

# Curriculum For General Electrician

(Certificate Level- 6 months)



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## **Overall objective of the course**

To produce the quality skilled work force for domestic / industrial sector of country to help reduce the poverty & increase the self employability.

### **Competencies gained after completion of the course**

After completing the course the trainee will be able to:

- Carry out domestic/ Industrial Electrical Installations
- Install domestic/ Industrial Safety, Security and communication system
- Inspect, test, trace and repair fault in domestic/ Industrial Electrical Installations
- Prepare estimates for domestic/ Industrial Electrical Installations

### **Opportunities available immediately and in the future**

Passed out may find out job opportunities in:

- Domestic Electrician shop as electrician
- Construction Industries as electrician
- Industrial low voltage electrical work shop
- Power Generation units
- Electrical equipment manufacturing firms
- Plant operations and maintenance
- Self employment as well as in public and private sector as an Assistant Electrician

## Overview about the program – Curriculum for General Electrician

Module Title and Aim	Learning Unit	Theory Day/hours	Workplace Day/hours
<p><b>Module 1:</b> Domestic Electrical Installation and Estimation</p> <p>Aim : On Successful completion of this module the trainee will be competent to work in the construction sector as a domestic electrician.</p> <p>At the end of this module the trainee how to install domestic wires / Safety /Security &amp; Communication System and Fault finding &amp; Repairing in Installation work.</p>	LU1: Fundamental of Electricity	15 Hours	36 Hours
	LU 2: Bench Work	15 Hours	36 Hours
	LU 3 Carry Out Domestic Electrical Wiring	15Hours	110 Hours
	LU4: Install Domestic Safety / Security and Communication System	15 Hours	65 Hours
	LU5: Carr out Inspection, Testing, Fault Finding and Repair in Domestic Electrical Installation	09 Hours	26 Hours
	LU6: Prepare Estimates For Electrical Installation	09 Hours	28 Hours
	TEST	TEST	02 Hours
<p><b>Module 2:</b> Industrial Electrical Installation &amp; Troubleshooting</p> <p>Aim : On Successful completion of this module the trainee will be competent to work in the Industrial sector as an electrician.</p> <p>At the end of this module the trainee how to install Industrial low voltage System and Fault finding &amp; Repairing in Industrial Installation work.</p>	LU1: Industrial Electrical Installation	26 Hours	104 Hours
	LU2: Industrial Safety / Security and Communication System	06 Hours	30 Hours
	LU3: Inspect, Test, Trace, and Repair Faults in Industrial Electrical Installation	12 Hours	48 Hours
	LU4: Install, Service and Repair Motors & Generators	14 Hours	56 Hours
	LU5: Install, Service and Repair Electrical Control system & Protective Switch gear	12 Hours	48 Hours
	LU6: Prepare Estimates For Electrical Installation	04 Hours	20 Hours
	TEST	TEST	02 Hours

# General Electrician Curriculum Contents

**Module 1 Title:** Domestic Electrical Installation and Estimation

**Objective of the Module:** To produce the quality skilled work force for domestic sector of country to help reduce the poverty & increase the self employability

**Duration:** 400 Hours    **Theory:** 80 Hours    **Practice:** 320 Hours

Learning Unit	Learning Outcomes	Learning Elements	Duration	Tools/Material Required	Learning Place
<b>LU 1: Fundamental of Electricity</b>	<p>On completion of this module the trainee should be able to:</p> <ul style="list-style-type: none"> <li>• Know the Structure of Atom</li> <li>• Conductor, Insulator , Semi Conductor and their properties</li> </ul>	<ul style="list-style-type: none"> <li>i. Explain and construction of Atoms</li> <li>ii. Explain electron, protons and neutrons</li> <li>iii. Differentiate between conductor, insulators and semiconductors</li> </ul>	06 Hours	Teaching Aids.	Work Shop /Class Room
<b>2: Ohm's Law</b>	<ul style="list-style-type: none"> <li>• Concept of resistance</li> <li>• Laws of resistance</li> <li>• Relation between I,V and R</li> </ul>	<ul style="list-style-type: none"> <li>i. Describe the relation between V&amp;I, I&amp;R when the resistance and voltage are remain constant respectively</li> </ul>	06 Hours		
<b>3: Series Circuit</b>	<ul style="list-style-type: none"> <li>• Connections of Resistances</li> <li>• Properties of Series Circuit</li> </ul>	<ul style="list-style-type: none"> <li>i. Describe the properties of series circuit</li> <li>ii. Behavior of voltage current and resistance</li> </ul>	06 Hour		
<b>4: Parallel Circuit</b>	<ul style="list-style-type: none"> <li>• Connection of resistances</li> <li>• Properties of parallel circuit</li> </ul>	<ul style="list-style-type: none"> <li>i. Describe the properties of</li> </ul>	06 Hours		

<b>5:Series and parallel (combined circuit)</b>	<ul style="list-style-type: none"> <li>• Connections of resistances</li> <li>• Trade calculations of Series and parallel Circuit</li> </ul>	<ul style="list-style-type: none"> <li>parallel circuit</li> <li>ii. Behavior of voltage , current , resistance and conductance</li> <li>i. Describe the combination of series and parallel circuit and their properties</li> <li>ii. Measuring Marking, cutting, filing,</li> </ul>	<p>06 Hours</p>		
<b>LU 2: Bench Work</b>	<ul style="list-style-type: none"> <li>• Make the I and L type terminal plate</li> </ul>	<ul style="list-style-type: none"> <li>i. Drilling, countersinking, champ ring</li> </ul>	<p>72Hours</p>	<ul style="list-style-type: none"> <li>• Tufnell sheet</li> <li>• Bench drill</li> <li>• Bench vice</li> <li>• Vice clamps</li> <li>• Metallic drill bit assorted size</li> <li>• Files</li> </ul>	
<b>LU 3:Carry out Domestic electrical installation</b>	<ul style="list-style-type: none"> <li>• Know safety rules and regulation in electrical installation works.</li> <li>• Know the Various types of tools and Testing / Measuring Instrument and their uses in domestic installation</li> </ul>	<ul style="list-style-type: none"> <li>i. Take suitable measures in the event of electrical installation hazards.</li> <li>ii. Implement rules and regulations in domestic electrical works</li> <li>iii. Use proper safety equipment and wears essential in electrical installation works</li> <li>i. Implement appropriate procedures in the event of a workshop accident</li> <li>ii. Describe various tools used in domestic Installation</li> <li>iii. Describe various testing / measuring instrument used</li> </ul>	<p>15 Hours</p> <p>15 Hours</p>	<ul style="list-style-type: none"> <li>• Electrician tool kit complete with AVO</li> </ul>	

	<ul style="list-style-type: none"> <li>• Know how to interpret electrical working diagram in given situations</li> <li>• Know the principle of operation of protective device in domestic installation</li> </ul>	<p>in domestic installation</p> <ol style="list-style-type: none"> <li>iv. Use proper tool and testing / measuring instrument in carrying out domestic installation work</li> <li>v. Maintenance of various Tools&amp; testing / measuring instruments</li> <li>i. Make installation diagram using electrical engineering symbols</li> <li>ii. Use different scales in working drawing</li> <li>iii. Locate the position of the various accessories on a drawing</li> <li>iv. Describe all the electrical accessories required for a job from working drawing</li> <li>v. Make the distribution system from a drawing</li> <li>i. Describe common types of protective devices.</li> <li>ii. Installation and application of circuit breaker and fuses in electrical installation</li> <li>iii. Determine current rating of fuses.</li> <li>iv. Take suitable measure for proper earthing.</li> <li>v. Implement the regulation relating to various types of protective devices.</li> <li>vi. Use current and voltage</li> </ol>	<p>15 Hours</p> <p>30 Hours</p>	<p>meter &amp; Muggger</p> <ul style="list-style-type: none"> <li>• Soldering lead and fluxes</li> <li>• Vices</li> <li>• Control and protective switchgear used in domestic electrical installations</li> <li>• Wires and cables</li> <li>• Electrical conduit</li> <li>• Anchor bolts</li> <li>• Insulation tape</li> <li>• Draw-wire/ tape etc.,</li> <li>• PVC Surface/ conduits</li> <li>• Soldering iron (40-100watts)</li> <li>• Compression tools</li> <li>• Measuring tape</li> <li>• Electrical accessories</li> <li>• Wiring accessories</li> <li>• Flexible cords</li> <li>• Raw plugs</li> <li>• Cable lugs</li> <li>• Nails, screws</li> <li>• Steel Scale</li> <li>• Pencil</li> <li>• Eraser</li> <li>• Pointers</li> <li>• Highlighter</li> </ul>	
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	<ul style="list-style-type: none"> <li>• Understand the earthing system &amp; defective earth.</li> </ul>	<p>Inspect earth leakage fault.</p> <ol style="list-style-type: none"> <li>Inspect short circuit faults.</li> <li>Inspect over loading faults.</li> <li>Inspect insulation break down faults.</li> <li>Describe earth continuity conductor, earth lead &amp; earthing rod.</li> </ol> <ol style="list-style-type: none"> <li>Install the earthing system and check the resistance.</li> <li>Replacement of defective faulty earthing component.</li> </ol>		<p>installations</p> <ul style="list-style-type: none"> <li>• Wires and cables</li> <li>• Electrical conduit</li> <li>• Anchor bolts</li> <li>• Insulation tape</li> <li>• Draw-wire/ tape etc.,</li> <li>• PVC Pipe / duct</li> <li>• Soldering iron (40-100watts)</li> <li>• Lugs punching tools</li> <li>• Measuring tape</li> <li>• Electrical accessories</li> <li>• Flexible cords</li> <li>• Cable lugs</li> <li>• Nails, screws</li> </ul>	
<b>LU5: Install Domestic Safety / Security and Communication System</b>	<ul style="list-style-type: none"> <li>• Understand the Safety / Security and communication System</li> </ul>	<p>Installation of Various Types Safety / security and communication system.</p> <ul style="list-style-type: none"> <li>• Fire detection alarm circuit</li> <li>• Security protection devices or bells , bell indicators and electrical openers</li> <li>• Domestic communication devices (inter com , CCTV camera etc)</li> </ul>	35 Hours	<ul style="list-style-type: none"> <li>• Electrician's tool kit</li> <li>• Measuring instruments (AVO meter)</li> </ul>	
<b>LU6: Prepare Estimates For Electrical Installation</b>	<ul style="list-style-type: none"> <li>• Estimates For Electrical Installation</li> </ul>	<p>Follow appropriate procedure estimating purchase procedure, cost of materials, various charges like labor, stores, overhead tools, contingency etc.</p>	37Hours	<ul style="list-style-type: none"> <li>• Measuring Tape</li> <li>• Calculator</li> <li>• Stationary</li> <li>• Layout Plans</li> <li>• Manufacturer's Specification</li> </ul>	

**Module 2 Title:** Industrial Electrical Installation & Troubleshooting

**Objective of the Module:** The trainee will be competent to work in the Industrial sector as an electrician.

**Duration:** 400 Hours **Theory:** 76 Hours **Practice:** 324 Hours

Learning Unit	Learning Out Comes	Learning Elements	Duration	Material Required	Learning Place
<b>LU1: Industrial Electrical Installation</b>	<p>On completion of this module, the trainee should:</p> <p>Know safety rules and regulation in electrical installation works.</p>	<ol style="list-style-type: none"> <li>i. Take suitable measures in the event of electrical installation hazards.</li> <li>ii. Implement rules and regulations in domestic electrical works.</li> <li>iii. Use proper safety equipment and wears essential in electrical installation works.</li> <li>iv. Implement the appropriate procedures in the event of a workshop accident</li> </ol>	15 Hours	Electrician’s tool kit <ul style="list-style-type: none"> <li>• Multi-meter</li> <li>• Material required for the installation</li> <li>• Insulation resistance tester</li> <li>• Wires and cables</li> <li>• Personal protective equipment</li> </ul>	Work Shop / Class Room
	<p>Know the Various types of tools and Testing / Measuring Instrument and their uses in domestic installation</p>	<ol style="list-style-type: none"> <li>i. Describe various tools used in industrial Installation</li> <li>ii. Describe Various testing / measuring Instrument used in industrial installation</li> <li>iii. Use proper tool and testing / measuring instrument in carrying out industrial installation work</li> <li>iv. Maintenance of various</li> </ol>	15 Hours		

		Tools & testing / measuring instruments.			
	Know how to interpret electrical working diagram in given situation.	<ul style="list-style-type: none"> <li>i. Make installation diagram using electrical engineering symbols.</li> <li>ii. Use different scales in working drawing.</li> <li>iii. Locate the position of the various accessories on a drawing.</li> <li>iv. Describe all the electrical accessories required for a job from working drawing</li> <li>v. Make the distribution system from a drawing</li> </ul>	15 Hours		
	Know different types of industrial installations.	<ul style="list-style-type: none"> <li>i. Take suitable points that make up an Electrical working diagram.</li> </ul>	10 Hours		
	Know the installation of different types of ducts and trunkings applying all relevant regulation and safety precautions.	<ul style="list-style-type: none"> <li>i. Install: <ul style="list-style-type: none"> <li>a. Simple surface wiring for industrial installation</li> <li>b. Conduct wiring for industrial installation</li> </ul> </li> <li>ii. Implement the safety measures as provided for by the prevailing statutory regulations in carry the above.</li> <li>iii. Describe ducts and trunking systems.</li> <li>iv. Distinguish the</li> </ul>	25 Hours		

	<p>Know the types of joints, terminations of cable and the safety precautions involved</p>	<p>advantages and disadvantages of ducts and trunking in industrial electrical installation.</p> <ul style="list-style-type: none"> <li>v. Install the different types of ducts and trunking</li> <li>vi. Selection, use and maintenance of tools and equipment used for ducts and trunking systems.</li> <li>vii. Installation of different types of bus-bar trunking.</li> <li>viii. Perform how to bend, Set, Shape, File and fabricate accessories used in connection with ducts and trunkings using the appropriate tools and equipment.</li> <li>ix. Perform how to join lengths of ducts and trunking.</li> <li>x. Determine the importance of earth continuity and ensure its provision on all types of ducts and trunking</li> </ul> <ul style="list-style-type: none"> <li>i. Describe different types of tools and materials related to cable jointing.</li> <li>ii. Use proper tools and materials related to cable jointing and termination such as</li> </ul>	<p>15 Hours</p>		
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	<p>Know the installation of all types of electrical machines and equipment.</p>	<p>soldering bit, blow lamp etc</p> <ul style="list-style-type: none"> <li>iii. Recognize different types of insulating materials e.g. PVC cables etc.</li> <li>iv. Identify different types of conductors e.g. Copper , Aluminum, etc</li> <li>v. Take the suitable conducting materials for a specific work.</li> <li>vi. Connect the appliances and accessories into their terminal correctly.</li> <li>vii. Implement the safety regulation involved in joints and termination operations</li> </ul> <ul style="list-style-type: none"> <li>i. Perform the different levels of controlling machine e.g. direct –on –line, autotransformer, star– delta, capacitor start, root resistance starters.</li> <li>ii. Make an electrical control circuit consisting of a start/stop station, overloads, two-3phasemotors (which have isolating switches). One of the motors is attached to a pump, and the other is driving a pressure tank that has a high pressures witch.</li> <li>iii. Make different types of</li> </ul>	<p>20 Hours</p>		
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	<p>Understand various methods of controlling electrical machines and equipment.</p>	<p>connection e.g. Star – Delta, Delta – Star, etc</p> <ul style="list-style-type: none"> <li>i. Arrange the different types of repair, e.g. routine repair, corrective, etc</li> <li>ii. Provide repair procedure for each item and types equipment and machine.</li> <li>iii. Use various types and grades of lubrications e.g. grease, oil, and coolant etc. properly</li> </ul> <p>Operate various types of tools and equipment used for Repair: grease gun, oilcan, screwdriver, pulley extractors, wrench, and blower, filler gauge.</p>	<p>15 Hours</p>		
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<b>LU2: Inspect, Test, Trace, and Repair Faults in Industrial Electrical Installation</b>	Understand the sequence of inspecting and testing industrial installation.	<ol style="list-style-type: none"> <li>i. Apply statutory safety regulations for life, properties and environment.</li> <li>ii. Visually detect electrical and mechanical loose connections.</li> <li>iii. Perform three types of electrical installation test.</li> </ol>	15 Hours	Electrician's tool kit <ul style="list-style-type: none"> <li>• Multi-meter</li> <li>• Material required for the installation</li> <li>• Insulation resistance tester</li> <li>• Wires and cables</li> <li>• Personal protective equipment</li> </ul>	Work Shop / Class Room
	Know methods of maintaining electrical machines and equipment.	<ol style="list-style-type: none"> <li>i. Determine the suitability of different types of enclosures and their application e.g. totally enclosed, water proof and semi-enclosed, etc.</li> <li>ii. Describe the construction of a good foundation form mounting machines and equipment.</li> <li>iii. Mount properly AC and DC machines and equipment.</li> <li>iv. Select the correct size of cable for the appropriate machine installations.</li> <li>v. Select flexible conduit correctly for machine terminations.</li> <li>vi. Connect starter in the circuit properly.</li> </ol>	25 Hours		



	Know faults in machines, equipment, installations and their remedies	<p>i. Inspect causes of breakdown e.g. short circuit, open circuit, worn out parts, insulation breakdown, incorrect use, and overload, ageing, etc</p> <p>ii. Detect the causes of faults and clarify them e.g. fuse melting, circuit breaker tripping, etc.</p> <p>iii. Determine fault by noise symptoms. Interpret circuit diagram</p>	20 Hours		
<b>LU3: Industrial Safety / Security and Communication System</b>	Understand the Safety / Security and communication System	<p>Install the Various Types of Safety / security and communication system</p> <p>Fire detection alarm circuit / Burglar alarm system</p> <p>Security protection system</p> <p>industrial communication devices (inter com , Public address system CCTV camera etc)</p>	36 Hours	<p>Electrician's tool kit</p> <ul style="list-style-type: none"> <li>• Multi-meter</li> <li>• Material required for the installation</li> <li>• Insulation resistance tester</li> <li>• Wires and cables</li> <li>• Personal protective equipment</li> </ul>	Work Shop / Class Room
<b>LU4: Prepare Estimates For Electrical Installation</b>	Estimates For Electrical Installation	<p>i. Follow appropriate procedure estimating purchase procedure, cost of materials, various charges like labor, stores, overhead tools, contingency etc.</p>	24 Hours	<p>Electrician's tool kit</p> <ul style="list-style-type: none"> <li>• Multi-meter</li> <li>• Material required for the installation</li> <li>• Insulation resistance tester</li> <li>• Wires and cables</li> <li>• Personal protective equipment</li> </ul>	Work Shop / Class Room

<b>LU5: Install, Service and Repair Motors &amp; Generators</b>	Understand the principles of operation of AC and DC machines and their applications.	<ol style="list-style-type: none"> <li>i. Describe the principle of operation &amp; operate each of the following machines:             <ol style="list-style-type: none"> <li>a. DC motor</li> <li>b. DC generator</li> <li>c. AC motor (Single phase &amp; three phase)</li> <li>d. AC generator (Single phase &amp; Three phase).</li> </ol> </li> <li>ii. Describe the constructional features Of:             <ol style="list-style-type: none"> <li>a. DC machines</li> <li>b. AC machines (Single phase &amp; Three Phase)</li> <li>c. AC generator (Single phase &amp; Three phase).</li> </ol> </li> <li>iii. Differentiate between:             <ol style="list-style-type: none"> <li>a. DC and AC motors</li> <li>b. DC and AC generators</li> </ol> </li> </ol>	20 Hours	Electrician's tool kit <ul style="list-style-type: none"> <li>• Multi-meter</li> <li>• Material required for the installation</li> <li>• Insulation resistance tester</li> <li>• Wires and cables</li> <li>• Personal protective equipment</li> </ul>	Work Shop / Class Room
	Know methods of maintaining electrical machines and equipment.	<ol style="list-style-type: none"> <li>i. Determine the suitability of different types of enclosures and their application e.g. totally enclosed, water proof and semi-enclosed, etc.</li> <li>ii. Describe the construction of a good foundation for mounting machines and equipment.</li> <li>iii. Mount properly AC and DC machines and equipment.</li> </ol>	25 Hours		

	Know faults in machines, equipment, installations and their remedies	<ul style="list-style-type: none"> <li>iv. Select the correct size of cable for the Appropriate machine installations.</li> <li>v. Select flexible conduit correctly for machine terminations.</li> <li>vi. Connect starter in the circuit properly.</li>   <li>i. Detect causes of breakdown e.g. short circuit, open circuit, worn out parts, insulation breakdown, incorrect use, and overload, ageing, etc</li> <li>ii. Inspect and clarify the causes of faults e.g. fuse melting, circuit breaker tripping, etc.</li> <li>iii. Determine fault by noise symptoms.</li> <li>iv. Interpret circuit diagram</li> </ul>	25 Hours		
<b>LU 6: Install, Service and Repair Electrical Control system &amp; Protective Switch gear</b>	Know the Various types of Control system & Switchgear and their uses in domestic installation	<ul style="list-style-type: none"> <li>i. Use proper electrical tools for wiring purpose</li> <li>ii. Use proper electrical measuring instruments during testing electrical installations</li> <li>iii. Install different types of electrical wiring systems for industrial purposes.</li> </ul>	10 Hours	Electrician's tool kit <ul style="list-style-type: none"> <li>• Multi-meter</li> <li>• Material required for the installation</li> <li>• Insulation resistance tester</li> <li>• Wires and cables</li> <li>• Personal protective equipment</li> </ul>	Work Shop / Class Room
	Know the trouble shooting &	<ul style="list-style-type: none"> <li>i. Install different types of</li> </ul>	20 Hours		



		<ul style="list-style-type: none"><li>i. Implement Electrical legislations and regulations related to electrical control system and protective switchgear</li><li>ii. Take suitable measures for record keeping and reporting.</li></ul>	10 Hours		
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## General Electrician Curriculum Assessment

**Module 1 Title:** Domestic Electrical Installation and Estimation

**Objective of the Module:** To produce the quality skilled work force for domestic sector of country to help reduce the poverty & increase the self employability

**Duration:** 400 Hours **Theory:** 80 Hours **Practice:** 320 Hours

Learning Unit	Theory Days / Hours	Work place Days / Hours	Recommended Formative Assessment	Recommended Methodology	Scheduled Dates
<b>M1-LU1 Fundamental of Electricity</b>	01 Hour	05 Hours	<ul style="list-style-type: none"> <li>• Explain and construction of Atoms</li> <li>• Explain electron, protons and neutrons</li> <li>• Differentiate between conductor, insulators and semiconductors</li> </ul>	<ul style="list-style-type: none"> <li>• Question answers Method</li> <li>• Demonstration Method</li> <li>• Work Shop Method</li> <li>• Home Assignment</li> <li>• Project Method</li> </ul>	As per Schedule
2: Ohm's Law	01 Hour	05 Hours	<ul style="list-style-type: none"> <li>• Describe the relation between V&amp;I, I&amp;R when the resistance and voltage are remain constant respectively</li> </ul>		
3: Series Circuit	01 Hour	05 Hours	<ul style="list-style-type: none"> <li>• Describe the properties of series circuit</li> <li>• Behavior of voltage current and resistance</li> </ul>		
4: Parallel Circuit	01 Hour	05 Hours	<ul style="list-style-type: none"> <li>• Describe the properties of parallel circuit</li> <li>• Behavior of voltage , current , resistance and conductance</li> </ul>		

5:Series and parallel (combined circuit)	01 Hour	05 Hours	<ul style="list-style-type: none"> <li>Describe the combination of series and parallel circuit and their properties</li> </ul>		
<b>M1- LU2 Bench Work</b>	15 Hours	57 Hours	<ul style="list-style-type: none"> <li>Measuring Marking, cutting, filing,</li> <li>Drilling, countersinking, hampering</li> </ul>	<ul style="list-style-type: none"> <li>Question answers Method</li> <li>Demonstration Method</li> <li>Work Shop Method</li> <li>Home Assignment</li> <li>Project Method</li> </ul>	
<b>M1- LU3 Domestic Electrical Installation</b>	03 Hours  03 Hours	12 Hours  12 Hours	<ul style="list-style-type: none"> <li>Take suitable measures in the event of electrical installation hazards.</li> <li>Implement rules and regulations in domestic electrical works.</li> <li>Use proper safety equipment and wears essential in electrical installation works.</li> <li>Implement the appropriate procedures in the event of a workshop accident.</li> <li>Describe various tools used in domestic Installation</li> <li>Describe Various testing / measuring Instrument used in domestic installation</li> <li>Use proper tool and testing /measuring instrument in carrying out domestic installation work</li> <li>Maintenance of various</li> <li>Tools &amp; testing / measuring instruments.</li> </ul>	<ul style="list-style-type: none"> <li>Question answers Method</li> <li>Demonstration Method</li> <li>Work Shop Method</li> <li>Home Assignment</li> <li>Project Method</li> </ul>	

	03Hours	12 Hours	<ul style="list-style-type: none"> <li>• Make installation diagram using electrical engineering symbols.</li> <li>• Use different scales in working drawing.</li> <li>• Locate the position of the various accessories on a drawing.</li> <li>• Describe all the electrical accessories required for a job from working drawing</li> <li>• Make the distribution System from a drawing.</li> </ul>		
	05Hours	25 Hours	<ul style="list-style-type: none"> <li>• Describe common types of protective devices.</li> <li>• Installation and application of circuit breaker and fuses in electrical installation.</li> <li>• Determine current rating of fuses.</li> <li>• Take suitable measure for proper earthing.</li> <li>• Implement the regulation relating to various types of protective devices.</li> <li>• Use current and voltage operated earth leakage circuit breaker, observing relevant regulations.</li> </ul>		
	05 Hours	25 Hours	<ul style="list-style-type: none"> <li>• Explain the concept of surface wiring.</li> <li>• Determine correct types and sizes of cables used for domestic installation.</li> <li>• Implement the relevant statutory regulations regarding surface wiring</li> <li>• Use proper tools for carrying out domestic installation.</li> </ul>		



	4 Hours	16 Hours	<ul style="list-style-type: none"> <li>• Apply the regulation of IEC on domestic wiring.</li> <li>• Explain the meaning of conduit</li> <li>• Determine the suitability of conduit installation.</li> <li>• Install different types of conduits; steel conduit, flexible conduit and PVC conduit.</li> <li>• Application of stuck and dice hacksaw etc.</li> <li>• Implement appropriate procedures for preparing conduit installation.</li> <li>• Use of running coupler, conduit boxes, bend elbows, tees, and other accessories for conduit work</li> <li>• Determine set and bend permissible radial length.</li> </ul> <ul style="list-style-type: none"> <li>• Describe different types of tools and materials related to cable jointing.</li> <li>• Use proper tools and materials related to cable jointing and termination such as soldering bit, blow lamp etc</li> <li>• Recognize different types of insulating materials e.g. PVC cables etc.</li> <li>• Identify different types of conductors e.g. Copper , Aluminum, etc</li> <li>• Take the suitable conducting materials for a specific work.</li> <li>• Connect the appliances and Accessories into their terminal correctly.</li> <li>• Implement the safety regulation</li> </ul>		
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			involved in joints and termination operations		
<b>M1- LU4 Carryout Inspection, Testing, Fault Finding and Repair in Domestic Electrical Installation</b>	05Hours	25 Hours	<ul style="list-style-type: none"> <li>• Apply statutory safety regulations for life, properties and environment.</li> <li>• Visually detect electrical and mechanical loose connections.</li> <li>• Perform three types of electrical installation test</li> </ul>	<ul style="list-style-type: none"> <li>• Question answers Method</li> <li>• Demonstration Method</li> <li>• Work Shop Method</li> <li>• Home Assignment</li> <li>• Project Method</li> </ul>	As per Schedule.
	05 Hours	25 Hours	<ul style="list-style-type: none"> <li>• Inspect different types of electrical fault in Domestic Installation.</li> <li>• Inspect earth leakage fault.</li> <li>• Inspect short circuit faults.</li> <li>• Inspect over loading faults.</li> <li>• Inspect insulation break down faults.</li> <li>• Describe earth continuity conductor earthing lead and earthing rod</li> </ul>		
	4 Hours	16 Hours	<ul style="list-style-type: none"> <li>• Install the Electrical earth and earthing resistance and part of earthing system</li> <li>• Defective Electrode and faulty / damage earthing electrode / conductor replaced</li> </ul>		
<b>M1- LU5 Install Domestic Safety / Security and Communication System</b>	05 Hours	30Hours	<ul style="list-style-type: none"> <li>• Installation of Various Types Safety / security and communication system</li> <li>• Photosensitive switches and movement sensor</li> <li>• Fire detection alarm circuit</li> <li>• Security protection devices</li> <li>• Door bells , bell indicators and electrical openers</li> </ul>	<ul style="list-style-type: none"> <li>• Question answers Method</li> <li>• Demonstration Method</li> <li>• Work Shop Method</li> <li>• Home Assignment</li> <li>• Project Method</li> </ul>	As per Schedule.

			<ul style="list-style-type: none"> <li>• Domestic communication devices (inter com , CCTV camera etc)</li> </ul>		
<b>M1- LU6</b> <b>Prepare Estimates</b> <b>For Electrical</b> <b>Installation</b>	07Hours	30 Hours	<ul style="list-style-type: none"> <li>• Follow appropriate procedure estimating purchase procedure, cost of materials, various charges like labor, stores, overhead tools, contingency etc.</li> </ul>	<ul style="list-style-type: none"> <li>• Question answers Method.</li> <li>• Home Assignment.</li> <li>• Project Method</li> </ul>	As per Schedule

**Module 2 Title:** Industrial Electrical Installation & Troubleshooting

**Objective of the Module:** The trainee will be competent to work in the Industrial sector as an electrician.

**Duration:** 400 Hours **Theory:** 76 Hours **Practice:** 324 Hours

Learning Unit	Theory Days / Hours	Work place Days / Hours	Recommended Formative Assessment	Recommended Methodology	Scheduled Dates
<b>M2-LU1</b> <b>Industrial Electrical Installation</b>	3 Hours	12 Hours	<ul style="list-style-type: none"> <li>• Take suitable measures in the event of electrical installation hazards.</li> <li>• Implement rules and regulations in domestic electrical works.</li> <li>• Use proper safety equipment and wears essential in electrical installation works.</li> <li>• Implement the appropriate procedures in the event of a workshop accident</li> </ul>	<ul style="list-style-type: none"> <li>• . Question answers Method</li> <li>• Demonstration Method</li> <li>• Work Shop Method</li> <li>• Home Assignment</li> <li>• Project Method</li> </ul>	As per Schedule.
	3 Hours	12 Hours	<ul style="list-style-type: none"> <li>• Describe various tools used in industrial Installation</li> <li>• Describe Various testing / measuring Instrument used in industrial installation</li> <li>• Use proper tool and testing /measuring instrument in carrying out industrial installation work</li> <li>• Maintenance of various</li> <li>• Tools &amp; testing / measuring instruments.</li> </ul>		
	3 Hours	12 Hours	<ul style="list-style-type: none"> <li>• Make installation diagram using electrical engineering symbols.</li> <li>• Use different scales in working drawing.</li> <li>• Locate the position of the various</li> </ul>		

	2 Hours	8 Hours	<p>accessories on a drawing.</p> <ul style="list-style-type: none"> <li>• Describe all the electrical accessories required for a job from working drawing</li> <li>• Make the distribution system from a drawing</li> </ul>		
	5 Hours	20 Hours	<ul style="list-style-type: none"> <li>• Take suitable points that make up an Electrical working diagram.</li> <li>• Install: <ul style="list-style-type: none"> <li>a. Simple surface wiring for industrial installation</li> <li>b. Conduct wiring for industrial installation</li> </ul> </li> <li>• Implement the safety measures as provided for by the prevailing statutory</li> <li>• Regulations in carry the above.</li> <li>• Describe ducts and trunking systems.</li> <li>• Distinguish the advantages and disadvantages of ducts and trunking in industrial electrical installation.</li> <li>• Install the different types of ducts and trunking</li> <li>• Selection, use and maintenance of tools and equipment used for ducts and trunking Systems.</li> <li>• Installation of different types of bus-bar trunking.</li> <li>• Perform how to bend, Set, Shape, File and fabricate accessories used in connection with ducts and trunkings using the appropriate tools and equipment.</li> <li>• Perform how to join lengths of ducts</li> </ul>		

	3 Hours	12 Hours	<p>and trunking .</p> <ul style="list-style-type: none"> <li>• Determine the importance of earth continuity and ensure its provision on all types of ducts and trunking</li> <li>• Describe different types of tools and materials related to cable jointing.</li> <li>• Use proper tools and materials related to cable jointing and termination such as soldering bit, blow lamp etc</li> <li>• Recognize different types of insulating materials e.g. PVC cables etc.</li> <li>• Identify different types of conductors e.g. Copper , Aluminum, etc</li> <li>• Take the suitable conducting materials for a specific work.</li> <li>• Connect the appliances and accessories into their terminal correctly.</li> <li>• Implement the safety regulation involved in joints and termination operations</li> </ul>		
	4 Hours	16 Hours	<ul style="list-style-type: none"> <li>• Perform the different levels of controlling machine e.g. direct –on – line, autotransformer, star – delta, capacitor start, root resistance starters.</li> <li>• Make an electrical control circuit consisting of a start/stop station, overloads, two-3phase motors (which have isolating switches). One of the motors is attached to a pump, and the other is driving a</li> </ul>		

	3 Hours	12 Hours	<p>pressure tank that has a high pressure switch.</p> <ul style="list-style-type: none"> <li>• Make different types of connection e.g. Star –Delta, Delta – Star, etc</li> <li>• Arrange the different types of repair, e.g. routine repair, corrective, etc</li> <li>• Provide repair procedure for each item and types equipment and machine.</li> <li>• Use various types and grades of lubrications e.g. grease, oil, and coolant etc. properly</li> <li>• Operate various types of tools and equipment used for Repair: grease gun, oilcan, screwdriver, pulley extractors, wrench, and blower, filler gauge.</li> </ul>		
<b>M2-LU2</b> <b>Inspect, Test, Trace, and Repair Faults in Industrial Electrical Installation</b>	3 Hours	12 Hours	<ul style="list-style-type: none"> <li>• Apply statutory safety regulations for life, properties and environment.</li> <li>• Visually detect electrical and mechanical loose connections.</li> <li>• Perform three types of electrical installation test.</li> </ul>	<ul style="list-style-type: none"> <li>• . Question answers Method</li> <li>• Demonstration Method</li> <li>• Work Shop Method</li> <li>• Home Assignment</li> <li>• Project Method</li> </ul>	As per Schedule.
	5 Hours	20 Hours	<ul style="list-style-type: none"> <li>• Determine the suitability of different types of enclosures and their application e.g. totally enclosed, water proof and semi-enclosed, etc.</li> <li>• Describe the construction of a good foundation for mounting machines and equipment.</li> <li>• Mount properly AC and DC machines and equipment.</li> <li>• Select the correct size of cable for</li> </ul>		

	4 Hours	16 Hours	<p>the appropriate machine installations.</p> <ul style="list-style-type: none"> <li>• Select flexible conduit correctly for machine terminations.</li> <li>• Connect starter in the circuit properly.</li> </ul> <ul style="list-style-type: none"> <li>• Inspect causes of breakdown e.g. short circuit, open circuit, worn out parts, insulation breakdown, incorrect use, and overload, ageing, etc</li> <li>• Detect the causes of faults and clarify them e.g. fuse melting, circuit breaker tripping, etc.</li> <li>• Determine fault by noise symptoms</li> <li>• Interpret circuit diagram</li> </ul>		
<b>M2-LU3 Industrial Safety / Security and Communication System</b>	6 Hours	30 Hours	<p>Install the Various Types of Safety / security and communication system</p> <ul style="list-style-type: none"> <li>• Fire detection alarm circuit / Burglar alarm system</li> <li>• Security protection devices system</li> <li>• Industrial communication devices (inter com , Public address system CCTV camera etc)</li> </ul>	<ul style="list-style-type: none"> <li>• Question answers Method</li> <li>• Demonstration Method</li> <li>• Work Shop Method</li> <li>• Home Assignment</li> <li>• Project Method</li> </ul>	As per Schedule.
<b>M2-LU4 Prepare Estimates For Electrical Installation</b>	4 Hours	20 Hours	<ul style="list-style-type: none"> <li>• Follow appropriate procedure estimating purchase procedure, cost of materials, various charges like labor, stores, overhead tools, contingency etc.</li> </ul>	<ul style="list-style-type: none"> <li>• Question answers Method</li> <li>• Demonstration Method</li> <li>• Work Shop Method</li> <li>• Home Assignment</li> <li>• Project Method</li> </ul>	As per Schedule.