALIFICATION PACK: SGJ/Q1801)

SECTOR: GREEN JOBS

GRADE : XI and XII

PSS CENTRAL INSTITUTE OF VOCATIONAL EDUCATION

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

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.

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(a constituent unit of NCERT, under Ministry of Education, Government of India)

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1. COURSE OVERVIEW

COURSE TITLE: SOLAR EV CHARGING ENTREPRENUER

Solar energy is becoming a vital part of clean transportation and green mobility. With the rise of electric vehicles, solar-powered EV charging systems offer new opportunities for reducing fuel dependence and building sustainable businesses. A **Solar EV Charger Entrepreneur** is responsible for planning, site surveys, cost analysis, system design, installation, and safe operation of charging stations. The role also requires business sense, problem-solving, and an understanding of market trends. This course provides practical knowledge of solar EV charging systems. It covers system components, lifecycle costs, installation methods, maintenance, and safety practices. Learners will also study business models, case studies of successful projects, and employability skills. After completing the course, they will be able to set up and manage solar EV charging ventures, preparing for a strong future in the clean energy and mobility sector.

COURSE OBJECTIVES:

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

- Understand the role of a Solar EV Charger Entrepreneur.
- Identify the key components of a solar-powered EV charging system.
- Demonstrate knowledge of tools and equipment used in installation.
- Conduct site surveys and evaluate important parameters for charging station setup.
- Assess lifecycle costs and financial aspects of solar EV charging projects.
- Apply basic technical and business principles in planning charging infrastructure.
- Design layouts for solar-based EV charging systems.
- Install and maintain solar-powered EV charging stations safely.
- Ensure proper operation and management of charging infrastructure.
- Analyze challenges in both grid-connected and solar-based charging systems.
- Study case studies and adopt best practices for successful business models.
- Apply safety measures for handling solar plus grid charging systems.
- Develop employability and entrepreneurial skills for business growth.
- Manage resources and address issues in installation and maintenance.
- Promote clean mobility through sustainable solar EV charging ventures.

COURSE REQUIREMENTS: The learner should be holding a 10th Grade pass certificate.

COURSE DURATION: 600 hrs

Grade 11	: 300 hrs
Grade 12	: 300 hrs
TOTAL	**: 600 hrs**

2. SCHEME OF UNITS AND ASSESMENT

The unit-wise distribution of hours and marks for Grade 11 is as follows:

GRADE 11			
	Units	**No. of Hours for Theory and Practical 300**	**Max. Marks for Theory and Practical 100**
Part A	**Employability Skills**		
	Unit 1: Communication Skills-III	25	**10**
	Unit 2: Self-management Skills-III	25	
	Unit 3: Information and Communication Technology Skills-III	20	
	Unit 4: Entrepreneurial Skills-III	25	
	Unit 5: Green Skills-III	15	
	Total	**110**	**10**
Part B	**Vocational Skills**		
	Unit 1: Introduction to Solar PV Technology	30	**40**
	Unit 2: Basics of Solar EV Charging Station	30	
	Unit 3: Elements of Solar powered EV Charging Station	30	
	Unit 4: Setiing up new venture of Solar EV charging Station	50	
	Unit 5: Market Research and Cost Estimation	25	
	Total	**165**	**40**
Part C	**Practical Work**		
	Practical Examination	06	15
	Written Test	01	10
	Viva Voce	03	10
	Total	**10**	**35**
Part D	**Project Work/Field Visit**		
	Practical File/Student Portfolio	10	10
	Viva Voce	05	05
	Total	**15**	**15**
	Grand Total	**300**	**100**

The unit-wise distribution of hours and marks for Grade12 is as follows:

GRADE 12			
	Units	**No. of Hours for Theory and Practical 300**	**Max. Marks for Theory and Practical 100**
Part A	**Employability Skills**		
	Unit 1: Communication Skills-IV	20	10
	Unit 2: Self-management Skills-IV	10	
	Unit 3: Information and Communication Technology Skills-IV	20	
	Unit 4: Entrepreneurial Skills-IV	15	
	Unit 5: Green Skills-IV	10	
	Total	**75**	**10**
Part B	**Vocational Skills**		
	Unit 1: Site Study for Setting up Solar EV Charging Station	25	40
	Unit 2: Installation of Solar EV Charging Station	40	
	Unit 3: Operations and Management of Solar EV Charging Station	35	
	Unit 4: Management of Lifecycle of the charging station	35	
	Unit 5: Personal Health and Safety	30	
	Total	**165**	**40**
Part C	**Practical Work**		
	Practical Examination	06	15
	Written Test	01	10
	Viva Voce	03	10
	Total	**10**	**35**
Part D	**Project Work/Field Visit**		
	Practical File/Student Portfolio	10	10
	Viva Voce	05	05
	Total	**15**	**15**
	Grand Total	**300**	**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 aides, 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.

4. ASSESSMENT AND CERTIFICATION

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, and 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: 40 marks**

S.No.	Typology of Question	No. of Questions			
		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)	**3**	**2**	**2**	**13**
2.	Understanding – (Comprehension – to be familiar with the meaning and to understand conceptually, interpret, compare, contrast, explain, paraphrase, or interpret information)	**2**	**3**	**2**	**14**

3.	Application – (Use abstract information in a concrete situation, to apply knowledge to new situations: Use given content to interpret a situation, private an example, or solve a problem)	**0**	**2**	**1**	**07**
4.	High Order Thinking Skills – (Analysis and 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**	**2**	**0**	**04**
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	**5x1=5**	**10x2=20**	**5x3=15**	**40**

SKILL ASSESSMENT (PRACTICAL)

Assessment of skills should be done by the assessors/examiners on the basis of practical demonstration of skills by students, 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 effective training in assessment principles and practices. The Sector Skill Councils should ensure that the assessors are provided with training on the assessment of competencies.

Practical Examination: Practical examination allows candidates to demonstrate the knowledge and understanding of performing a task. This will include the performance of tasks and viva voce. Teachers/Examiner will clearly define the tasks that candidates are required to perform during the practical examination. These tasks should align with the learning objectives of the course. Students are to be evaluated based on their skills, technique, accuracy, and overall performance.
For the practical exam, 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. They will assess the candidates' skills, adherence to industry standards, and efficiency in task execution. Special emphasis should be on assessment of the candidate's ability to troubleshoot and solve problems related to the tasks. During the viva voce, focus should be on assessment of candidate's communication skills and understanding of the subject.

Project Work: Project work is a great way to assess the practical skills on a certain period or timeline. Projects should simulate real-world scenarios, allowing students to solve problems or create something tangible using the skills and knowledge they've acquired. Projects should align with the curriculum's learning objectives, ensuring that students are applying relevant concepts and skills. Clear and detailed guidelines, including project objectives, evaluation criteria, and deadlines should be provided by the teachers/assessors. Rubrics, which would include aspects like content, creativity, organization, presentation, and adherence to deadlines, should be used by the Assessors to establish specific criteria for marking or grading.

Field visits can be followed by the submission of reports by the students, based on checklist. Teachers will develop a detailed checklist of items or questions students need to address during the visit. This could include specific observations, data collection, interviews, etc. Teachers will assess the reports based on the completeness of checklist items, depth of observations, analysis, and overall presentation. After the visit, teachers will also encourage students to reflect on their field experience, for example what students learned, how will they apply the knowledge gained through the field visit, etc.

Student Portfolio is a compilation of documents that supports the students' claim of competence. Documents may include reports, articles, and photos of products prepared by students in relation to the unit of competency. Copies of certificates and awards received for academic achievements, extracurricular activities, or competitions may also be included in the portfolio. Student's portfolio may also include personal reflections of the students on their learning journey, challenges faced, and lessons learned.

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.

5. UNIT CONTENTS

GRADE 11

Part A: Employability Skills

S.No.	Units	Duration (hrs)
1.	Communication Skills-III	25
2.	Self-management Skills-III	25
3.	Information and Communication Technology Skills-III	20
4.	Entrepreneurial Skills-III	25
5.	Green Skills-III	15
	Total	**110**

UNIT 1: COMMUNICATION SKILLS – III			
Learning Outcome	**Theory (10 hrs)**	**Practical (15 hrs)**	**Duration (25 hrs)**
1. Demonstrate the knowledge of communication.	1. Introduction to the 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. Classroom discussion on the 7Cs (i.e. Clear, Concise, Concrete, Correct, Coherent, Courteous and Complete) for effective communication.	03

2. Demonstrate verbal communication.	1. Verbal Communication. 2. Public Speaking.	1. Role-play of a phone conversation. 2. Group activity on delivering a speech and practicing public speaking.	02
3. Demonstrate non-verbal communication.	1. Importance of non-verbal communication. 2. Types of non- verbal communication. 3. Visual Communication.	1. Role-play on non-verbal communication. 2. Group exercise and discussion on Do's andDon'ts to avoid body language mistakes. 3. Group activity on methods of communication.	02
4. Demonstrate speech using correct pronunciation.	1. Pronunciation basics. 2. Speaking properly. 3. Phonetics. 4. Types of sounds.	1. Group activities on practicing pronunciation.	01
5. Apply an assertive communication style.	1. Important communication styles. 2. Assertive communication. 3. Advantages of assertive communication. 4. Practicing assertive Communication.	1. Group discussion on communication styles. 2. Group discussion on observing and sharing communication styles.	03
6. Demonstrate the knowledge of saying no.	1. Steps for saying 'No' Connecting words.	1. Group discussion on how to say 'No'?	02
7. Identify and use parts of speech in writing.	1. Capitalization. 2. Punctuation. 3. Basic parts of speech Supporting parts ofspeech.	1. Group activity on identifying parts of speech. 2. Writing a paragraph with punctuation marks. 3. Group activity on constructing sentences. 4. Group activity on identifying parts of speech.	03
8. Write correct sentences andparagraphs.	1. Parts of a sentence. 2. Types of object. 3. Types of sentences Paragraph.	1. Activity on framing sentences. 2. Activity on active and passive voice. 3. Assignment on writing different types of sentences.	02
9. Communicate with people.	1. Greetings Introducing self and others.	1. Role-play on formal and informal greetings. 2. Role-play on introducing someone. 3. Practice and group	02

		discussion on how to greet different people.	
10. Introduce yourself to others and write about oneself.	1. Talking about self Filling a form.	1. Practicing self-introduction and fillingup forms. 2. Practicing self-introduction to others.	01
11. Develop questioning skill.	1. Main types of questions. 2. Forming closed and open-ended questions.	1. Practice exercise on forming questions. 2. Group activity on framing questions.	01
12. Communicate information about family to others.	1. Names of relatives Relations.	1. Practice talking about family. 2. Role-play on talking about family members.	01
13. Describe habits and routines.	1.Concept of habits and routines.	1. Group discussion on habits and routines. 2. Group activity on describing routines.	01
14. Ask or give directions to others.	1. Asking for directions Using landmarks.	1. Role-play on asking and giving directions. 2. Identifying symbols used for giving directions.	01
		Total	**25**

UNIT 2: SELF-MANAGEMENT–III			
Learning Outcome	**Theory (10 hrs)**	**Practical (15 hrs)**	**Duration (25 hrs)**
1. Identify and analyze own strengths andweaknesses.	1. Understanding self. 2. Techniques for identifying strengthsand weaknesses. 3. Difference between interests and abilities.	1. Activity on writing aimsin life. 2. Preparing a worksheeton interests and abilities.	03

2. Demonstrate personal grooming skills.	1. Guidelines fordressing and grooming. 2. Preparing a personal grooming checklist.	1. Role-play on dressing and grooming standards. 2. Self-reflection activity on various aspects of personal grooming.	04
3. Maintaining personal hygiene.	1. Importance of personal hygiene. 2. Three steps to personal hygiene. 3. Essential steps of hand washing.	1. Role-play on personal hygiene. 2. Assignment on personal hygiene.	03
4. Demonstrate the knowledge of working in a teamand participating in group activities.	1. Describe the benefits of teamwork. 2. Working in a team.	1. Assignment on working in a team. 2. Self-reflection on team work.	03
5. Develop networking skills.	1. Benefits of networking skills. 2. Steps to build networking skills.	1. Group activity on networking in action. 2. Assignment on networking skills.	03
6. Describe the meaning and importance of self-motivation.	1. Meaning of self-motivation. 2. Types of motivation Steps to building self-motivation.	1. Activity on staying motivated. 2. Assignment on reasons hindering motivation.	03
7. Set goals.	1. Meaning of goals and purpose of goal-setting Setting SMART goals.	1. Assignment on setting SMART goals. 2. Activity on developing long-term and short- term goals using SMART method.	03
8. Apply time management strategies and techniques.	1. Meaning and importance of time management Steps for effective time management.	1. Preparing a checklist of daily activities.	03
		Total	**25**

UNIT 3: INFORMATION AND COMMUNICATION TECHNOLOGY-III			
Learning Outcome	**Theory (08 hrs)**	**Practical (12 hrs)**	**Duration (20 hrs)**

1. Create a document on the word processor.	1. Introduction to ICT. 2. Advantages of using a word processor. 3. Work with Libre Office Writer.	1. Demonstration and practice of the following: • Creating a new document • Typing text • Saving the text • Opening and saving afile on Microsoft Word/Libre Office Writer.	02
2.Identify icons on thetoolbar.	1. Status bar. 2. Menu bar. 3. Icons on the Menu bar. 4. Multiple ways to perform a function.	1. Group activity on using basic user interface of LibreOffice writer. 2. Group activity on working with Microsoft Word.	02
3. Save, close, open and print document.	1. Save a word document. 2. Close a word document. 3. Open an existing document. 4. Print.	1. Group activity on performing the functions for saving, closing and printing documents in LibreOffice Writer. 2. Group activity on performing the functions 3. for saving, closing and printing documents in Microsoft Word.	02
4.Format text in a word document.	1. Change style and size of text. 2. Align text. 3. Cut, Copy, and Paste, Find and replace.	1. Group activity on formatting text in LibreOffice Writer. 2. Group activity on formatting text in Microsoft Word.	02
5. Check spelling and grammar in a word document.	1. Use of spell checker Autocorrect.	1. Group activity on checking spellings and grammar using LibreOffice Writer. 2. Group activity on checking spellings andgrammar using Microsoft Word.	02
6. Insert lists, tables, pictures, and shapes in a word document.	1. Insert bullet list. 2. Number list. 3. Tables. 4. Pictures Shapes.	1. Practical exercise of inserting lists and tables using LibreOffice Writer.	03

7. Insert header, footer and page number in a word document.	1. Insert header. 2. Insert footer. 3. Insert pagenumber Page count.	1. Practical exercise of inserting header, footer and page numbers in LibreOffice Writer. 2. Practical exercise of inserting header, footer and page numbers in Microsoft Word.	03
8. Make changes by using the track change option in aword document.	1. Tracking option. 2. Manage option Compare documents.	1. Group activity on performing track changes in LibreOfficeWriter. 2. Group activity on performing track changes in Microsoft Word.	04
		Total	**25**

4: ENTREPRENEURSHIP SKILLS – III			
Learning Outcome	**Theory (10 hrs)**	**Practical(15 hrs)**	**Duration (25 hrs)**
1. Differentiate between different kinds of businesses.	1. Introduction to entrepreneurship. 2. Types of business activities.	1. Role-play on different kinds of businesses around us.	03
2. Describe the significance of entrepreneurial values.	1. Meaning ofvalue. 2. Values of an Entrepreneur. 3. Case study on qualities of an entrepreneur.	1. Role-play on qualities of an entrepreneur.	03
3. Demonstrate the attitudinal changes required to become an entrepreneur.	1. Difference between the attitude of entrepreneur and employee.	1. Interviewing employees and entrepreneurs.	03
4 Develop thinking skills like an entrepreneur.	1. Problems of entrepreneurs. 2. Problem-solving ways to think like an entrepreneur.	1. Group activity on identifying and solving problems.	04
5. Generate business ideas.	1. The business cycles. 2. Principles of idea creation. 3. Generating a business idea 4. Case studies.	1. Brainstorming on generating business ideas.	04
6. Describe customer needs and the importance of conducting a customer survey.	1. Understanding customer needs. 2. Conducting a customer survey.	1. Group activity to conduct a customer survey.	04
7. Create a business plan.	1. Importance of business planning.	1. Group activity on developing a	

	2. Preparing a business plan. 3. Principles to follow for growing a business case studies.	business plan.	04
		Total	**25**

UNIT 5: GREEN SKILLS – III			
Learning Outcome	**Theory (07 hrs)**	**Practical (08 hrs)**	**Duration (15 hrs)**
1. Describe the importance of the main sector of the green economy.	1. Meaning of ecosystem, food chain and sustainable development. 2. Main sectors of the green economy- E-waste management, green transportation, renewal energy, green construction, and water management.	1. Group discussionon sectors of green economy. 2. Poster making on various sectors for promoting green economy.	06
2.Describe the main recommendations of policies for the green economy.	1. Policies for a green economy.	1. Group discussionon initiatives for promoting the green economy. 2. Writing an essay or a short note on the importantinitiatives for promoting green economy.	03
3. Describe the major green sectors/ areas and the role of various stakeholders in the green economy.	1. Stakeholders in the green economy.	1. Group discussion on the role of stakeholders in the green economy. 2. Making solar bulbs.	03
4. Identify the role of government and private agencies in the green economy.	1. Role of the government in promoting a green economy. 2. Role of private agencies in promoting green economy.	1. Group discussion on the role of Government and Private Agencies in promoting a green economy. 2. Poster-making on green sectors.	03
		Total	**15**

Part B: Vocational Skills

No.	Units	Duration(Hrs.)
1.	Introduction to Solar PV Technology	30
2.	Basics of Solar EV Charging Station	30
3.	Elements of Solar powered EV Charging Station	30
4.	Setiing up new venture of Solar EV charging Station	50
5.	Market research and Cost Estimation	25
	Total	**165 hrs**

UNIT 1: INTRODUCTION TO SOLAR PV TECHNOLOGY			
Learning Outcome	**Theory** ***(20 Hrs.)***	**Practical** ***(40 Hrs.)***	**Duration** ***(60 Hrs)***
1. Explain the classification of energy and its sources	1. Introduction of energy (Renewable energy and non-renewable energy) 2. Various types of Renewable energy and Non-renewable energy 3. Advantages and Disadvantages of Renewable energy and Non-renewable energy	1. Observe and enlist the sources of energy around yourself. 2.Classify the above enlisted sources of energy into renewable and non-renewable energy. 3. Collect and paste pictures of different renewable and non-renewable energy sources.	04
2. Explain the significance of solar energy as a sustainable energy source.	1. Introduction to Solar Energy as a renewable energy source. 2. Environmental and economic benefits of solar energy. 3. Relevance of solar energy in addressing global energy demands. 4. Advantages of solar energy over other renewable energy sources.	1. Conduct a group discussion on significance of solar energy as a renewable resource. 2. Enlist the various applications of solar energy in different sectors.	04
3. Discuss the scope of Solar PV technology in energy sector at global level.	1. Introduction to Solar PV system. 2. Future scope of Solar PV system. 3. Applications of Solar PV technology	1. Group Discussion on the future scope of Solar PV technology technology. 2. Visit to Solar PV system on site and observe it carefully.	04
4. Discuss the imporatnce of electric vehicles in todays world and role of charging stations in their adoption.	1. Role of Electric Vehicles in automotive industry. 2. Importance of charging stations for electric vehicles.	1. Visit charging station of Electric Vehciles.	04

5. Identify scope and business opportunities in solar EV charging stations	1. Introduction to Solar EV charging startion. 2. Usage of solar energy in EV charging stations. 3. Buisness opportunities in solar EV charging stations.	1. List solar EV chargers around you. 2. Meet the local staff and entreprenuers related to the specific domain. 3. Organize an expert talk by any local entreprenuer related to the solar sector.	07
4. Describe the entrepreneur's role in solar EV charging	1. Introduction to Solar EV Charging Entrepreneurship 2. Roles and responsibilities of Solar EV Charging Entreprenuer.	1. Visit 1–2 potential sites. 2. Check sunlight, space, and accessibility.	07
		Total	**30**
UNIT 2: BASICS OF SOLAR EV CHARGING STATION			
1. Understanding basic terminologies used in Solar Industry	1. Various technical solar PV terms/abbreviations such as GHI, DNI, ISC, VMP, MPPT etc.	1. Use a flashlight to simulate the sun and measure how the light intensity changes as it moves closer or farther from a surface, relating to Direct Normal Irradiance (DNI). 2. Take students outside the classroom to measure the length of shadows at different times of the day, helping them understand solar altitude and its effect on sunlight. 3. Create a chart showing how sunlight changes during the day and explain how it affects solar panels' energy generation.	07
2. Describe various types of solar PV systems.	1. Introduction to various Solar PV systems such as On-grid, Off-grid, and Hybrid systems. 2. Advantages and disadvantages of a solar PV system: On-grid, Offgrid and Hybrid system. 3. Conversion of the Off-grid system into the Ongrid system. 4. Role of grid in EV charging stations	1. Visit a Site with OnGrid, Off-Grid, and Hybrid Solar PV Systems. 2. Conduct a Group Discussion on the differences Between OnGrid, Off-Grid, and Hybrid Solar PV Systems 3. Compare the Advantages and Disadvantages of OnGrid, Off-Grid, and Hybrid Systems.	07
3. Explain the Module Mounting Structure (MMS) and its types.	1. Introduction to Module Mounting Structures (MMS). 2. Types of Module Mounting Structures (MMS). 3. Materials Used in MMS. 4. Effect of wind on various Module Mounting structures (MMS).	1. Identify different types of Modules Mounting Structures (MMS). 2. Conduct a group discussion on the comparison of different MMS and make a list of pros and cons of each.	07

4. Explain solar/grid EV charging stations	1. Overview of EV charging stations 2. Functions of key components for 2-wheelers, 4-wheelers, and others.	1. Visit or observe charging station. 2. Identify and label key components included in it.	07
5. Undersatnd the schematic diagram of solar based EV charging station.	1. Schematic diagram of based EV charging station. 2. Comparison of Solar charging station with a normal EV charging station		02
		Total	**30**
UNIT 3: ELEMENTS OF SOLAR POWERED EV CHARGING STATION			
1. Identify and describe components of Solar EV Charging System	1. Basic components of EV charging station 2. Components of a solar based EV charging station 3. Comparison betweeen the normal and solar powered EV station.	1. Visit to a EV charging station 2. Visit to solar powered EV station 3. Identify the components of EV charging station 4. Identify the components of solar powered EV charging station	10
2. Understand working of solar panels and inverters	1. Basics of PV cells and panels 2. Role of inverter in DC–AC conversion	1. Visit to any site where solar powers are mounted. 2. Conduct a group discussion on "Why inverter is essential for Solar power system"	6
3. Understand batteries and Battery Management System (BMS)	1. Types of batteries (Li-ion, Lead-acid) 2. State of Charge(SOC), State of Heath (SOH), charging/discharging cycles 3. Importance of BMS	1. Visit to battery service/workshop 2. Open discussion: "Choosing a battery dor EV"	6
4. Demonstrate system integration (PV + Battery + Charger + Motor)	1. Working of the complete system with all components connected.	1. Activity: Assemble a small trainer kit showing PV → Inverter → Battery → Charger 2. Draw a Poster: "Energy flow in EV charging system"	8
		Total	**30**
UNIT 4: SETTING UP NEW VENTURE FOR SOLAR EV CHARGING STATION			
1. Explain the relevance of starting a new venture in the field of solar energy	1. Benefits of setting up new venture on solar energy rather than any other conventional sources of energy 2. Various market research reports and success stories of a succesful entreprenuer related to the field of solar energy	1. Open Discussion on the successs stories of Solar charger entreprenuer.	04

2.Explain steps to start a solar PV business	1. Initial Steps to start a solar PV business 2. Business plan preparation (basic)	1.Conduct a group discussion on the Scope of being a Solar PV Charging Entrprenuer.	07
3. Demonstrate professionalism in solar project sites	1. Safety and discipline at installation sites 2. Team coordination between engineers, technicians, and clients	1. Role play: Customer–technician interaction 2. Conduct a Group discussion on Best workplace practices in solar projects	05
4. Demonstarte the use digital tools for solar business documentation and reporting	1. Proposal writing (Word) 2. Data handling (Excel for load estimation, costing) 3.Presentations (PowerPoint for client pitches)	1. Hands-on: Create a load calculation sheet in Excel 2. Prepare a client presentation for a rooftop solar system	08
5. Identify technical and financial risks in solar business	1. Equipment quality issues 2. Grid integration challenges 3. Financing & customer acquisition	1. Conduct a Group discussion: "What challenges do startups face in solar sector?" 2. Poster: Risk vs Mitigation in Solar Business	08
6. Understand legal and regulatory framework	1. GST and taxation on solar equipment 2. MNRE guidelines, DISCOM approvals, net-metering policies 3. BIS standards for PV systems	1. Draft a checklist of approvals for rooftop solar 2. Visit to a solar company to understand compliance	06
7. Explain key success factors for solar ventures	1. Quality installation & after-sales service 2. Marketing and customer awareness 3. Technology updates & innovation	1. Case study analysis of successful solar enterprises 2. Group presentation: "Keys to success in solar business"	05
8. Apply inclusive practices in solar business	1. Equal opportunities in technical teams 2. Safety and accessibility at worksites	1. Group discussion: Women in solar entrepreneurship 2. Activity: Design an inclusive workplace policy for solar projects	07
		Total	**50**
UNIT 5: MARKET RESEARCH & COST ESTIMATION			
1.Explain the importance of market research for solar EV charging	1. Purpose of market research 2. Identifying target customers (individual EV owners, fleet operators, commercial hubs) 3. Analyzing competitors and locations	1. Group discussion: "Why market research is important before starting a business?" 2. Activity: Conduct a quick survey on EV charging demand in the local area	02

2. Identify key factors influencing demand for solar EV charging.	1. Growth of EV adoption in India 2. Government policies and incentives 3. Location selection (urban, highways, institutions)	1. Case study: EV adoption in a city/state	03
3. Understand cost elements of a solar EV charging station	1. Fixed costs: land, construction, equipment (solar panels, inverter, batteries, chargers) 2. Variable costs: electricity, Operations and Managemtn, staff, software 3. One-time vs recurring expenses	1. Activity: Identify and list cost components from a sample project 2. Hands-on: Breakdown of costs using Excel	10
4. Estimate total project cost and profitability	1. Simple cost estimation methods 2. Capital Expenditure (CAPEX) & Operating Expenditure (OPEX) 3. Payback period and Return on Investment (ROI)	1. Exercise: Calculate approximate cost for a 10 kW solar EV charging station	10
		Total	**25**

GRADE XII

Part A: Employability Skills

S.No.	Units	Duration (hrs)
1.	Communication Skills- IV	25
2.	Self-management Skills - IV	25
3.	Information and Communication Technology Skills - IV	20
4.	Entrepreneurial Skills – IV	25
5.	Green Skills – IV	15
	Total	**110**

UNIT 1: COMMUNICATION SKILLS - IV			
Learning Outcome	**Theory (10 hrs)**	**Practical (15 hrs)**	**Duration (25 hrs)**
1. Demonstrate active listening skills.	1. Active listening - listening skill, stages of active listening.	1. Group discussion on factors affecting active listening. 2. Poster making on steps for active listening.	10

	2. Overcoming barriers to active listening.	3. Role-play on negative effects of not listening actively.	
2. Identify the parts of speech.	1. Parts of speech – using capitals, punctuation, basic parts of speech, Supporting parts of speech.	1. Group practice on identifying parts of speech. 2. Group practice on constructing sentences.	10
3. Write sentences.	1. Writing skills to practice the following: • Simple sentence • Complex sentence • Types of object. 2. Identify the types of sentences • Active and Passive sentences • Statement/Declarative sentence • Question/Interrogative sentence • Emotion/Reaction or Exclamatory sentence. • Order or Imperative sentence. • Paragraph writing.	1. Group activity on writing sentences and paragraphs. 2. Group activity on practicing writing sentences in active or passive voice. 3. Group activity on writing different types of sentences (i.e., declarative, exclamatory, interrogative and imperative).	05
		Total	**25**

UNIT 2: SELF-MANAGEMENT SKILLS – IV			
Learning Outcome	**Theory (10 hrs)**	**Practical (15 hrs)**	**Duration (25 hrs)**
1. Describe the various factors influencing motivation and positive attitude.	1. Motivation and positive attitude. 2. Intrinsic and extrinsic motivation. 3. Positive attitude – ways to maintain positive attitude. 4. Stress and stress management - ways to manage stress.	1. Role-play on avoiding stressful situations. 2. Activity on listing negative situations and ways to turn it positive.	10
2. Describe how to become result oriented.	1. How to become result oriented? 2. Goal setting – examples of result-oriented goals.	1. Group activity on listing aim in life.	05
3. Describe the importance of self-awareness and the basic personality traits, types and disorders.	1. Steps towards self-awareness. 2. Personality and basic personality traits. 3. Common personality	1. Group discussion on self-awareness. 2. Group discussion on common personality disorders.	10

	disorders- • Suspicious • Emotional and impulsive • Anxious. 4. Steps to overcome personality disorders.	3. Brainstorming steps to overcome personality disorder.	
		Total	**25**

UNIT 3: INFORMATION AND COMMUNICATION TECHNOLOGY SKILLS – IV			
Learning Outcome	**Theory (06 hrs)**	**Practical (14 hrs)**	**Duration (20 hrs)**
1. Identify the components of a spreadsheet application.	1. Getting started with spreadsheet - types of a spreadsheet, steps to start LibreOffice Calc., components of a worksheet.	1. Group activity on identifying components of spreadsheet in LibreOffice Calc.	02
2. Perform basic operations in a spreadsheet.	1. Opening workbook and entering data – types of data, steps to enter data, editing and deleting data in a cell. 2. Selecting multiple cells. 3. Saving the spreadsheet in various formats. 4. Closing the spreadsheet. 5. Opening the spreadsheet. 6. Printing the spreadsheet.	1. Group activity on working with data on LibreOffice Calc.	03
3. Demonstrate the knowledge of working with data and formatting text.	1. Using a spreadsheet for addition – adding value directly, adding by using cell address, using a mouse to select values in a formula, using sum function, copying and moving formula. 2. Need to format cell and content. 3. Changing text style and font size. 4. Align text in a cell. 5. Highlight text.	1. Group activity on formatting a spreadsheet in LibreOffice Calc 2. Group activity on performing basic calculations in LibreOffice Calc.	02
4. Demonstrate the knowledge of using advanced features in spreadsheet.	1. Sorting data. 2. Filtering data. 3. Protecting spreadsheet with password.	1. Group activity on sorting data in LibreOffice Calc.	03

5. Make use of the software used for making slide presentations.	1. Presentation software available. 2. Stapes to start LibreOffice Impress. 3. Adding text to a presentation.	1. Group practice on working with LibreOffice Impress tools.	02
6. Demonstrate the knowledge to open, close and save slide presentations.	1. Open, Close, Save and Print a slide presentation.	1. Group activity on saving, closing and opening a presentation in LibreOffice Impress.	01
7. Demonstrate the operations related to slides and texts in the presentation.	1. Working with slides and text in a presentation- adding slides to a presentation, deleting slides, adding and formatting text, highlighting text, aligning text, changing text colour.	1. Group activity on working with font styles in LibreOffice Impress.	04
8. Demonstrate the use of advanced features in a presentation.	1. Advanced features used in a presentation. 2. Inserting shapes in the presentation. 3. Inserting clipart and images in a presentation. 4. Changing slide layout.	1. Group activity on changing slide layout on LibreOffice Impress.	03
		Total	**20**

UNIT 4: ENTREPRENEURIAL SKILLS-IV			
Learning Outcome	**Theory (10 hrs)**	**Practical (15 hrs)**	**Duration (25 hrs)**
1. Describe the concept of entrepreneurship and the types and roles and functions entrepreneur.	1. Entrepreneurship and entrepreneur. 2. Characteristics of entrepreneurship. 3. Entrepreneurship-art and science. 4. Qualities of a successful entrepreneur. 5. Types of entrepreneurs. 6. Roles and functions of an entrepreneur. 7. What motivates an entrepreneur. 8. Identifying opportunities and risk-taking. 9. Startups.	1. Group discussion on the topic "An entrepreneur is not born but created". 2. Conducting a classroom quiz on various aspects of entrepreneurship. 3. Chart preparation on types of entrepreneurs. 4. Brainstorming activity on what motivates an entrepreneur.	10
2. Identify the barriers to entrepreneurship.	1. Barriers to entrepreneurship. 2. Environmental barriers. 3. No or faulty business plan. 4. Personal barriers.	1. Group discussion about "What we fear about entrepreneurship". 2. Activity on taking an interview of an	05

		entrepreneur.	
3. Identify the attitude that make an entrepreneur successful.	1. Entrepreneurial attitude.	1. Group activity on identifying entrepreneurial attitude.	05
4. Demonstrate the knowledge of entrepreneurial attitude and competencies.	1. Entrepreneurial competencies. 2. Decisiveness. 3. Initiative. 4. Interpersonal skills- positive attitude, stress management. 5. Perseverance. 6. Organizational skills- time management, goal setting, efficiency, managing quality.	1. Playing games, such as "Who am I". 2. Brainstorming a business idea. 3. Group practice on "Best out of Waste". 4. Group discussion on the topic of "Let's grow together". 5. Group activity on listing stress and methods to deal with it like Yoga, deep breathing exercises, etc. 6. Group activity on time management.	05
		Total	**25**

UNIT 5: GREEN SKILLS-IV

Learning Outcome	Theory (05 hrs)	Practical (10 hrs)	Duration (15 hrs)
1. Identify the benefits of the green jobs.	1. Green jobs. 2. Benefits of green jobs. 3. Green jobs in different sectors: • Agriculture • Transportation • Water conservation • Solar and wind energy • Eco-tourism • Building and construction • Solid waste management • Appropriate technology.	1. Group discussion on the importance of green job. 2. Chart preparation on green jobs in different sectors.	08
3. State the importance of green jobs.	1. Importance of green jobs in • Limiting greenhouse gas emissions • Minimizing waste and pollution • Protecting and restoring ecosystems • Adapting to the effects of climate	1. Preparing posters on green jobs. 2. Group activity on tree plantation. 3. Brainstorming different ways of minimizing waste and pollution.	07

	change		
		Total	**15**

Part B: Vocational Skills

S.No.	Units	Duration
1.	Site Study for Setting up Solar EV Charging Station	25
2.	Installation of Solar EV Charging Station	40
3.	Operations and Management of Solar EV Charging Station	35
4.	Management of Lifecycle of the charging station	35
5.	Personal Health and Safety	30
	Total	**165**

UNIT 1: SITE STUDY FOR SETTING UP SOLAR EV CHARGING STATION			
Learning Outcome	**Theory** ***(Hrs)***	**Practical** ***(Hrs)***	**Duration (Hrs)**
1. Identify key parameters for site selection of setting up Solar EV charging station	1. Key parameters to be check before setting Solar EV charging station such as sunligh availibility, shading, land/space requirement. Accesibility etc.	1. Prepare a checklist for the important site parameters needed to be checked.	03
2. Analyze suitability of site location for site selection	1. Checking Traffic flow and EV density 2. Considering Safety and environmental considerations.	1. Group activity: Compare 2 sites and analyze suitability 2. Case study of an existing EV charging station	03
3. Interpret site drawings and design guidelines	1. Basics of layout, orientation, and schematic diagram 2. Placement of solar panels, chargers, and batteries	1. Draw a simple schematic of solar charging EV station 2. Sketch a layout plan for a small charging site	04
4.Assess site-specific conditions such as soil type, fesilibilty of type of solar mounting structure and drainage	1. Conditions for an ideal site 2.Accessing the soil type and suitable foundation on it.	1. Group discussion on Rooftop VS ground site 2. Create a poster on Good Site vs Poor Site for	04
5. Evaluate potential demand for EV charging	1. Importance of demand analysis 2. Factors affecting such numbers of EVs, parking time, load demand	Local survey of EV users - Group discussion on EV adoption trends	03
6. Calculate load and solar capacity requirement	Basics of load estimation - Solar PV capacity vs EV demand	1. Hands-on: Calculate load for 5 EVs/day 2. Prepare load estimation sheet in Excel	05
7. Describe elements of Detailed Project Report (DPR)	1. Structure of DPR: technical, financial, environmental, risk analysis 2. Role of DPR in financing	1. Group activity: Outline DPR for 10 kW solar + grid EV station.	03

		Total	**25**
UNIT 2: INSTALLATION OF SOLAR EV CHARGING STATION			
1. Identify pre-installation requirements and safety measures.	1. Importance of planning before installation 2. Tools, equipment, and safety gear 3. Entrepreneur's role in ensuring safe and cost-effective installation	1. Demonstration of tools & PPE 2. Preparing a checklist for safe and economical setup	05
2. Install mounting structures as per site requirements to maximize efficiency and reduce costs.	1. Rooftop vs ground-mounted structures 2. Orientation, tilt angle, and land use considerations 3. Cost factors in selecting mounting types	1. Assemble mounting structures 2. Compare rooftop vs ground setup with pros/cons (cost & business relevance)	05
3. Mount solar PV modules and connect them for reliable and scalable EV charging.	1. PV module specifications - Series/parallel connections 2. Cable management for safety and efficiency	1. Group task: Calculate module requirement for a small EV station	05
4. Install inverter, charge controller, and battery to ensure continuous business operation.	1. Role of inverter, charge controller, and optional battery storage 2. Grid integration for business continuity 3. Importance of efficiency for profitability	1. Connect PV array to inverter and grid 2. Install and test battery backup system 3. Open discussion: Why backup matters for entrepreneurs	10
5. Install and connect EV charger units considering customer safety and convenience.	1. Types of EV chargers (AC, DC, fast) 2. Placement guidelines (parking, customer access) 3. Earthing, surge protection, and user safety	1. Connect charger to inverter/grid 2. Simulate customer charging experience	10
6. Perform final wiring, safety checks, and commissioning to make the station business-ready.	1. Earthing, lightning protection 2. Commissioning checklist 3. Customer readiness: ensuring system reliability for business	1. Perform continuity and safety tests 2. Create a mock "handover report" as if for customers/investors	05
		Total	**40**
UNIT 3: OPERATIONS AND MANAGEMENT OF SOLAR EV CHARGING STATION			
1. Operate EV charging systems as per standard procedure.	1. Startup/shutdown sequence - Charging protocols (AC/DC/fast) 2. Customer-friendly operation	1. Demonstrate EV charging using demo kit/vehicle 2. Record charging time and energy used	05
2. Maintain daily records for smooth station management.	1. Importance of logbooks 2. Recording units consumed, downtime, revenue	1. Prepare and fill sample logbook/record sheets 2. Data entry in spreadsheet	04
3. Manage customer service and payment systems.	1. Modes of payment (cash, UPI, RFID cards, apps)	1. Simulate customer billing	04

	2. Customer interaction skills	2. Demo use of payment app/software	
4. Monitor system performance and calculate investment vs profit.	1. Energy monitoring systems 2. Capital cost of solar EV charging station 3. Operating cost, revenue streams, and profit margins	1. Case study: Prepare cost sheet of a 10 kW solar EV station 2. Activity: Calculate payback period based on charging rates	08
5. Ensure compliance with government policies and regulations.	1. State and central EV charging policies 2. Subsidies, tax benefits, and incentives 3. Licensing and approvals	1. Open discussion: Local/state EV policy 2. Draft a compliance checklist for a new entrepreneur	05
6. Use digital tools for business growth and station monitoring.	1. Importance of logbooks & digital records 2. Recording energy produced, energy sold, downtime 3. Data use in performance evaluation	1. Students create a mock social media page for station promotion	06
7. Plan for scaling and future growth.	1. Adding more charging points and Integrating fast chargers 2. Methods for Expanding customer base 3. Collaboration with fleet operators & EV companies	1. Prepare a simple expansion plan 2. Group discussion: Opportunities in rural vs urban areas	03
		Total	**35**
UNIT 4: MANAGEMENT OF LIFECYCLE OF THE CHARGING STATION			
1. Identify cost parameters of major components in solar - grid based EV charging station.	1. Cost of solar PV panels, inverter, charger, battery, BOS (Balance of System) 2. Civil, electrical, and land-related cost factors	Break down cost of a sample 10 kW EV charging project into component-wise cost sheet	07
2. Analyse cost variations based on site conditions and requirements.	1. Impact of rooftop vs ground-mounted systems - Urban vs rural cost differences	1. Case study comparison: Same station in rural vs urban area with cost variations	05
3. Explain CAPEX (Capital Expenditure) and O&M (Operations & Maintenance) costs.	1. Definition of CAPEX and O&M - Fixed vs recurring expenses 2. Typical % cost of O&M in solar EV stations	1. Prepare sample CAPEX and O&M cost sheet for a demo station	07
4. Estimate lifecycle cost of solar EV charging station.	1. Lifecycle stages: installation, operation, maintenance, replacement, disposal -Lifecycle costing method	1. Group activity: Calculate lifecycle cost of a 10-year solar EV project (assume inputs)	06
5. Calculate project financials (savings, payback, IRR, ROI).	1. Simple payback, Net Present Value (NPV), Internal Rate of Return (IRR) - How to include these in DPR	1. Mock pitch: Students prepare and present a financing plan for an EV charging startup	05
5. Assess business viability and capital-raising options.	1. Sources of funds: self-funding, bank loans, private investors, government schemes		05

		Total	**35**
UNIT 5: PERSONAL HEALTH AND SAFETY			
1.Explain the importance of personal cleanliness and hygiene at worksites.	1. Need for hygiene in outdoor/field jobs 2. Link between cleanliness and safety 3. Preventing infections and illness	1. Demonstrate steps of personal hygiene (hand wash, sanitization, protective clothing) before and after site work	05
2.Demonstrate the use of PPE (Personal Protective Equipment).	1. Types of PPE for solar EV projects (helmets, gloves, masks, safety shoes, harness) 2. Importance of correct usage	1. Prepare a Safety checklist before site entry and dicuss with each other.	05
3.Apply standard safety procedures during installation	1. Safety rules for handling electrical equipment including fire safety basics 2. Solar-specific risks (shock, burns, sharp edges)	1. Prepare checklist for daily housekeeping 2. Locate and check first aid box items 3. Role play: Administer first aid in case of electric shock 4. Demonstration: Proper disposal of gloves, masks, and damaged materials 5. Prepare waste disposal chart generated from the	05
4.Maintain good housekeeping and infection control at project sites.	1. Importance of organized worksite 2. Cleaning tools & materials 3. Infection control (COVID-like guidelines)		05
5. Identify and administer first aid at the worksite.	1. Basics of first aid: cuts, burns, electric shock 2. First aid box materials 3. Reporting of health incidents		05
6. Handle and dispose hazardous waste safely.	1. Types of hazardous waste in solar projects (damaged batteries, wires, packaging) 2. Standard disposal methods		05
		Total	**30**

6. ORGANISATION OF FIELD VISITS

In a year, at least 3 field visits/educational tours should be organized for the students to expose them to the activities in the workplace. Visit a Solar EV Charging Station site and observe the following:

1. **Location & Accessibility** : The site should be in an easily accessible area where vehicles can smoothly enter, park, and exit. Good connectivity to highways, markets, or public places adds business advantage.
2. **Available Space:**There must be enough land to set up solar panels, charging stations, and parking. The layout should also allow smooth vehicle movement without congestion.
3. **Sunlight Availability**: The site should receive clear sunlight during most of the day. Shading from nearby trees, poles, or tall buildings must be minimal to ensure higher solar power generation.
4. **Electrical Setup**: Proper electrical infrastructure must be available, including grid access, cable routing, and space for inverters. Provisions for battery storage can add backup support.
5. **Charging Infrastructure**: The site should have sufficient area for installing slow and fast chargers. Placement should ensure safe use and easy access for all types of EVs.
6. **Safety & Security**: The location must be safe from flooding or waterlogging. Security measures like fencing, CCTV, and proper lighting ensure protection of equipment and users.
7. **Customer Convenience**: Facilities such as shaded waiting areas, seating, and smooth entry–exit routes should be provided. This improves user experience and attracts repeat customers.
8. **Future Expansion**: The site should have enough provision for adding more chargers and solar panels.

This allows the entrepreneur to scale up operations as EV demand grows.

9. **Surrounding Demand:** The site must be in an area with potential EV users such as residential colonies, offices, malls, or highways. A high-demand location ensures better business opportunities.

In addition to the technical and detailed observations mentioned earlier, some key additional observations to include are:

- Type of project (Residential/Commercial)
- Manpower engaged (Number and roles)
- Total expenditure of the project
- Expected total annual income from the installation

7. LIST OF EQUIPMENTS 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. Following are the basic list of equipment and materials required:

S.No.	Equipment & Materials	Quantity	Cost
For Civil Works			
1.	Measuring Tape	2 No.	₹300
2.	Spirit Level	2 No.	₹600
3.	Adjustable Wrench	2 No.	₹250
4.	Hammer & Pliers	2 No.	₹900
5.	Spanner and allen key set	1 set each	₹1300
6.	Shovel/Trowel/Bucket	2 No.	₹1300
7.	Safety Accessories (Gloves, Helmet, Shoes)	As required	₹2000
For Solar Works			
8.	Solar Panel Mounting System	1 Set	₹15,000
9.	Solar Panels for Demonstration	1 No.	₹8,000
10.	Solar Panel Mounting Brackets & Rails	10 No.	₹2000
11.	Solar panels clips and fasterners (AC/DC)	As required.	₹3000
12.	PVC Pipes (For conduits)	10 meters	₹250
13.	Cable Ties and clamps	1 pack/2 no.s	₹1100
Electrical & Charging works			
14.	EV Charging Gun (Type-2)	1 No.	₹25000
15.	AC EV Charger (Slow)	1 No.	₹35000
16.	DC Fast Charger (Demo Unit)	1 No.	₹1,20,000
17.	Inverter (String / Hybrid)	1 No.	₹2500
18.	Battery Storage Unit (Lithium-ion)	1 No.	₹40,000
19.	Distribution Box (MCB, RCCB, Isolator)	1 set	₹ 5,000
20.	Earthing Kit (Copper Rod, Plate)	1 set	₹3,500

Note: This list provides a general idea of basic quantities required and its pricing, but actual rates can vary based on location, brand, and quality of tools.

8. VOCATIONAL TEACHER'S AND TRAINERS' QUALIFICATION AND GUIDELINES

Qualification	Minimum Competencies	Age Limit
Degree/ B.Voc. (Bachelor in Vocation) in Civil, Mechanical, Electrical and Electronics Engineering, Agricultural, from a recognized Institute /University, with at least 1-year work / teaching experience. **OR** Diploma in Civil, Agricultural, Mechanical and Electrical and Electronics Engineering from a recognized Institute/ University, with at least 2-year work / teaching experience	Effective communication skills (oral and written) Basic computing skills.	18-37 years (as on Jan. 01 (mention the year)) Age relaxation to be provided as per Govt. rules.

These guidelines have been prepared with the aim of helping and guiding the States in engaging qualified Vocational Teachers/Trainers in schools. Various parameters that need to be considered while engaging Vocational Teachers/Trainers include the mode and procedure of selection, 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 Samagra Shiksha in the following ways:
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 organizations 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.

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 organize 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 counseling 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. Organization of activities for promotion of vocational subjects;
11. Involvement in placement of students/student support services.

9. LIST OF CONTRIBUTORS

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