SHORT TERM VOCATIONAL CERTIFICATE COURSE

COURSE NAME:

ELECTRICAL TECHNICIAN

(6 months Duration)

Prepared by
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HYDERABAD, TELANGANA

ELECTRICAL TECHNICIAN

NAME OF THE COURSE	: **ELECTRICAL TECHNICIAN**
SECTOR	: ENGINEERING (ENGG)
COURSE CODE	: ET
ENTRY QUALIFICATION	: 10^{th} class pass or fail
PRE-REQUISITES	: Basic Knowledge of Electrical Accessories, Materials, Domestic Appliances and Tools

TERMINAL COMPETENCE:

After completing this course, candidate will be able to work as an Assistant Electrician.

DURATION:

6 Months - (40 Hours: English + 200 Hours: Course content -Total 240 Hours)

INTRODUCTION:

Electrical Technician has an important role in our daily needs. It's difficult to imagine the present society without electricity. The electrical world is vast and versatile. Daily new innovations are being made and being added in this field. Electrical Technicians are those, who will assist the main Electrician and other supervisors in maintaining, modifying, repair and installation of electrical wirings, electrical appliances and electric machines.

OBJECTIVES:

- To learn electrical wiring rules and wiring methods, maintenance of electrical domestic appliances and basic connections of electrical motors.
- To understand and practice the usage of electrician tools, electrical safety.
- To assist in domestic wiring installations and, carryout repair and servicing and repair of electrical appliances and motors.

SKILLS:

- Be able to assist in domestic wiring installations and carryout repair and maintenance of electrical appliances.
- Be able to use of electrician tools and observe electrical safety

ON THE JOB TRAINING AND PRACTICALS:

- Work with field electrician or technician
- Work with electrical wiring contractor
- Work at domestic appliances servicing authorized centers

- Work at local electrical sales and service shops

COURSE SYLLABUS

Theory

Unit No	Unit Name/Main content
1	Electrical safety and General Wiring Rules
2	Electrician Tools and Usage
3	Basic Electricals
4	Electrical Instruments
5	House Wiring
6	Domestic Appliances

Practical & OJT:

Unit No	Unit Name/Main content
1	Practice on Electrical safety and Wiring Rules, Earthing
2	Practice and maintenance of Electrician Tools
3	Basic Electricals – Power sources, Current, Power and Energy calculation, Reading of power rating, Function of Transformer, Rectifier, Inverter
4	Electrical Instruments connecting and noting the measurements
5	House Wiring Installation, Repair
6	Domestic Appliances Servicing

SCHEME OF INSTRUCTION/MODULE:

1. Communicative English: 40 hours
2. Course Content: 200 hours

Duration of Course	Theory		On the Job Training/Practical		Total	
	Hours	Weightage	Hours	Weightage	Hours	Weightage
1 Module (06 months)	60	30%	140	70%	200	100%

SYLLABUS (Theory)

1. Electrical Safety and General Wiring Rules (5 Hrs)

Concept on electricity and current - Electric shock and effects on human body - First aid - Electrical safety – Fuse, MCB, ELCB, RCCB etc., - Earthing - General wiring rules - Energy efficiency and star rating - Fire hazards due to short circuit - Fire extinguishers, Safety and its importance, PPEs,

2. Electrician Tools and Usage (5 Hrs)

Neon Tester, Test lamp, Wire stripper, Electrician knife, Cutting pleir, Screw driver, Hammer, Chisel, measuring tape, Hacksaw, spanners, die and die stock, Drill machine, cutting machine, Soldering iron, Basic Power tools.

3. Basic Electricals (5 Hrs)

Electric current, Fundamentals of voltage, current, resistance, capacitance, inductance, Measurement units-volts, Amps, Ohms Electric current – Voltage & EMF – Resistance & Resistor – Power and Energy – Capacitance & Capacitor - Sources of electricity – Generator – Cells & Battery – Transformer – Power Distribution Lines – Single phase, Three phase supply systems – Electric Motors Types and basic connections.

4. Electrical Instruments (5 Hrs)

Voltmeter, Ammeter, Watt meter, Energy Meter, Ohm meter, Megger, Multimeter, Tachometer (rpm/speed measuring), Clip on meter/clamp meter

5. House Wiring (20 Hrs)

Types of house wiring, materials used in house wiring (wiring accessories), wires and the cables, switches, holders, sockets, ceiling roses, switch boards etc., - wiring symbols - wiring toolkit, wiring circuits and diagrams, tube light connections - testing a wiring, inverter wiring - preparation of estimate – LED lamps.

6. Domestic Appliances (20 Hrs)

Household electrical appliances - heating appliances, electric Iron, electric cooker, electric stove, water heater- Motor based appliances, fan, washing machine, mixer grinder, air cooler microwave oven, geyser, Refrigerator and Air-conditioner.

ON THE JOB TRAINING AND LAB

Practical Sessions - 6 units - (140 Hours)

S. No.	Chapter	Contents (Theory)	Practical Lab/OJT	No of Hours
1	Electrical safety and General Wiring Rules	Concept on electricity and current - Electric shock and effects on human body - First aid - Electrical safety – Fuse, MCB, ELCB, RCCB etc., - Earthing - General wiring	First AID/show/explain the safety items – Demonstration of operation of MCB, ELCB and Firefighting equipment – installation of	**20**

		rules - Energy efficiency and star rating - Fire hazards due to short circuit - Fire extinguishers, Safety and its importance, PPEs,	pipe/plate/rod/ composite earthing.	
2	Electrician Tools and usage	Neon Tester, Test lamp, Wire stripper, Electrician knife, Cutting pleir, Screw driver, Hammer, Chisel, measuring tape, Hacksaw, spanners, die and die stock, Drill machine, cutting machine, Soldering iron, Basic Power tools.	Identification of Electrician tools, switch board preparation by using tools, Identification of parts, safety and simple usage of power tools like drill machine, cutting machine etc., Measurement of conductor size by using SWG, test lamp preparation and usage.	**20**
3	Basic Electricals	Electric current, Fundamentals of voltage, current, resistance, capacitance, inductance, Measurement units-volts, Amps, Ohms Electric current – Voltage & EMF – Resistance & Resistor – Power and Energy – Capacitance & Capacitor - Sources of electricity – Generator – Cells & Battery – Transformer – Power Distribution Lines – Single phase, Three phase supply systems – Electric Motors Types and basic connections.	Demonstration of Generation of Electricity – Hand driven Generator – Cells and batteries – grouping/series-parallel connections – Series parallel resistances – identifying watts, calculation of current, watts, energy etc., - understanding the function of transformer by connecting a small transformer (220/6V or 220/9-0-9V etc), identification of single phase and three phase supply – measuring the voltage – motors identification, power rating HP/kW, speed/rpm, motor starters identification and connections.	**20**

4	Electrical Instruments	Voltmeter, Ammeter, Watt meter, Energy Meter, Ohm meter, Megger, Multimeter, Tachometer (rpm/speed measuring), Clip on meter/clamp meter.	Identification and connection of Voltmeter, Ammeter, Watt meter, Energy Meter, Ohm meter, Megger, Multimeter, Tachometer (rpm/speed measuring), Clip on meter/clamp meter	**20**
5	House Wiring	Types of house wiring, materials used in house wiring (wiring accessories), wires and the cables, switches, holders, sockets, ceiling roses, switch boards etc., wiring symbols - wiring toolkit, wiring circuits and diagrams, tube light connections - testing a wiring, inverter wiring - preparation of estimate – LED lamps.	Identification of wiring methods – Identification of wiring materials and accessories – reading and preparation of wiring diagram – Preparation of series testing board, main board, distribution board, switch board - service wires/mains - simple lamp/wiring circuits – installation of one lamp, lamp and socket, two-way switch, bed room wiring, corridor wiring through conduit/casing capping wiring method –installation of ceiling fan, fixing tube light.	**30**
6	Domestic Appliances	Household electrical appliances - heating appliances, electric Iron, electric cooker, electric stove, water heater- Motor based appliances, fan, washing machine, mixer grinder, air cooler microwave oven, geyser, Refrigerator and Air-conditioner.	Testing, Dismantling, assembling and identification of parts of heating appliances electric Iron, electric cooker, electric stove, water heater- Testing, Dismantling, assembling and identification of parts of Motor based appliances, fan, washing machine, mixer grinder, air cooler	**30**

			Simple know-how of Refrigerator and Air-conditioner	

LIST OF EQUIPMENT/TOOLS/ACESSORIES

1. Electrician tool kit : 10 sets
2. Wiring practice bins : 4 units
3. First aid box : 4 units
4. First Aid Charts :
5. Fire extinguishers : 4 units
6. Electrical accessories : 4 sets
7. Domestic appliances : 4 sets (all models)
8. Electrical instruments : 4 sets (as listed in syllabus)
9. Live models of generators, motors : 2 sets

QUALIFICATIONS OF TEACHING FACULTY:

1. Graduation from any recognized university with an aggregate of 55% marks in Electrical Engineering (or)

2. Diploma/Polytechnic (DEEE) in Electrical Engineering with 2 years' experience (or)

3. 4+ Years of Experience in ITI Electrician course.

REFERENCE BOOKS/ INTERNET LINKS:

1. https://nimi.gov.in/nimi/forms/nimicart_listproduct.aspx?idCategory=5
2. https://nsdcindia.org/contentavailability/1408
3. ITI Books
4. Telangana State Intermediate Vocational Electrical Technician 1st and 2nd year textbooks

DIVISION OF MARKS:

Theory: 100 Max. Marks

1. Communicative English: 20 marks
2. Short Questions: 6 x5m = 30 marks
3. Long Questions: 4x10 = 40 marks
4. Multiple Choice Questions: 10x1=10 marks

Practical: 100 Max. Marks

1. External: 40 marks
2. Record/ Mini Project & Viva: 10 marks
3. Internship/ OJT: 50 marks

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REGD. NO. :

TIME: 3 HRS **MAX MARKS: 100**

ELECTRICAL TECHNICIAN
MODEL QUESTION PAPER (THEORY)

SECTION- A

COMMUNICATIVE ENGLISH 20 MARKS

SECTION- B

Note: a) Answer ALL questions.
b) Each question carries **5 Marks**. **6X5M=30 MARKS**

1. State the effects of electric shock on human body.
2. Draw the diagram of soldering iron and label it.
3. What is battery?
4. State the uses of multimeter and clamp meter.
5. Write the types of house wiring methods.
6. Write the reasons for shock from the electric iron.

SECTION- C

Note: a) Answer any **FOUR** questions.

b) Each question carries **10 Marks**. **4X10M=40 MARKS**

1. What are the reasons for fire accidents due to short circuit?
2. Name wire joints and mention their applications. Draw any two wire joints.
3. List various types of electric motors and their uses.
4. Draw the connections of single-phase energy meter with load or house wiring.
5. Write the procedure of installing conduit wiring with simple diagrams.
6. Draw the internal parts of ceiling fan and write general faults in ceiling fan.

SECTION-D 10X1=10 Marks

1. During the electric shock _____will occur in/on human body
   a) Bleeding b) Heart attack c) Burns d) All above
2. Electric current is _____ types
   a) AC b) DC c) 3-Phase d) All above
3. MCB means
   a) Mini Circuit Breaker b) Motor Control Board c) Maximum Current Bell d) None of above
4. _____ are main tools used by an electrician
   a) Tester, cutting plier b) Test lamp, measuring tape c) Hammer, hacksaw d) All above
5. With help of tester, we can check
   a) Current in phase wire b) Earth leakage c) Fault in wiring d) all above
6. Hack saw is used to _____
   a) Make holes b) Cut the pipes c) Cut the boards d) b & c
7. The following tool is used for fixing the switches is:
   a) Tester b) Screw driver c) Hammer d) Hacksaw
8. Examples for the power load are:
   a) Electric iron, geyser
   b) Pump set, electric stove
   c) Tube light and t A socket
   d) a & b
9. General faults in heating appliances are:
   a) Wire break or heating element break (open circuit fault)
   b) Short at power cord or at terminals (short circuit fault)
   c) Giving shock (leakage or earth fault)
   d) All above
10. Electric irons are of following types:
   a) Non automatic and automatic iron
   b) Light weight and heavy weight iron
   c) Steam iron
   d) All above

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ELECTRICAL TECHNICIAN

MODEL QUESTION PAPER (PRACTICAL)

Note: a) Answer ALL questions.
b) Each question carries **10 Marks**. **4X10 = 40MARKS**

1. Fix the given accessories on switch board.
2. Use the multimeter and note the readings at
   a) Main board b) Any Load c) Testing the power cord
3. Prepare a switch board for seven switches, two sockets, one regulator, one indicator, one fuse.
4. Testing, dismantling, assembling and identification of parts of heating appliances like electric iron, electric cooker, electric stove.

Record/Mini Project **10 Marks**

Internship **50 Marks**