

**LEARNING OUTCOME BASED VOCATIONAL CURRICULUM**

**CLASS 11 & 12**

**SECTOR:  
POWER**

**JOB ROLE**

**ELECTRICIAN DOMESTIC SOLUTIONS**

**(QUALIFICATION PACK: REF. ID. PSS/Q6001)**



**State Council of Educational Research & Training (SCERT) Kerala**  
(Department of General Education, Government of Kerala)  
Vidhya Bhavan, Poojappura, Thiruvananthapuram





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[www.scert.kerala.gov.in](http://www.scert.kerala.gov.in)



**LEARNING OUTCOME BASED  
VOCATIONAL CURRICULUM**

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## FOREWORD

A collaborative initiative for developing learning outcome based vocational curriculum and courseware aimed at integrating both vocational and general qualifications has been implemented by the State Council of Educational Research and Training (SCERT) Kerala and the PSSCIVE Bhopal. This is intended to open up pathways of career progression for students and the SCERT Kerala is developing curricula under the project as an integral part of Vocationalisation of Education under Samagra Shiksha, approved by the Government of Kerala. Decisive improvement in the teaching-learning process and working competencies through learning outcomes that have been judiciously embedded in the vocational subject is expected to be the major impact that will be brought about by the learning outcome based vocational curriculum.

It is a matter of great pleasure to introduce this learning outcome based vocational curriculum as part of the vocational training package for the job role of Electrician Domestic Solutions (PSS/Q6001). The curriculum has been developed for the higher secondary students of vocational education and is aligned to the National Occupation Standards (NOSs) of a job role identified and approved under the National Skill Qualification Framework (NSQF).

The key aim of the curriculum will be to provide children with employability and vocational skills that would in turn aid occupational mobility and lifelong learning. A major transformation in the teaching process is also aimed at, which will be brought about through interactive sessions in classrooms, practical activities in laboratories and workshops, projects, field visits, and professional experiences.

The curriculum has been meticulously developed and judiciously reviewed by a group of experts and their much-valued contributions are immensely acknowledged. The imminent utility of the curriculum will without doubt, be adjudged 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 enhancement and augmentation to this document.

**Dr. J Prasad**  
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## ACKNOWLEDGEMENTS

We are grateful to the Director, National Council of Educational Research & Training (NCERT) and Prof. Rajesh P Khambayat, Ph.D., Joint Director, PSSCIVE Bhopal for their support and guidance. We also acknowledge the contributions of the officials at the Technical Support Group of Samagra Shiksha, Ministry of Education, National Skill Development Agency (NSDA) and National Skill Development Corporation (NSDC) and Power Sector Skill Council of India (PSSCI) for their support and cooperation.

We are extremely thankful to Dr. RVG Menon, Chairperson, High Power Committee for the implementation of NSQF in Kerala, Dr. Sukesh Kumar, Former Principal, Government Engineering College Palakkad and Sri. G S Unnikrishnan Nair, Former Director State Agricultural Management and Extension Training Institute (SAMETI), Thiruvananthapuram for their mentorship in the process of developing this document. The contributions made by Dr. Vinay Swarup Mehrotra, Professor and Head, Curriculum Development and Evaluation Centre (CDEC), PSSCIVE Bhopal in development of the curriculum are duly acknowledged.

We are grateful to the experts for their earnest efforts and contributions in the development of this learning outcome based vocational curriculum. Their names are acknowledged in the list of contributors.

We are grateful to the Vocational Higher Secondary wing of the Directorate of General Education (DGE) Kerala for extending the support to develop this curriculum document on time by providing the service of its teaching staff.



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		Unit 2: Basic Health and safety practices in power related work
		Unit 3: House wiring types and fault repair
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## 1. COURSE OVERVIEW

### COURSE TITLE: ELECTRICIAN DOMESTIC SOLUTIONS

#### GENERAL OBJECTIVES

Electricity is one of the most important contribution that science has given to the society. It has also become a part of daily life and one cannot think of a world without it. Trained manpower is required in the Electrical field at various levels ranging from electrical technician or electricians to engineers and researchers. The role of an electrician is mainly in the field of domestic installations and servicing of common domestic appliances. The main objective of Electrician Domestic Solutions course is to create skilled manpower to carry out domestic installations as well as servicing of domestic appliances.

On successful completion of the course, the learners will be able to;

- understand the various aspects of domestic wiring with earthing.
- comprehend the condition of wiring with a megger.
- tests the condition of earthing & Trouble shoots the problems in domestic wiring.
- provide connections to various electrical appliances.
- trouble shoot problems in domestic appliances & service them.
- check the condition of storage batteries, charge & maintain them

#### COURSE OUTCOMES

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

- apply effective oral and written communication skills to interact with people and customers;
- identify the principal components of a computer system;
- demonstrate the basic skills of using computer;
- demonstrate self-management skills;
- demonstrate the ability to provide a self-analysis in context of entrepreneurial skills and abilities;
- practice to work effectively with others;
- demonstrate the knowledge of the importance of green skills in meeting and challenges of sustainable development and environment protection;
- develop basic concept of power system;
- use basic health and safety practices for power related work;
- develop skills in House wiring and its fault repair;
- prepare distribution board in a house wiring;
- implement control and protective devices in house wiring;
- develop basic concepts of Electrical Machines;

- perform maintenance and repair of house hold gadgets;
- implement standalone power supplies.

### COURSE REQUIREMENTS

The learner should have the basic knowledge of science.

### COURSE DURATION: 600 hrs

Class 11	300hrs
Class 12	<b>300hrs</b>
<b>Total</b>	<b>600 hrs</b>

## 2.SCHEME OF UNITS

The unit-wise distribution of hours and scores for Class 11 is as follows:

CLASS 11			
	Units	Theory and Practical (300 Hrs)	Max. Scores (100 Hrs)
<b>Part A</b>	<b>Employability Skills</b>		
1.	Communication Skills – III	25	<b>10</b>
2.	Self-management Skills – III	25	
3.	Information and Communication Technology Skills – III	20	
4.	Entrepreneurial Skills – III	25	
5.	Green Skills – III	15	
	<b>Total</b>	<b>110</b>	<b>10</b>
<b>Part B</b>	<b>Vocational Skills</b>		
6.	Fundamentals of Electricity	32	
7.	Basic Health and Safety Practices in power related work	32	
8.	House wiring types and fault repair	37	
9.	Mains, Distribution, Controls, Circuits and protection in house wiring	64	
	<b>Total</b>	<b>165</b>	
<b>Part C</b>	<b>Practical Work</b>		
	Practical Examination	06	15
	Written Test	01	10
	Viva Voce	03	10
	<b>Total</b>	<b>10</b>	<b>35</b>
<b>Part D</b>	<b>Project Work/Field Visit/ OJT</b>		
	Practical File/Student Portfolio	10	10
	Viva Voce	05	05
	<b>Total</b>	<b>15</b>	<b>15</b>
	<b>Grand Total</b>	<b>300</b>	<b>100</b>

The unit-wise distribution of hours and scores for Class 12 is as follows:

CLASS 12			
	Units	No. of Hours for Theory and Practical =300	Max. Scores for Theory and Practical = 100
<b>Part A</b>	<b>Employability Skills</b>		
1.	Communication Skills – IV	25	10
2.	Self-management Skills – IV	25	
3.	Information and Communication Technology Skills – IV	20	
4.	Entrepreneurial Skills – IV	25	
5.	Green Skills – IV	15	
	<b>Total</b>	<b>110</b>	<b>10</b>
<b>Part B</b>	<b>Vocational Skills</b>		
6.	Unit 1: Electrical Machines	32	
7.	Unit 2: Maintenance and repair of domestic appliances	96	
8.	Unit 3: Illumination and Stand-alone power supplies	37	
	<b>Total</b>	<b>165</b>	<b>40</b>
<b>Part C</b>	<b>Practical Work</b>		
	Practical Examination	06	15
	Written Test	01	10
	Viva Voce	03	10
	<b>Total</b>	<b>10</b>	<b>35</b>
<b>Part D</b>	<b>Project Work/Field Visit/OJT</b>		
	Practical File/Student Portfolio	10	10
	Viva Voce	05	05
	<b>Total</b>	<b>15</b>	<b>15</b>
	<b>Grand Total</b>	<b>300</b>	<b>100</b>

### 3. LEARNING OUTCOME BASED ACTIVITIES

Classroom, Laboratory/workshop and field are the key spots where teaching and learning take place. Classroom and laboratory-based teaching and learning facilitate knowledge creation whereas field visits open venues for free interaction with experts and also helps acquaint learners with various tools, materials, equipment procedures and operations in the workplace. While considering these intensified ways of knowledge acquisition, emphasis should also be laid on the occupational safety, health and hygiene of the participants.

#### Classroom activities

Classroom activities are mainly interactive lecture sessions, followed by discussions and doubt clarifications. Classes are handled by trained vocational teachers and this is considered as an integral part of the course. The most attractive feature of the class is that the classes are in tune with the outcome-based curriculum. Teaching learning processes are well planned and implemented.

Teaching learning materials such as audio-visual materials, colour slides, charts, diagrams, models, exhibits, handouts, on-line teaching materials etc., have been incorporated in accordance with the topic and this may help the teachers to impart the content in an effective manner.

### **Practical work in Laboratory / Workshop**

Practical work is usually performed to enhance the skills of the learners which are indeed essential for them to become specialized technicians. Practical sessions may include hands on training, simulation training, role-play, case-based studies, and exercises. Equipment and other appliances are available for use in abundance. Trained personnel teach and exercise specialized techniques. Practical classes involving laboratory/workshop are well planned with tools, equipment, materials, and other skill acquisition activities. Vocational teachers should submit the plan of laboratory/workshop work in advance to the head of the institution and get it sanctioned prior to use.

### **Field visits/ Educational Tour**

Field visit is one of the ways and means of learning outside the classroom. It promotes knowledge acquisition by giving opportunity to learners to interact with renowned experts and to make observations of the activities performed by them. An observation check list may help the students to ensure the collection of required information and its analysis for further use. This may be developed with the help of vocational teachers who are in charge of outdoor learning activities. All the field visits are well planned by taking into consideration of the learning requirements, distance to travel, time, health, and hygiene. The Principal and teachers should plan to implement at least three field visits within a year by making all necessary arrangements.

### **Virtual Field Visits, Expert Interactions and Practical Activities**

With the rapid potentials offered by information technology in digital classrooms, the extent of virtual field visits, online expert interactions and online demonstrations cum practical activities can be worked out. It may be helpful amid the current Covid 19 pandemic scenario. A State level cluster of teachers and experts in the concerned subject can be pooled together for the purpose. The guidelines for such activities can be issued by the concerned SCERTs.

### **Suggested Topics for Expert Interaction**

- The Future Scope of Electricians in the modern world.
- Generation aspects of Electrical Power
- Transmission and Distribution of Electrical Power
- Electrical wiring
- Electrical Safety and First aid
- Earthing and Installation of Protective Systems

- IOT based Home Automation
- Home Energy Conservation
- Basics of Battery Maintenance
- Stand alone Power supplies
- Solar PV System Installation and maintenance
- Servicing of Domestic appliances
- AC & DC Machines

#### **4. ASSESSMENT AND CERTIFICATION**

The National Skill Qualification Framework (NSQF) is based on outcomes rather than inputs referred by the National Occupation Standards (NOSs). Learning outcomes, as per the NSQF level descriptors, include the Process, Professional Knowledge, Professional Skills, Core Skills and Responsibility. Knowledge in the job of a learner shall be the basis of assessment. It would also be considered if the learning program undertaken by the learner has delivered the required output. Certification is based on required standards so that the learner and the employer could come to know about the competency attained in the vocational subject/ course. In order to make the assessment reliable, valid, flexible, convenient, cost effective, fair and transparent standardised assessment tools are to be used. Technology assisted assessment process is in vogue now.

#### **Knowledge Assessment (Theory)**

Knowledge Assessment usually includes two components – Internal Assessment and External Assessment. External assessment includes theory examination conducted by the concerned examination Boards. Tools for assessment contain components for testing the application of knowledge. Knowledge testing can be performed by making use of either objective or short answer type paper-based test. Source of the questions should be the content of the curriculum.

## Written Test

A group, comprising of academicians, experts from existing vocational subject experts / teachers, subject experts from University/ College or from the industry prepare theory question paper for the vocational subjects. A panel of experts for question paper setting and conducting examination should be formed by the respective central / state boards. Written tests allow the learners to demonstrate that they have acquired the necessary knowledge and skill in the given topics.

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

**Duration: 3 hrs**

**Maximum Scores: 50**

No. of Questions					
	Typology of Question	Very Short Answer (1 Score)	Short Answer (2 Scores)	Long Answer (3 Scores)	Scores
1.	Remembering – (Knowledge based simple recall questions, to know specific facts, terms, concepts, principles, or theories; identify, define or recite, information)	3	3	3	18
2.	Understanding – (Comprehension – to be familiar with meaning and to understand conceptually, interpret, compare, contrast, explain, paraphrase, or interpret information)	2	4	3	19
3.	Application – (Use abstract information in concrete situation, to apply knowledge to new situations: Use given content to interpret a situation, provide 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
	<b>Total</b>	<b>5x1=5</b>	<b>12x2=24</b>	<b>7x3=21</b>	<b>50 (24 questions)</b>



### **Skill Assessment (Practical)**

Skill assessment should be done by considering the practical demonstration of skills by the candidate. It is assessed by making use of a competency checklist prepared by experts. The competency checklist should be developed as per the National Occupation Standards (NOSs). This should be in tune with the qualification pack for the Job Role to ensure necessary consistency in the quality of assessment across different sectors and institutions. As per the performance criteria defined in the National Occupation Standards, the students have to demonstrate their competencies in front of the examiners. Assessment will indicate whether they are competent or incompetent. The assessors assessing the skills of the students should possess enough industrial experience and should have undergone a rigorous training in assessment principles and practices. The Sector Skill Councils (SSCs) should ensure that the assessors are given the required training on the assessment of competencies.

The demonstration of knowledge and skill in performing a task of the learners, is the purpose of the practical examination. This include practical examination where hands on experience will be displayed and a viva voce. A team of two evaluators, one a subject teacher and the other an expert from the relevant industry certified by the relevant Board or SSCs concerned can conduct practical examination as well as viva voce.

### **Project Work**

Project is an efficient strategy to assess the practical skills acquired along a certain timeline. Project is chosen and given to candidates only on the basis of their capabilities, because it needs specific skills. It is performed step by step and the first and foremost step is classroom discussion and selection of the topic for the project. After fixing the topic and objectives, the methodology of the project work should be decided during the classroom discussions. Monitoring and evaluation should be done at each stage. Proper feedback shall be provided to the learners for improvement and innovation. Field visits can be organized as part of the project work. The data collected may be used for presentations and report writing. Accuracy of the data is to be ensured. The entire project work is maintained as a practical work file or as student's portfolio.

### **Student Portfolio**

It is a document that supports the candidate claim of competencies acquired as a part of the teaching learning process. The student portfolio is a compilation of project reports, articles, photos of products prepared by the student.

### **Viva Voce**

Viva voce provides chance to each candidate to demonstrate communication skills and content knowledge. It is a way of obtaining feedback on the student's experience, learning, project work

and field visit. Audio visual recording of the whole procedure can be done for future reference and documentation. A Board, including external examiners, is constituted as per the norms which in turn should be suitably adapted to the specific requirement of the vocational subjects.

The central/state examination board for secondary education and the respective Sector Skill Councils can certify the competencies of the learner upon the successful completion of the course.

## 5. UNIT CONTENTS

### CLASS 11

#### Part A: Employability Skills

Sl.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
	<b>Total</b>	<b>110</b>

#### Unit 1: Communication Skill– III

Expected Learning Outcome	Theory (10 hrs)	Practical (15 hrs)	Duration (25 hrs)
1. Demonstrate knowledge of various methods of communication	<ul style="list-style-type: none"> <li>➤ Methods of communication</li> <li>• Verbal</li> <li>• Non-verbal</li> <li>• Visual</li> </ul>	<ul style="list-style-type: none"> <li>• Writing pros and cons of written, verbal, and non-verbal communication</li> <li>• Listing do's and don'ts for avoiding common body language mistakes</li> </ul>	05
2. Identify specific communication styles	<ul style="list-style-type: none"> <li>➤ Communication styles- assertive, aggressive, passive-aggressive, submissive, etc.</li> </ul>	<ul style="list-style-type: none"> <li>• Observing and sharing communication styles of friends, teachers and family members and adapting the best practices</li> <li>• Role plays on communication styles.</li> </ul>	10
3. Demonstrate basic writing skills	<ul style="list-style-type: none"> <li>➤ Writing skills to the following:</li> <li>• Sentence</li> <li>• Phrase</li> <li>• Kinds of Sentences</li> <li>• Parts of Sentence</li> <li>• Parts of Speech</li> <li>• Articles</li> <li>• Construction of a Paragraph</li> </ul>	<ul style="list-style-type: none"> <li>• Demonstration and practice of writing sentences and paragraphs on topics related to the subject</li> </ul>	10
	<b>Total</b>		<b>25</b>

<b>Unit 2: Self-Management – III</b>			
<b>Expected Learning Outcome</b>	<b>Theory (10 hrs)</b>	<b>Practical (15 hrs)</b>	<b>Duration (25 hrs)</b>
1. Demonstrate impressive appearance and grooming	<ul style="list-style-type: none"> <li>Describe the importance of dressing appropriately, looking decent and positive body language</li> <li>Describe the term grooming</li> <li>Prepare a personal grooming checklist</li> <li>Describe the techniques of self- exploration</li> </ul>	<ul style="list-style-type: none"> <li>Demonstration of impressive appearance and groomed personality</li> <li>Demonstration of the ability to self-explore</li> </ul>	10
2. Demonstrate team work skills	<ul style="list-style-type: none"> <li>Describe the important factors that influence in team building</li> <li>Describe factors influencing team work</li> </ul>	<ul style="list-style-type: none"> <li>Group discussion on qualities of a good team</li> <li>Group discussion on strategies that are adopted for team building and team work</li> </ul>	10
3. Apply time management strategies and techniques	<ul style="list-style-type: none"> <li>Meaning and importance of time management – setting and prioritizing goals, creating a schedule, making lists of tasks, balancing work and leisure, using different optimization tools to break large tasks into smaller tasks.</li> </ul>	<ul style="list-style-type: none"> <li>Game on time management</li> <li>Checklist preparation</li> <li>To-do-list preparation</li> </ul>	05
<b>Total</b>			<b>25</b>

<b>Unit 3: Information and Communication Technology - III</b>			
<b>Expected Learning Outcome</b>	<b>Theory (08 hrs)</b>	<b>Practical (12 hrs)</b>	<b>Duration (20 hrs)</b>
1. Create a document on word processor	<ul style="list-style-type: none"> <li>Introduction to word processing.</li> <li>Software packages for word processing.</li> <li>Opening and exiting the word processor.</li> <li>Creating a document</li> </ul>	<ul style="list-style-type: none"> <li>➤ Demonstration and practice of the following: <ul style="list-style-type: none"> <li>Listing the features of word processing</li> <li>Listing the software packages for word processing</li> <li>Opening and exit the word processor</li> <li>Creating a document</li> </ul> </li> </ul>	10
2. Edit, save and print a document in word	<ul style="list-style-type: none"> <li>Editing text</li> <li>Wrapping and aligning</li> </ul>	<ul style="list-style-type: none"> <li>➤ Demonstration and practising the</li> </ul>	10

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processor	<p>the text</p> <ul style="list-style-type: none"> <li>• Font size, type and face</li> <li>• Header and Footer</li> <li>• Auto correct</li> <li>• Numbering and bullet</li> <li>• Creating table</li> <li>• Find and replace</li> <li>• Page numbering</li> <li>• Printing document</li> <li>• Saving a document in various formats</li> </ul>	<p>following:</p> <ul style="list-style-type: none"> <li>• Editing the text</li> <li>• Word wrapping and alignment</li> <li>• Changing font type, size and face</li> <li>• Inserting header and footer</li> <li>• Removing header and footer</li> <li>• Using autocorrect option</li> <li>• Insert page numbers and bullet</li> <li>• Save and print a document</li> </ul>	
<b>Total</b>			<b>20</b>

Unit 4: Entrepreneurial Skills – III			
Expected Learning Outcome	Theory (10 hrs)	Practical (15 hrs)	Duration (25 hrs)
1. Describe the significance of entrepreneurial values and attitude	<ul style="list-style-type: none"> <li>• Values in general and entrepreneurial values</li> <li>• Entrepreneurial value orientation with respect to innovativeness, independence, outstanding performance and respect for work</li> </ul>	<ul style="list-style-type: none"> <li>• Listing of entrepreneurial values by the students.</li> <li>• Group work on identification of entrepreneurial values and their roles after listing or reading 2-3 stories of successful entrepreneur</li> <li>• Exhibiting entrepreneurial values in Ice breaking, rapport building, group work and home assignments</li> </ul>	10
2. Demonstrate the knowledge of attitudinal changes required to become an entrepreneur	<ul style="list-style-type: none"> <li>• Attitudes in general and entrepreneurial attitudes</li> <li>• Using imagination/ intuition</li> <li>• Tendency to take moderate risk</li> <li>• Enjoying freedom of expression and action</li> <li>• Looking for economic opportunities</li> <li>• Believing that we can</li> </ul>	<ul style="list-style-type: none"> <li>• Preparing a list of factors that influence attitude in general and entrepreneurial attitude</li> <li>• Demonstrating and identifying own entrepreneurial attitudes during the following micro lab activities like</li> </ul>	15

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	<p>change the environment</p> <ul style="list-style-type: none"> <li>Analyzing situation and planning action</li> <li>Involving in activity</li> </ul>	<p>thematic appreciation test</p> <ul style="list-style-type: none"> <li>Preparing a short write-up on “who am I”</li> <li>Take up a product and suggest how its features can be improved</li> <li>Group activity for suggesting brand names, names of enterprises, etc.</li> </ul>	
<b>Total</b>			<b>25</b>

Unit 5: Green Skills – III			
Expected Learning Outcome	Theory (07 hrs)	Practical (08 hrs)	Duration (15 hrs)
1. Describe importance of main sector of green economy	<ul style="list-style-type: none"> <li>Main sectors of green economy- E-waste management, green transportation, renewal energy, green construction, water management</li> <li>Policy initiatives for greening economy in India</li> </ul>	<ul style="list-style-type: none"> <li>Preparing a poster on any one of the sectors of green economy</li> <li>Writing a two-page essay on important initiatives taken in India for promoting green economy</li> </ul>	08
2. Describe the major green Sectors/Areas and the role of various stakeholder in green economy	<ul style="list-style-type: none"> <li>Stakeholders in green economy</li> <li>Role of government and private agencies in greening cities, buildings, tourism, industry, transport, renewable energy, waste management, agriculture, water, forests and fisheries</li> </ul>	<ul style="list-style-type: none"> <li>Preparing posters on green Sectors/Areas: cities, buildings, tourism, industry, transport, renewable energy, waste management, agriculture, water, forests and fisheries</li> </ul>	07
<b>Total</b>			<b>15</b>

### PART B: VOCATIONAL SKILLS

Sl.No.	Units	Duration (hrs)
1.	Fundamentals of Electricity	32
2.	Basic Health and Safety Practices in power related work	32
3.	House wiring types and fault repair	37
4.	Mains, Distribution, Controls, Circuits, and protection in house wiring	64
	<b>Total</b>	<b>165</b>

Unit 1 :Fundamentals of Electricity				
Sl. No	Expected Learning Outcome	Theory (24 hrs)	Practical (8 hrs)	Duration (32 hrs)
1	Explain fundamentals of Electricity	<ul style="list-style-type: none"> <li>• Electron theory.</li> <li>• Classification of materials- Conductor, Semiconductor, Insulators - its properties.</li> <li>• Definitions for Current, Voltage, Resistance, Resistance Laws, Resistivity , Series - Parallel Connections, Ohms law, Kirchoffs Laws, Work , Power and Energy, Capacitance and Inductance.</li> </ul>	<ul style="list-style-type: none"> <li>• Demonstrate Ohms Law and do practice</li> <li>• Voltage and Current measurement using Multimeter</li> <li>• Verification of KCL , KVL</li> </ul>	10
2	Explain the process of Electricity generation	<ul style="list-style-type: none"> <li>• Origin and importance of electricity</li> <li>• Understanding power sector scenario in India</li> <li>• Generation of Electrical Power (Conventional &amp; Non-conventional methods – Basics only)</li> <li>• Transmission of electrical power</li> <li>• various transmission Voltage levels</li> <li>• Substation – elements of substation</li> <li>• Single line diagram (generation to distribution)</li> <li>• Functions of Power Distribution Companies.</li> <li>• Understand CEA guidelines , Electricity act 2003, IS standards</li> </ul>	<ul style="list-style-type: none"> <li>• Listing Sources of Electrical Energy</li> <li>• Draw sketches to show how electrical energy is generated</li> <li>• Demonstrate a single line diagram</li> </ul>	09
3	Differentiate between Single Phase and Three Phase AC Systems	<ul style="list-style-type: none"> <li>• Comparison and Advantages of DC and AC systems.</li> <li>• Related terms frequency, Instantaneous value, R.M.S.value, Average value, Peak factor, form factor, and Impedance etc, power factor, its importance and methods to improve pf</li> </ul>	<ul style="list-style-type: none"> <li>• Demonstrate Various Types of meters.</li> <li>• Draw Charts for 3 Phase star &amp; Delta connections</li> </ul>	13

## ELECTRICIAN DOMESTIC SOLUTIONS

		<ul style="list-style-type: none"> <li>• Sine wave, phase and phase difference.</li> <li>• Active and Reactive power</li> <li>• Single Phase and three-phase system.</li> <li>• Advantages of AC poly-phase system</li> <li>• Star and Delta connection.</li> <li>• Line and phase - voltage, current</li> <li>• measuring devices – usage, rating, selection, types etc</li> </ul>		
4	Identify various electrical symbols and tools for electrical wiring installation	<ul style="list-style-type: none"> <li>• Identification of various electrical symbols.</li> <li>• Introduction to National Electrical Code(NEC)</li> <li>• Electrical Hand Tools- Their Specification -size and number.</li> <li>• Safety precautions while using tools</li> <li>• Developing Circuit, wiring layouts</li> </ul>	<ul style="list-style-type: none"> <li>• Draw the sketches of electrical symbols &amp; hand tools.</li> <li>• Demonstrate safety precautions while using tools</li> <li>• Demonstrate the selection of various hand tools and its safe usage</li> </ul>	4
5	Identify various ratings and specifications of domestic wiring accessories	<ul style="list-style-type: none"> <li>• I.E. rules on electrical wiring.</li> <li>• Study (rating, current carrying capacity and Specification) of wiring accessories- switches, sockets, plugs, fuses, relays, MCB, ELCB, MCCB etc</li> <li>• Grading of cables and current ratings.</li> </ul>	<ul style="list-style-type: none"> <li>• List various wiring materials.</li> </ul>	5
<b>Total</b>				32

### Unit 2 :Basic Health and Safety Practices in Power Related Work

Sl. No.	Expected Learning Outcome	Theory (12 hrs)	Practical (20 hrs)	Duration (32hrs)
1	Explain Personal Health and Safety Measures	<ul style="list-style-type: none"> <li>• Introduction to Occupational Safety and Health -importance of safety and health at workplace, CEA regulations</li> <li>• Protective clothing and</li> </ul>	<ul style="list-style-type: none"> <li>• Demonstrate the use of various protective equipment and protective clothing methods for specific work</li> </ul>	8

## ELECTRICIAN DOMESTIC SOLUTIONS

		<p>equipment for specific tasks and work conditions.</p> <ul style="list-style-type: none"> <li>Occupational Hazards- Basic Hazards- Possible Causes of risk and accident.</li> <li>Safe working practices at workplace</li> </ul>	<p>conditions</p> <ul style="list-style-type: none"> <li>Identify various occupational hazards and possible risks associated with electrical wiring</li> <li>Draw charts related to Safety &amp; Health standards</li> </ul>	
<b>2</b>	Identify the hazards and risks involved while performing electrical wiring	<ul style="list-style-type: none"> <li>Hazard identification and avoidance, safety signs for Danger, Warning, caution &amp; personal safety message Cause of Electrical hazards.</li> <li>Electrical safe working procedures</li> <li>Recognize various abnormalities in system installed alarms etc.</li> </ul>	<ul style="list-style-type: none"> <li>Practice Safe lifting and carrying practices</li> <li>Demonstrate various safety Measures while working at heights</li> <li>List various causes for electrical hazards/fire</li> </ul>	8
<b>3</b>	Explain the cause and effects of electrical shock and its first aid	<ul style="list-style-type: none"> <li>Shock – causes of electric shock.</li> <li>Electric Shock- effects and Treatment.</li> <li>Basic first-aid practices (bleeding, choking, electric shock, poisoning) and persons response.</li> <li>Artificial Respiration and CPR</li> <li>Method to move injured people and others during an emergency</li> </ul>	<ul style="list-style-type: none"> <li>Demonstrate how to free a person from electrocution and to check a person's response</li> <li>Demonstrate &amp; Practice first aid in case of bleeding, choking, electric shock, poisoning, burns etc</li> <li>Demonstrate basic techniques of bandaging</li> <li>Demonstrate the artificial respiration and the CPR Process</li> <li>Demonstrate method to move injured people and others during an emergency</li> </ul>	10
<b>4</b>	Identify cause of fire hazard and demonstration of a fire extinguisher	<ul style="list-style-type: none"> <li>Causes of fire and types of fire</li> <li>Types and working of fire extinguishers.</li> </ul>	<ul style="list-style-type: none"> <li>Practice rescue techniques applied during fire hazard</li> <li>Demonstrate good</li> </ul>	6



## ELECTRICIAN DOMESTIC SOLUTIONS

			house keeping in order to prevent fire hazards	
			<ul style="list-style-type: none"> <li>Practice the correct use of a fire extinguisher.</li> </ul>	
<b>Total</b>				<b>32</b>

Unit 3 :House wiring types and fault repair				
Sl. No.	Expected Learning Outcome	Theory (12hrs)	Practical (25hrs)	Duration (37 hrs)
1	Describe various types of domestic wiring system	<ul style="list-style-type: none"> <li>Types of House wiring</li> <li>Cleat wiring, Casing and Caping, Baton Wiring, Conduit wiring. (Baton &amp; Cleat nomenclatures only)</li> </ul>	<ul style="list-style-type: none"> <li>Practically understand various types of electrical wirings</li> </ul>	7
2	Identify Location of DB and switch board, Conduit laying procedures in domestic wiring	<ul style="list-style-type: none"> <li>Principle of laying out in domestic wiring</li> <li>Optimal expenditure based selection of Accessories.</li> <li>Economic way of wiring implementation considering future load growth</li> </ul>	<ul style="list-style-type: none"> <li>Estimation and cost-preparation of wiring layout.</li> <li>Practically Understand Depth of groove, channel size, clamping, boxes, hole pass on walls, pre lantern fittings and hooks on ceiling etc.</li> <li>practice inserting steel wire to drag the bunch of wires through conduit pipe using wire puller</li> </ul>	12
3	Identify different types of Wires and cables used in domestic wiring	<ul style="list-style-type: none"> <li>Types of wires and Cables, FR, FRLS, FRLS-ZH cables.</li> </ul>	<ul style="list-style-type: none"> <li>Identify various types of cables and measure conductor size using SWG.</li> </ul>	3
4	Identify common faults in Domestic wiring	<ul style="list-style-type: none"> <li>Types of faults in Electrical Wiring Short Circuit, open circuit, leakage &amp; Polarity Mismatch issues in Electrical wiring</li> </ul>	<ul style="list-style-type: none"> <li>Inspection of fault locating points (fuse blown, MCB, RCCB trip) in wiring circuit</li> <li>Identify reasons for Open circuits-</li> </ul>	8

## ELECTRICIAN DOMESTIC SOLUTIONS

			overheated switches, socket, and wires due to loose contact, Overload etc	
<b>5</b>	Explain suitable safety methods employed in domestic wiring	<ul style="list-style-type: none"> <li>• Safety Regulations &amp; Guidelines related to Wiring</li> <li>• Care and maintenance of trade tools</li> <li>• Introduction to Personal Protective Equipment (PPE)-Types- respiratory &amp; Non respiratory</li> </ul>	<ul style="list-style-type: none"> <li>• Demonstrate safety aspects in electrical wiring</li> <li>• Demonstrate proper care and maintenance of tools and tackles</li> <li>• Identify Personal Protective Equipment (PPE) and use the same as per related working environment.</li> </ul>	7
<b>Total</b>				<b>37</b>

Unit 4 : Mains , distribution, controls , circuits and protection in house wiring				
Sl.No.	Expected Learning Outcome	Theory (30 hrs)	Practical (34 hrs)	Duration (64 Hrs)
<b>1</b>	Identify main circuit, power circuit, sub circuit, distribution board, energy meter and service mains in house wiring	<ul style="list-style-type: none"> <li>• Utility service connection-requirements</li> <li>• Sub circuit- LDB, PDB design</li> <li>• Components of Mains Board</li> <li>• Basic Working of Controlling and Protection devices – MCB, ELCB, RCCB, Fuse -Kitkat</li> <li>• Equal distribution of load on three phase wiring</li> <li>• Checking Color coding, connection and identification of conductors, cables and wires based on IE standards</li> </ul>	<ul style="list-style-type: none"> <li>• Prepare of layout and estimation for LDB and PDB</li> <li>• Wire-up main board for Light and power loads</li> </ul>	14
<b>2</b>	Demonstrate house wiring in open and closed conduit system	<ul style="list-style-type: none"> <li>• Locating and marking positions of conduit</li> <li>• Understanding plan for identifying obstructions</li> <li>• Checking cable routing</li> </ul>	<ul style="list-style-type: none"> <li>• Practice different wiring with minimum points.</li> <li>• Practice laying conduits- positioning,</li> </ul>	14

		<p>and connection of unipolar devices</p> <ul style="list-style-type: none"> <li>• Installation of fixtures, control and distribution equipment.</li> <li>• Wire Joints- Types</li> <li>• Additional requirements calculation- extended line (for load, communication, cctv etc)</li> </ul>	<p>making openings in structures, reading plan for obstructions, laying conduit with clamps, fitting fixtures, controlling and protective devices, pulling out wires through conduits etc.</p> <ul style="list-style-type: none"> <li>• Practice wire joints.</li> <li>• Practice wiring extended lines for additional points.</li> </ul>	
3	Apply protective devices in house wiring	<ul style="list-style-type: none"> <li>• Protective Devices in Electric Circuit.</li> <li>• Insulation resistance</li> <li>• IR measurement- megger</li> <li>• Selection of equipments considering external influences – Updated technology products1)</li> <li>• Design protective devices as per load</li> <li>• Installation and testing of protective devices</li> <li>• Ensuring connections of devices are as per CEA guidelines</li> </ul>	<ul style="list-style-type: none"> <li>• Practice installation of Protective devices in a circuit.</li> <li>• Practice the selection of Under voltage protective devices.</li> <li>• Practice the methods of protection against electrical shock</li> <li>• Practice the use of megger and measuring using the same.</li> <li>• Practice proper selection of cables as per load, checking connections for proper tightening, colour coding etc</li> </ul>	9
4	Demonstrate earthing in domestic wiring installation	<ul style="list-style-type: none"> <li>• Earthing &amp; Its importance</li> <li>• Types of earthing (PE&amp; FE)</li> <li>• Plate earthing and pipe earthing methods and IEE regulations.</li> </ul>	<ul style="list-style-type: none"> <li>• Plan and prepare Earthing installation</li> <li>• Practice the procedure of earth connection with appliances, sockets, mainboards and distribution boards.</li> <li>• Practice pipe earthing</li> <li>• Practice plate earthing</li> </ul>	11
5	Demonstrate the	<ul style="list-style-type: none"> <li>• Fitting installation</li> </ul>	<ul style="list-style-type: none"> <li>• Demonstrate</li> </ul>	8

## ELECTRICIAN DOMESTIC SOLUTIONS

	installation of power saving devices, home automation and control circuit in domestic electrical installations	<ul style="list-style-type: none"> <li>• Introduction to Technology based power saving devices.</li> <li>• IOT Based Home automations, Wired automations</li> <li>• Installation of water pump with control circuit for water level indicator</li> <li>• Selection of Starters – DOL &amp; Star/Delta</li> </ul>	<p>various fittings- LED, fans, tube lights, lamps, doorbells, switches, geyser, inverter, exhaust fans, safety alarms etc.</p> <ul style="list-style-type: none"> <li>• Demonstrate use of energy saving devices like trimmers, impulse relays, programmable switches, twilight switch and movement detectors.</li> <li>• Practice DOL starter Connections</li> </ul>	
<b>6</b>	Identify various testing instruments and methods of testing in domestic installation.	<ul style="list-style-type: none"> <li>• Testing of installations</li> </ul>	<ul style="list-style-type: none"> <li>• Operate instruments to check the healthiness of house wiring in terms of leakage insulation resistance</li> <li>• Operate instruments to check the continuity, open circuit, short circuit and load flow</li> <li>• Operate instruments to check the earth resistance</li> </ul>	8
<b>Total</b>				<b>64</b>

### CLASS 12

#### Part A: Employability Skills

Sl.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
	<b>Total</b>	<b>110</b>

<b>Unit 1: Communication Skills - IV</b>			
<b>Expected Learning Outcome</b>	<b>Theory (10 hrs)</b>	<b>Practical (15 hrs)</b>	<b>Duration (25 hrs)</b>
1. Describe the steps to active listening skills	<ul style="list-style-type: none"> <li>• Importance of active listening at workplace</li> <li>• Steps to active listening</li> </ul>	<ul style="list-style-type: none"> <li>• Demonstration of the key aspects of becoming active listener</li> <li>• Preparing posters of steps for active listening</li> </ul>	10
2. Demonstrate basic writing skills	<ul style="list-style-type: none"> <li>- Writing skills to the following:               <ul style="list-style-type: none"> <li>• Sentence</li> <li>• Phrase</li> <li>• Kinds of Sentences</li> <li>• Parts of Sentence</li> <li>• Parts of Speech</li> <li>• Articles</li> <li>• Construction of a Paragraph</li> </ul> </li> </ul>	<ul style="list-style-type: none"> <li>• Demonstration and practice of writing sentences and paragraphs on topics related to the subject</li> </ul>	15
<b>Total</b>			<b>25</b>

<b>Unit 2: Self-Management Skills – IV</b>			
<b>Expected Learning Outcome</b>	<b>Theory (10 hrs)</b>	<b>Practical (15 hrs)</b>	<b>Duration (25 hrs)</b>
1. Describe the various factors influencing self-motivation	<ul style="list-style-type: none"> <li>• Finding and listing motives (needs and desires);</li> <li>• Finding sources of motivation and inspiration (music, books, activities);expansive thoughts; living fully in the present moment; dreaming big</li> </ul>	<ul style="list-style-type: none"> <li>• Group discussion on identifying needs and desire</li> <li>• Discussion on sources of motivation and inspiration</li> </ul>	10
2. Describe the basic personality traits, types and disorders	<ul style="list-style-type: none"> <li>• Describe the meaning of personality</li> <li>• Describe how personality influence others</li> <li>• Describe basic personality traits</li> <li>• Describe common personality disorders- paranoid, antisocial, schizoid, borderline, narcissistic, avoidant, dependent and obsessive</li> </ul>	<ul style="list-style-type: none"> <li>• Demonstrate the knowledge of different personality types</li> </ul>	15
<b>Total</b>			<b>25</b>

<b>Unit 3: Information and Communication Technology Skills - IV</b>			
<b>Expected Learning Outcome</b>	<b>Theory (06 hrs)</b>	<b>Practical (14 hrs)</b>	<b>Duration (20 hrs)</b>
1. Perform tabulation using spreadsheet application	<ul style="list-style-type: none"> <li>• Introduction to spreadsheet application</li> <li>• Spreadsheet applications</li> <li>• Creating a new worksheet</li> <li>• Opening workbook and entering text</li> <li>• Resizing fonts and styles</li> <li>• Copying and moving</li> <li>• Filter and sorting</li> <li>• Formulas and functions</li> <li>• Password protection.</li> <li>• Printing a spreadsheet.</li> <li>• Saving a spreadsheet in various formats.</li> </ul>	<ul style="list-style-type: none"> <li>- Demonstration and practice on the following:               <ul style="list-style-type: none"> <li>• Introduction to the spreadsheet application</li> <li>• Listing the spreadsheet applications</li> <li>• Creating a new worksheet</li> <li>• Opening the workbook and enter text</li> <li>• Resizing fonts and styles</li> <li>• Copying and move the cell data</li> <li>• Sorting and Filter the data</li> <li>• Applying elementary formulas and functions</li> <li>• Protecting the spreadsheet with password</li> <li>• Printing a spreadsheet</li> <li>• Saving the spreadsheet in various formats.</li> </ul> </li> </ul>	<b>10</b>
2. Prepare presentation using presentation application	<ul style="list-style-type: none"> <li>• Introduction to presentation</li> <li>• Software packages for presentation</li> <li>• Creating a new presentation</li> <li>• Adding a slide</li> <li>• Deleting a slide</li> <li>• Entering and editing text</li> <li>• Formatting text</li> <li>• Inserting clipart and images</li> <li>• Slide layout</li> <li>• Saving a presentation</li> <li>• Printing a presentation document.</li> </ul>	<ul style="list-style-type: none"> <li>- Demonstration and practice on the following:               <ul style="list-style-type: none"> <li>• Listing the software packages for presentation</li> <li>• Explaining the features of presentation</li> <li>• Creating a new presentation</li> <li>• Adding a slide to presentation.</li> <li>• Deleting a slide</li> <li>• Entering and edit text</li> <li>• Formatting text</li> <li>• Inserting clipart and images</li> <li>• Sliding layout</li> <li>• Saving a presentation</li> <li>• Printing a presentation document</li> </ul> </li> </ul>	<b>10</b>
<b>Total</b>			<b>20</b>

<b>Unit 4: Entrepreneurial Skills - IV</b>			
<b>Expected Learning Outcome</b>	<b>Theory (10 hrs)</b>	<b>Practical (15 hrs)</b>	<b>Duration (25 hrs)</b>
1. Identify the general and entrepreneurial behavioural competencies	<ul style="list-style-type: none"> <li>Barriers to becoming entrepreneur</li> <li>Behavioural and entrepreneurial competencies – adaptability/decisiveness, initiative/perseverance, interpersonal skills, organizational skills, stress management, valuing service and diversity</li> </ul>	<ul style="list-style-type: none"> <li>Administering self-rating questionnaire and score responses on each of the competencies</li> <li>Collect small story/ anecdote of prominent successful entrepreneurs</li> <li>Identify entrepreneurial competencies reflected in each story and connect it to the definition of behavioural competencies</li> <li>Preparation of competencies profile of students</li> </ul>	<b>10</b>
2. Demonstrate the knowledge of self-assessment of behavioural competencies	<ul style="list-style-type: none"> <li>Entrepreneurial competencies in particular: self -confidence, initiative, seeing and acting on opportunities, concern for quality, goal setting and risk taking, problem solving and creativity, systematic planning and efficiency, information seeking, persistence, influencing and negotiating, team building</li> </ul>	<ul style="list-style-type: none"> <li>Games and exercises on changing entrepreneurial behaviour and development of competencies for enhancing self-confidence, problem solving, goal setting, information seeking, team building and creativity</li> </ul>	<b>15</b>
<b>Total</b>			<b>25</b>

<b>Unit 5: Green Skills - IV</b>			
<b>Expected Learning Outcome</b>	<b>Theory (05 hrs)</b>	<b>Practical (10 hrs)</b>	<b>Duration (15 hrs)</b>
1. Identify the role and importance of green jobs in different sectors	<ul style="list-style-type: none"> <li>Role of green jobs in toxin-free homes,</li> <li>Green organic gardening, public transport and energy conservation,</li> <li>Green jobs in water conservation</li> <li>Green jobs in solar and</li> </ul>	<ul style="list-style-type: none"> <li>Listing of green jobs and preparation of posters on green job profiles</li> <li>Prepare posters on green jobs.</li> </ul>	<b>15</b>

## ELECTRICIAN DOMESTIC SOLUTIONS

	wind power, waste reduction, reuse and recycling of wastes, <ul style="list-style-type: none"> <li>• Green jobs in green tourism</li> <li>• Green jobs in building and construction</li> <li>• Green jobs in appropriate technology</li> <li>• Role of green jobs in Improving energy and raw materials use</li> <li>• Role of green jobs in limiting greenhouse gas emissions</li> <li>• Role of green jobs minimizing waste and pollution</li> <li>• Role of green jobs in protecting and restoring ecosystems</li> <li>• Role of green jobs in support adaptation to the effects of climate change</li> </ul>		
<b>Total</b>			<b>15</b>

### Part B–Vocational Skills

Sl.No.	Units	Duration (hrs)
1.	Unit 1: Electrical Machines	32
2.	Unit 2: Maintenance and repair of domestic appliances	96
3.	Unit 3: Illumination and Stand-alone power supplies	37
<b>Total</b>		<b>165</b>

Unit 1 :Electrical Machines				
Sl. No.	Expected Learning Outcome	Theory (12 hrs)	Practical (20 Hrs )	Duration (32 hrs)
1	Explain the working of Transformer	<ul style="list-style-type: none"> <li>• Magnetism – Electromagnetic Induction</li> <li>• Transformer Working</li> <li>• Transformer types (nomenclature)</li> <li>• Turns ratio</li> <li>• KVA rating</li> </ul>	<ul style="list-style-type: none"> <li>• Identify the parts of a transformer</li> </ul>	6
2	Explain the working principle of AC Generators and Motors	<ul style="list-style-type: none"> <li>• AC machines - generator-types-working principle.</li> <li>• AC Motor- three phase motor-</li> </ul>	<ul style="list-style-type: none"> <li>• Demonstrate the parts and working of motor and generator.</li> <li>• Practice to assemble–de-assemble a</li> </ul>	18



		<p>construction-RMF-working</p> <ul style="list-style-type: none"> <li>• Necessity of starter &amp; types</li> <li>• DOL starter working and connection diagram</li> <li>• single phase motor-Working- &amp; application of different types of single phase motors- Universal motors- Brushless DCM</li> <li>• significance of poles-significance of windings-rpm-speed and direction</li> </ul>	<p>motor/pump to identify various parts and their functions.</p>	
3	Demonstrate Insulation Resistance and gauge measurement of motor windings	<ul style="list-style-type: none"> <li>• Insulation resistance measurement for motor windings-winding to earth-between live conductors</li> <li>• Types of motor winding-gauge of winding wires-motor winding insulation</li> </ul>	<ul style="list-style-type: none"> <li>• Test IR of motor windings. Line to earth, line to line.</li> </ul>	8
<b>Total</b>				<b>32</b>

**Unit 2 :Maintenance and Repair of Domestic Appliances**

Sl. No.	Expected Learning Outcome	Theory (30 hrs)	Practical ( 66 hrs)	Duration (96 hrs)
1	Develop skill in identifying specification and protective systems of various appliances	<ul style="list-style-type: none"> <li>• Circuit diagrams and specifications of electrical equipment.</li> <li>• Capacity, load, and power consumption of various electrical equipment.</li> <li>• Equipment connections and overload / fault tripping devices for gadget protection</li> <li>• Isolating and switching devices for equipment protection</li> </ul>	<ul style="list-style-type: none"> <li>• Understand and practice ratings and specifications of various equipment- KW, Amps, Kwh , Voltage, Capacity etc.</li> <li>• Practice the equipment connections, connections of trip switches and isolators.</li> </ul>	8
2	Demonstrate various types of Heating Elements,	<ul style="list-style-type: none"> <li>• Heating Elements- Types, various shape, size and capacity.</li> </ul>	<ul style="list-style-type: none"> <li>• Demonstrate materials used to make various</li> </ul>	8

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	Thermal Relays and Insulations used in Heating Appliances	<ul style="list-style-type: none"> <li>• materials for making heating element</li> <li>• Thermal insulations in electrical gadgets.</li> <li>• Study of timers, thermal relays and bimetallic strips used in electrical gadgets/equipment</li> </ul>	<p>types of heating elements - nichrome, kanthal, eureka etc.,</p> <ul style="list-style-type: none"> <li>• Demonstrate various shape, size and capacity of heating elements according to applications and usages</li> <li>• Demonstrate types of thermal insulations used in electrical gadgets- mica, asbestos, ceramics, glass wool etc.</li> </ul>	
<b>3</b>	Identify the parts of Various Domestic Appliances	<ul style="list-style-type: none"> <li>➤ Draw the circuit connection, Constructional details and Function of each part of <ul style="list-style-type: none"> <li>• Automatic Iron</li> <li>• Water Heater</li> <li>• Toaster</li> <li>• Induction Cooker</li> <li>• Ceiling fan</li> <li>• Electric Mixer</li> <li>• Water Pump</li> </ul> </li> </ul>	<ul style="list-style-type: none"> <li>➤ Practice identifying the parts of Domestic appliances <ul style="list-style-type: none"> <li>• Automatic Iron</li> <li>• Water Heater</li> <li>• Toaster</li> <li>• Induction Cooker</li> <li>• Ceiling fan</li> <li>• Electric Mixer</li> <li>• Water Pump</li> </ul> </li> </ul>	35
<b>4</b>	Develop skill in Servicing of Various domestic appliances	<ul style="list-style-type: none"> <li>➤ Precaution to be taken while using various appliances.</li> <li>➤ Preparation of trouble shooting chart and fault rectification of <ul style="list-style-type: none"> <li>• Automatic Iron</li> <li>• Water Heater</li> <li>• Toaster</li> <li>• Induction Cooker</li> <li>• Ceiling fan</li> <li>• Electric Mixer</li> <li>• Water Pump</li> </ul> </li> </ul>	<ul style="list-style-type: none"> <li>➤ Practice Various test to identify faults and rectification procedure of <ul style="list-style-type: none"> <li>• Automatic Iron</li> <li>• Water Heater</li> <li>• Toaster</li> <li>• Induction Cooker</li> <li>• Ceiling fan</li> <li>• Electric Mixer</li> <li>• Water Pump</li> </ul> </li> </ul>	45
<b>Total</b>				<b>96</b>

<b>Unit 3 :Illumination and Standalone Power supplies</b>				
<b>Sl. No.</b>	<b>Expected Learning Outcome</b>	<b>Theory (12 hrs)</b>	<b>Practical (25 hrs)</b>	<b>Duration (37 hrs)</b>
1	Explain different types of lamps	<ul style="list-style-type: none"> <li>➤ Parts and working of               <ul style="list-style-type: none"> <li>• Incandescent lamp</li> <li>• Fluorescent lamp</li> <li>• LED lamp</li> <li>• Sodium Vapour Lamp</li> </ul> </li> </ul>	<ul style="list-style-type: none"> <li>➤ Practice soldering of electronic components and prepare an LED lamp</li> </ul>	10
2	Develop skill in maintenance of solar panel	<ul style="list-style-type: none"> <li>• Photo Voltaic Effect</li> <li>• Advantages &amp; Disadvantages of Solar</li> <li>• Maintenance of solar panels</li> </ul>	<ul style="list-style-type: none"> <li>• Practice Cleaning of solar panels for removal of dust, bird droppings, pollen, leaves, branches etc. as per maintenance schedule</li> <li>• Practice safe handling &amp; maintenance of SPV system</li> </ul>	10
2	Develop skill in maintenance of standalone power supplies	<ul style="list-style-type: none"> <li>• Different types of Lead Acid Battery</li> <li>• AH Capacity</li> <li>• Care &amp; Maintenance of Lead Acid Battery</li> <li>• Usage and connections of Inverter and UPS</li> </ul>	<ul style="list-style-type: none"> <li>• Practice Inverter, UPS and Battery Connections</li> </ul>	17
<b>Total</b>				<b>37</b>

## 6. ORGANISATION OF FIELD VISITS/ON-THE-JOB TRAINING

In a year, at least three field visits/educational tours should be organized for the students to expose them to the activities in the workplace. Teachers and students should visit a construction site, Industries, home appliance servicing centers, generating stations, transmission substations etc.

During the visit, students should obtain the following information's from the Assistant Engineer, contractor, site supervisor and technicians of the center.

1. Types of Electrical Wiring
2. Classification and rating of various wiring accessories.
3. Methods of Laying conduits and wire pulling
4. Work safety in domestic wiring
5. Emergency rescue and first-aid practices
6. Fire and Electrical Hazards.

7. Electrical faults inspection and repair
8. Methods of protection systems
9. Selection of protective devices
10. Earthing and its importance
11. Testing and measuring instruments
12. IOT based technologies in automation
13. Types of DC and AC machines.
14. Servicing of various home appliances
15. Installation of various standalone power supplies.
16. Testing of insulation resistance and earth resistance
17. Types of Electricity generation
18. Transmission aspects of Electrical Power.

On-the-job training of at least 80 hours is to be organised by the institution to provide hands-on training to the students.

### **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.

1. Crimping Tool
2. Combination Pliers
3. Screwdriver set
4. Wire stripper and nipper
5. Ballpein hammer
6. Multimeter
7. Double end spanner set
8. Drilling machine
9. Nose pliers
10. Side cutting pliers
11. Line tester
12. Pocker
13. Wire gauge
14. Soldering kit
15. wiring puller
16. Safety gears

17. first aid box
18. fire extinguishers
19. Distribution boards
20. MCB
21. RCCB
22. Isolators
23. Energy Meter
24. Single phase panel boards
25. Wires and Cables
26. Wiring accessories
27. PVC Conduits
28. Voltmeter
29. Ammeter
30. Clamp meter
31. Earth resistance tester
32. Insulation tester
33. Switches
34. Ceiling Fan
35. Mixer grinder
36. Inverter with battery and charger
37. Induction cooker
38. Water Heater
39. Solar P V panel
40. Dol Starters
41. Electric Iron
42. Electric Toaster

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