Syllabus for Electrical Assembly and Installation Assistant

Course Name	Electrical Assembly and Installation Assistant
Sector	Power
Course Code	POW/2023/EAIA/253
Level	3
Occupation	Electrical Wireman/ Jr. Technician Electrical/ Electrical fitter Assistant/ Electrical maintenance Assistant/ Technical Assistant Electrical
Job Description	An Electrical Assembly and Installation Assistant will assist for assembly and installation of electrical components and systems in various applications, including machinery, equipment and electrical panels is iron/ steel/ plant or other heavy industries. They interpret electrical specifications of wiring accessories, machine parts, other components, and Electrical Drawings, wiring and circuit diagrams. This role involves assisting in troubleshooting electrical issues, maintaining tools and to ensure the smooth operation of electrical systems.
Course Duration	Total Duration 360 hrs. (T- 90 hrs , P- 150 hrs , OJT- 60 hrs and ES-60 hrs)
Trainees' Entry Qualification	Grade 10 OR Grade 8 with two year of (NTC/ NAC) after 8th OR Grade 8 pass and pursuing continuous schooling in regular school with vocational subject OR 8th grade pass with 2 yrs relevant experience OR Previous relevant Qualification of NSQF Level 2 with one yr experience OR Previous relevant Qualification of NSQF Level 2.5 with 6 months experience
Trainers Qualification	BE/B.Tech in Electrical Engineering with 1Yr experience OR Diploma in Electrical Engineering with 2 Yrs experience. OR ITI in Electrician with 5 Yrs experience.

Structure of Course:

Module No.	Module name	Outcome	Theory (Hrs)	Practical (Hrs)	Total (Hrs) [Multiple of 30]
1.	Selection of tools and measuring instruments	Identify and select tools and measuring instruments required for electrical machine maintenance, fittings and testing.	10	20	30
2.	Electrical systems and equipment identification and usage	Identify and use of electrical wiring with accessories, cables, electrical machines and its different parts including starters, protective devices and other electrical components.	25	35	60
3.	Interpretation of electrical drawings	Draw and interpret power circuit and control circuit for electrical motor installation and lighting circuit.	10	20	30
4.	Assembly and Installation	Assemble and install Motor, Generator, Compressor, Pump and EOT crane.	30	60	90
5.	Occupational safety and quality of work	Ensure Occupational safety and quality of work maintaining all applicable regulations.	15	15	30
6.	OJT	Work in real job situation with special emphasis on basic safety and hazards in this domain (OJT).	--	60	60
7.	Employability Skill	As per guided curriculum	60	--	60
		TOTAL:	150	210	360

SYLLABUS:

1. Module Name: Selection of tools and measuring instruments

Outcome: Identify and select tools and measuring instruments required for electrical machine maintenance, fittings and testing.

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Theory Content:

1.1 Tools:

i) Operation, ii) Diagram, iii) Application of the following tools:-

Plier Insulated, Plier Side Cutting, Screw Driver, Neon Tester, Hammer, Pincer, Chisel, Hand Drill Machine, Allen Key, Grease Gun, Out Side Micrometer, Motorised Bench Grinder, Rawl plug tool and bit, Crimping Tool, Wire stripper, Try Square, Outside and Inside Divider Calliper, Pliers flat nose, Pliers round nose, Tweezers, Spanner, Gauge, wire imperial, file set, Soldering Iron.

1.2 Measuring Instruments:

i) Working principle, ii) Connection diagram, iii) Application of the following instruments:-

Digital Multi Meter, Analog Multi Meter, Ohm Meter – Series & Shunt Type, A.C. & D.C. Voltmeter, A.C. & D.C. Ammeter, Wattmeter, DC Power Supply, Megger, Earth tester, Clamp meter.

Practical Content: (Write a report on each practical)

1. Familiarization of different tools and their practical application.
2. Measurement of A.C, D.C voltage and current, resistance using digital multimeter / A.C. & D.C. Voltmeter / A.C. & D.C. Ammeter.
3. Measurement of power for 3-phase and single phase load using wattmeter.
4. Measurement of high resistance/ insulation resistance using Megger.
5. Measurement of Earth resistance using Earth tester.
6. Operation of D.C. power supply.
7. Use of clamp meter for measurement of current, voltage.

Tools & Equipment needed : (For 30 Trainee)

Sl. No.	Item Description	Specification	Qty / Number
1.	Rule wooden	4 fold 60 mm	5 Nos.
2.	Screw driver	100 mm	5 Nos.
3.	Screw driver	150 mm	5 Nos.
4.	Heavy duty screw driver	200 mm	5 Nos.
5.	Electrician screw driver	250 mm thin stem insulated handle	5 Nos.
6.	Electrician connector, screw driver	100 mm insulated handle thin stem	5 Nos.
7.	Neon Tester	Standard	5 Nos.
8.	Plier insulated	150 mm	2 nos
9.	Plier side cutting	150 mm	2 nos
10.	Knife double bladed Electrician	Standard	2 nos
11.	Hammer, cross peen	115 grams with handle	2 nos
12.	Hammer ball peen	0.75 kg. With handle	2 nos
13.	Pincer	150 mm	2 nos
14.	Firmer chisel wood	12 mm	2 nos
15.	Saw tenon	250 mm	2 nos
16.	Steel rule	300 mm	2 nos
17.	C. Clamp	200 mm, 150 mm and 100 mm.	2 nos
18.	Spanner	150 mm adjustable 15 degree	2 nos
19.	Blow lamp	0.5 litre	2 nos
20.	Chisel	25 mm & 6 mm	2 nos
21.	Electric drill machine portable	6 mm capacity	2 nos
22.	Allen key	Standard	2 nos
23.	Oil can	0.12 litre	2 nos
24.	Grease gun	Standard	2 nos
25.	Outside micrometer	0 to 25 mm	2 nos
26.	Motorised bench grinder	Grinder motor: 0.55 KW , 0.75 HP, 3 Phase , 2800 RPM	2 nos
27.	Pulley puller	3 jaw	5 Nos.
28.	Bearing puller	as per SKF bearing no.	5 Nos.

Sl. No.	Item Description	Specification	Qty / Number
29.	Crimping tool	Standard	2 Nos.
30.	Scissors blade	150 mm	5 Nos.
31.	Wire stripper	20 cm	2 Nos.
32.	Hacksaw frame	200 mm adjustable	2 Nos.
33.	Hacksaw frame	300 mm adjustable	2 Nos.
34.	Flat nose plier	100 mm	2 nos
35.	Tweezers	100 mm	2 nos
36.	Spanner	D.E. metric standard set	2 nos
37.	Gauge, wire imperial	Standard	2 nos
38.	File flat	200 mm 2nd cut	2 nos
39.	File half round	200 mm 2nd cut	2 nos
40.	File round	200 mm 2nd cut	2 nos
41.	File flat	150 rough	2 nos
42.	File flat	250 mm smooth	2 nos
43.	Soldering Iron	25 watt, 65 watt	2 nos. each
44.	Desoldering gun	Spring loaded vacuum style solder remover	2 nos
45.	Growler	Input 230V AC, Armature dia 20-100mm	2 nos
46.	Digital multimeter	3 ½ digits, LCD display, 0-1000 M Ohms, 750 volt AC, 1000V DC, 10A	2 nos
47.	A.C. Voltmeter	MI type, 0-500V	2 nos
48.	D.C. Voltmeter	MC type, 0-500V	2 nos
49.	A.C. Ammeter	MI type, 0-10A	2 nos
50.	D.C. Ammeter	MC type, 0-10A	2 nos
51.	Wattmeter	Dynamometer type, 150-300-600V, 5-10A	2 nos
52.	Megger	500 Volt	2 nos
53.	Digital 4-wire Earth resistance tester	Earth Resistance 0-2Ω, 0-20Ω, 0-200Ω, 0-2kΩ. Voltage 0-300 AC	2 nos
54.	D.C. power supply	Dual channel, 0-30V, 2A	2 Nos.
55.	Clamp meter	AC/DC current 0-400A, AC/DC voltage 0-600V, Frequency 5-500Hz	2 Nos.
56.	Fuse	Kit Kat type, 10A	10 Nos.
57.	Fuse	Cartridge type, 10A	10 Nos.

2. Module Name: Electrical systems and equipment identification and usage

Outcome: Identify and use of electrical wiring with accessories, cables, electrical machines and its different parts including starters, protective devices and other electrical components.

Theory Content:

2.1 Electrical wiring and materials:

2.1.1 Types of wiring system, Schematic diagram of wiring system. Accessories used for wiring– Main switch (ICDP, ICTP&N), Distribution board, Fuse, MCB, Cable, Conduit, Casing, Inspection box, One way Switch, Two way switch, Switch board, Plug Socket (only specification and use).

2.1.2 Concept of Earthing, requirement of earthing, types of earthing system – rod, pipe and plate earthing, Earthing of electrical installation, Earthing of electrical machines.

2.1.3 Electrical Panel with components installed inside [Power Distribution Panel (PDB), Power Control Center Panel (PCC), Motor Control Center Panel (MCC)]

2.2 Electrical Equipments:

i) Working principle, ii) Connection diagram, iii) Application of the following:

Current Transformer (CT), Potential Transformer (PT), Electromagnetic Contactor, Overload relay, Push button switch, Rotary Switch & other type of switch, Timer relay, Variac, D.C 4-point starter, D.O.L starter, Star-Delta starter.

2.3 Machineries:

i) Working principle, ii) Connection diagram, iii) Application of the following:

DC Motor (Series, Shunt, Compound), DC generator (Series, Shunt, Compound), Three phase induction motor (Slip-ring, Squirrel cage type), Three phase transformer, Single phase Transformer, Pumps, Compressor.

2.4 Electric Overhead Travelling (EOT) Crane: Operating mechanism, components of EOT, concept of Variable Voltage Variable Frequency (VVVF) Drive used for EOT, application of EOT.

Practical Content: (Write a report on each practical)

1. Orientation of Conduit wiring with its accessories.
2. Exposure of Casing wiring with its accessories.
3. Make a circuit using conduit wiring with one lamp point, one power plug and one fan point.
4. Comprehend of control components to run a 3-phase induction motor.
5. Identify different parts of a D.C. motor.
6. Identify of different parts of an A.C. induction motor (Three phase, Single phase).
7. Recognize different parts of transformer (Three phase, Single phase).
8. Identify different parts of a DC 4-point starter and its operation and draw the connection diagram.
9. Make a D.O.L starter using control components and test the starter.
10. Make an automatic Star-Delta starter using control components and test the starter.
11. Awareness of the components required for EOT crane and its operation and making a chart of the components.
12. Identify of the components required for compressor and its operation and making a chart of the components.

Tools & Equipment needed: (For 30 Trainee)

Sl. No.	Item Description	Specification	Qty / Number
1.	Conduit	PVC, 25 mm diameter, 2mm thick, for 1.5 mm^2 Al wire	5 Nos.
2.	Conduit bend	20 mm	5Nos.
3.	Saddle	20 mm, metallic	5 Nos.

Sl. No.	Item Description	Specification	Qty / Number
4.	Junction box	25 mm, two way	5Nos.
5.	Socket	5 Pin, 240V, 16A	5 Nos.
6.	Contactor	3-phase, 440volt,16amp, 2NO+ 2NC auxiliary contacts	5 Nos.
7.	Thermal overload relay	3-phase, 0-15 A, 440V	4 Nos.
8.	Timer relay	On delay type, 240V, 1NO+1NC	4Nos.
9.	Timer relay	Off delay type, 240V, 1NO+1NC	4 Nos.
10.	Push button switch	10A, 240V	4 Nos.
11.	M.C.B.	4 pole, 16 A, 440V	4 Nos.
12.	DC 4-point starter	5 HP, 240V DC	2 Nos.
13.	Different parts of a DC motor for assembling	Dismantled DC Motor	1 No.
14.	Different parts of a 3-phase squirrel cage induction motor for assembling	Dismantled 3-phase squirrel cage induction motor	1 No.
15.	Different parts of a single phase induction motor for assembling	Dismantled single phase induction motor	1 No.
16.	DC shunt motor	2 HP, 220V	1 No.
17.	3-phase squirrel cage induction motor	3-phase 400 volt, 50 Hz, 2 HP, 1440 rpm	1 No.
18.	Single phase induction motor	1 HP, 230 volt, 50 Hz, capacitor run	1 No.
19.	D.O.L starter	3-phase, 400 V, 50 Hz, 5HP	2Nos.
20.	Star-Delta starter manual	3-phase, 400 V, 50 Hz, 7.5HP	2Nos.
21.	Star-Delta starter automatic	3-phase, 400 V, 50 Hz, 7.5HP	2 Nos.
22.	Fuse	Kit Kat type, 10A	10 Nos.
23.	Fuse	Cartridge type, 10A	10 Nos.
24	EOT cranes with control panel		1 No.
25	Different parts of an EOT crane	Dismantled EOT crane	1 No.

3. Module Name Interpretation of electrical drawings

Outcome: Draw and interpret power circuit and control circuit for electrical motor installation and lighting circuit.

Theory Content:

3.1 Single line diagram, power line diagram for installation of electrical machine (both power circuit and control circuit)

3.2 Different symbols used to draw the single line diagram, power line diagram and machine components.

3.3 Interpretation of electrical drawings for assembling different parts of motor, generator, motor winding.

Practical Content: (Write a report on each practical)

1. Draw Single line diagram, power line diagram (commencing from supply to motor) of wiring to install a DC motor using 4-point starter (both power circuit and control circuit)
2. Draw Single line diagram, power line diagram (commencing from supply to motor) of wiring to install an AC motor using D.O.L / Star-Delta starter (both power circuit and control circuit)
3. Draw Single line diagram, power line diagram of lighting & power circuit.

Tools & Equipment needed: (For 30 Trainee)

Sl. No.	Item Description	Specification	Qty / Number
1.	Rule wooden	4 fold 60 mm	5 Nos.
2.	White board		1 no
3.	Marker pen		As required

4. Module Name: Assembly and Installation
Outcome: Assemble and install Motor, Generator, Compressor, and Pump and EOT crane.

Theory Content:
4.1 Assembling of machine: Procedures of assembling of Motor, Generator, Compressor, Pump, EOT crane.

4.2. Installation of Machine:
4.2.1 Installation of D.C. motor and 4-point starter with its accessories, complete wiring of the motor connection, rules related to the motor wiring.
4.2.2 Installation of A.C. motor (3-phase, Single phase) and starter with its accessories, complete wiring of the motor connection, rules related to the motor wiring.
4.3.3 Installation of control panel (includes different meters, contactor, thermal overload relay, timer relay, switch, indicator lamp, MCB, Main switch, Bus bar)
4.3.4 Installation of small transformer.
4.3.5 Components, operation and installation of EOT crane.

4.3 Installation of wiring: Wiring for light and power circuit, rules related to the wiring for light and power circuit.

Practical Content: (Write a report on each practical)
1. Assemble a D.C. motor with different parts.
2. Install a D.C. shunt motor with its starter and other accessories (commencing from supply to motor), run the motor.
3. Assemble a 3-phase induction motor with different parts.
4. Install a 3-phase induction motor with its starter (D.O.L / Star-Delta) and other accessories (commencing from supply to motor), run the motor.
5. Assemble a single phase induction motor with different parts.
6. Install a Single phase induction motor and its starter (D.O.L.) and other accessories (commencing from supply to motor), run the motor.
7. Study of a control panel (including different types of meters, contactor, relay, switch, indicator lamp, MCB, Main switch, Bus bar) and note the wiring diagram and specification of each component.
8. Visit (in a nearby Iron/ steel plant or a heavy Engineering industry to study use of each machine.

Tools & Equipment needed: (For 30 Trainee)

Sl. No.	Item Description	Specification	Qty / Number
1.	Contactor	3-phase, 440volt,16amp, 2NO+ 2NC auxiliary contacts	4 Nos.

Sl. No.	Item Description	Specification	Qty / Number
2.	Thermal overload relay	3-phase, 0-15 A, 440V	4 Nos
3.	Timer relay	On delay type, 240V, 1NO+1NC	4 Nos
4.	Timer relay	Off delay type, 240V, 1NO+1NC	4 Nos
5.	Push button switch	10A, 240V	4 Nos
6.	M.C.B.	4 pole, 16 A, 440V	4 Nos
7.	DC 4-point starter	5 HP, 240V DC	1 No
8.	Different parts of a DC motor for assembling practice	Dismantled DC compound motor	1 No
9.	Different parts of a 3-phase squirrel cage induction motor for assembling practice	Dismantled 3-phase squirrel cage induction motor	1 No
10.	Different parts of a single phase induction motor for assembling	Dismantled single phase induction motor	1 No
11.	DC shunt motor	2 HP, 220V	1 No.
12.	3-phase squirrel cage induction motor	3-phase 400 volt, 50 Hz, 2 HP, 1440 rpm	1 No
13.	Single phase induction motor	1 HP, 230 volt, 50 Hz, capacitor run	1 No
14.	D.O.L starter	3-phase, 400 V, 50 Hz, 5HP	4 Nos.
15.	Automatic Star-Delta starter	3-phase, 400 V, 50 Hz, 7.5HP	4 Nos.
16.	Manual Star-Delta starter	3-phase, 400 V, 50 Hz, 7.5HP	4 Nos.
17.	Electrical control panel	Control panel components – voltmeters, ammeter, wattmeter, RPM meter, frequency meter, contactor, relay, switch, indicator lamp, MCB, Main switch, Bus bar	1 No
18.	EOT cranes with control panel		1 No.
19.	Different parts of an EOT crane	Dismantled EOT crane	1 No.

5. Module Name: Occupational safety and quality of work

Outcome: Ensure Occupational safety and quality of work maintaining all applicable regulations.

Theory Content:

5.1 Electrical Safety: Dos & don'ts for electrical work.
5.2 Causes of electrical accidents.
5.3 Health and safety procedures and work-related hazards
5.4 Procedure for rescuing the person who has received an electric shock, methods of providing artificial respiration.
5.5 Maintaining safety procedures for electrical fire, Types of fire extinguishers to be used for electrical fire.
5.6 Rescue from any emergency situation, First aid procedures.
5.7 Safety guidelines of machine installation.
5.8 Preparation of document for health and safety

Practical Content: (Write a report on each practical)

1. Use of Personal protective Equipment (PPE).
2. Use of fire extinguisher.
3. Make a list for nomenclature of different Safety Symbol.

4. Use of Safety instrument and clothing.
5. Make a list for the items required in First Aid Box.
6. Make a list for implementation of Electrical safety rules (I.E. rules) for assembling and installation.

Tools & Equipment needed: (For 30 Trainee)

1. Personal protective Equipment (PPE) – 5 Sets
2. Fire extinguisher – 5 Nos.
3. First Aid Box – 5 Sets
4. Safety clothing – 5 Sets

6. Module Name: OJT

Outcome: Work in real job situation with special emphasis on basic safety and hazards in this domain

Practical Content:

Assessor will check report prepared for this component of Practical training of the course and assess whether competency has been developed to work in the real job situation with special emphasis on basic safety and hazards in this domain. (The trainee is expected to undertake work in actual workplace under any supervisor / contractor for **60 Hours.**)

Module Name : Employability Skills **(60 Hrs)**

Key Learning Outcomes

Introduction to Employability Skills Duration: 1.5 Hours

After completing this programme, participants will be able to:

1. Discuss the Employability Skills required for jobs in various industries
2. List different learning and employability related GOI and private portals and their usage

Constitutional values - Citizenship Duration: 1.5 Hours

3. Explain the constitutional values, including civic rights and duties, citizenship, responsibility towards society and personal values and ethics such as honesty, integrity, caring and respecting others that are required to become a responsible citizen
4. Show how to practice different environmentally sustainable practices.

Becoming a Professional in the 21st Century Duration: 2.5 Hours

5. Discuss importance of relevant 21st century skills.
6. Exhibit 21st century skills like Self-Awareness, Behavior Skills, time management, critical and adaptive thinking, problem-solving, creative thinking, social and cultural awareness, emotional awareness, learning to learn etc. in personal or professional life.
7. Describe the benefits of continuous learning.

Basic English Skills Duration: 10 Hours

8. Show how to use basic English sentences for everyday conversation in different contexts, in person and over the telephone
9. Read and interpret text written in basic English
10. Write a short note/paragraph / letter/e -mail using basic English

Career Development & Goal Setting Duration: 2 Hours

11. Create a career development plan with well-defined short- and long-term goals

Communication Skills Duration: 5 Hours

12. Demonstrate how to communicate effectively using verbal and nonverbal communication etiquette.
13. Explain the importance of active listening for effective communication
14. Discuss the significance of working collaboratively with others in a team

Diversity & Inclusion Duration: 2.5 Hours

15. Demonstrate how to behave, communicate, and conduct oneself appropriately with all genders and PwD
16. Discuss the significance of escalating sexual harassment issues as per POSH act.

Financial and Legal Literacy Duration:5 Hours

17. Outline the importance of selecting the right financial institution, product, and service
18. Demonstrate how to carry out offline and online financial transactions, safely and securely
19. List the common components of salary and compute income, expenditure, taxes, investments etc.
20. Discuss the legal rights, laws, and aids

Essential Digital Skills Duration: 10 Hours

21. Describe the role of digital technology in today's life
22. Demonstrate how to operate digital devices and use the associated applications and features, safely and securely
23. Discuss the significance of displaying responsible online behavior while browsing, using various social media platforms, e-mails, etc., safely and securely
24. Create sample word documents, excel sheets and presentations using basic features
25. utilize virtual collaboration tools to work effectively

Entrepreneurship Duration: 7 Hours

26. Explain the types of entrepreneurship and enterprises
27. Discuss how to identify opportunities for potential business, sources of funding and associated financial and legal risks with its mitigation plan
28. Describe the 4Ps of Marketing-Product, Price, Place and Promotion and apply them as per requirement
29. Create a sample business plan, for the selected business opportunity

Customer Service Duration: 5 Hours

30. Describe the significance of analyzing different types and needs of customers
31. Explain the significance of identifying customer needs and responding to them in a professional manner.
32. Discuss the significance of maintaining hygiene and dressing appropriately

Getting Ready for apprenticeship & Jobs Duration: 8 Hours

33. Create a professional Curriculum Vitae (CV)
34. Use various offline and online job search sources such as employment exchanges, recruitment agencies, and job portals respectively
35. Discuss the significance of maintaining hygiene and confidence during an interview
36. Perform a mock interview
37. List the steps for searching and registering for apprenticeship opportunities

Learning Outcome – Assessment Criteria

Module No.	Outcome	Assessment Criteria
1.	Identify and select tools and measuring instruments required for electrical machine maintenance, fittings and testing.	**After completion of this module students will be able to:** 1.1 Identify different tools required for electrical machine maintenance and fittings. 1.2 Identify different measuring instruments required for testing of electrical machine. 1.3 Use different tools required for electrical machine maintenance and fittings. 1.4 Use different measuring instruments required for testing of electrical machine.
2.	Identify and use of electrical wiring with accessories, cables, electrical machines and its different parts including starters, protective devices and other electrical components.	**After completion of this module students will be able to:** 2.1 Identify and use of electrical wiring with all accessories. 2.2 Define different earthing systems. 2.3 Explain components used in Electrical Panel. 2.4 Explain working principle, connection diagram and application of electrical equipments 2.5 Explain working principle, connection diagram and application of electrical machines 2.6 Explain different components and operation of EOT crane.
3.	Draw and interpret power circuit and control circuit electrical motor installation and lighting circuit.	**After completion of this module students will be able to:** 3.1 Interpret and draw single line diagram, power line diagram for installation of electrical machine (both power circuit and control circuit) 3.2 Draw different symbols used to draw the single line diagram, power line diagram and machine components. 3.3 Interpret electrical drawings for assembling different parts of motor, generator, motor winding.
4.	Assemble and install Motor, Generator, Compressor, Pump and EOT crane.	**After completion of this module students will be able to:** 4.1 Explain the procedures of assembling of Motor, Generator, Compressor, Pump, EOT Crane. 4.2 Explain installation of D.C. motor and 4-point starter with its accessories; complete wiring of the motor

		connection. 4.3 Demonstrate installation of A.C. motor (3-phase, Single phase) and starter with its accessories, complete wiring of the motor connection. 4.4 Define rules related to the motor wiring. 4.5 Explain installation of electrical control panel with all components. 4.6 Describe wiring for light and power circuit, rules related to the wiring for light and power circuit.
5.	Ensure Occupational safety and quality of work maintaining all applicable regulations.	**After completion of this module students will be able to:** 5.1 Maintain safety procedures for electrical fire. 5.2 Use fire extinguisher for electrical fire. 5.3 Use of Personal protective Equipment (PPE). 5.4 Use Safety instrument and clothing.
6.	Work in real job situation with special emphasis on basic safety and hazards in this domain (OJT).	Assessor will check report prepared for this component of Practical training of the course and assess whether competency has been developed to work in the real job situation with special emphasis on basic safety and hazards in this domain. (The trainee is expected to undertake work in actual workplace under any supervisor / contractor for 60 Hours.)
7.	Employability Skill	As per guided curriculum

Tools & Equipments: (For 30 Trainees)

Sl. No.	**Item Description**	**Specification**	**Qty / Number**
1.	Rule wooden	4 fold 60 mm	5 Nos.
2.	Screw driver	100 mm	5 Nos.
3.	Screw driver	150 mm	5 Nos.
4.	Heavy duty screw driver	200 mm	5 Nos.
5.	Electrician screw driver	250 mm thin stem insulated handle	5 Nos.
6.	Electrician connector, screw driver	100 mm insulated handle thin stem	5 Nos.
7.	Neon Tester	Standard	5 Nos.
8.	Plier insulated	150 mm	5 Nos.
9.	Plier side cutting	150 mm	5 Nos.
10.	Knife double bladed Electrician	Standard	5 Nos.
11.	Hammer, cross peen	115 grams with handle	5 Nos.
12.	Hammer ball peen	0.75 kg. With handle	5 Nos.
13.	Pincer	150 mm	5 Nos.
14.	Firmer chisel wood	12 mm	5 Nos.
15.	Saw tenon	250 mm	5 Nos.
16.	Steel rule	300 mm	5 Nos.

Sl. No.	Item Description	Specification	Qty / Number
17.	C. Clamp	200 mm, 150 mm and 100 mm.	5 Nos.
18.	Spanner	150 mm adjustable 15 degree	5 Nos.
19.	Blow lamp	0.5 litre	5 Nos.
20.	Chisel	25 mm & 6 mm	5 Nos.
21.	Electric drill machine portable	6 mm capacity	5 Nos.
22.	Allen key	Standard	5 Nos.
23.	Oil can	0.12 litre	5 Nos.
24.	Grease gun	Standard	5 Nos.
25.	Outside micrometer	0 to 25 mm	5 Nos.
26.	Motorised bench grinder	Grinder motor: 0.55 KW , 0.75 HP, 3 Phase , 2800 RPM	5 Nos.
27.	Pulley puller	3 jaw	5 Nos.
28.	Bearing puller	as per SKF bearing no.	5 Nos.
29.	Crimping tool	Standard	5 Nos.
30.	Scissors blade	150 mm	5 Nos.
31.	Wire stripper	20 cm	5 Nos.
32.	Hacksaw frame	200 mm adjustable	5 Nos.
33.	Hacksaw frame	300 mm adjustable	5 Nos.
34.	Flat nose plier	100 mm	5 nos
35.	Tweezers	100 mm	5 nos.
36.	Spanner	D.E. metric standard set	5 Nos.
37.	Gauge, wire imperial	Standard	5 Nos.
38.	File flat	200 mm 2nd cut	6 nos.
39.	File half round	200 mm 2nd cut	5 nos.
40.	File round	200 mm 2nd cut	5 nos.
41.	File flat	150 rough	5 nos.
42.	File flat	250 mm smooth	5 nos.
43.	Soldering Iron	25 watt, 65 watt	5 nos. each
44.	Desoldering gun	Spring loaded vacuum style solder remover	5 nos.
45.	Growler	Input 230V AC, Armature dia 20-100mm	5 Nos.
46.	Digital multimeter	3 ½ digits, LCD display, 0-1000 M Ohms, 750 volt AC, 1000V DC, 10A	5 Nos.
47.	A.C. Voltmeter	MI type, 0-500V	5 Nos.
48.	D.C. Voltmeter	MC type, 0-500V	5 Nos.
49.	A.C. Ammeter	MI type, 0-10A	5 Nos.
50.	D.C. Ammeter	MC type, 0-10A	5 Nos.
51.	Wattmeter	Dynamometer type, 150-300-600V, 5-10A	5 Nos.
52.	Megger	500 Volt	5 Nos.
53.	Digital 4-wire Earth resistance tester	Earth Resistance 0-2Ω, 0-20Ω, 0-200Ω, 0-2kΩ. Voltage 0-300 AC	5 Nos.
54.	D.C. power supply	Dual channel, 0-30V, 2A	5 Nos.
55.	Clamp meter	AC/DC current 0-400A, AC/DC voltage 0-	5 Nos.

Sl. No.	Item Description	Specification	Qty / Number
		600V, Frequency 5-500Hz	
56.	Fuse	Kit Kat type, 10A	10 Nos.
57.	Fuse	Cartridge type, 10A	10 Nos.
58.	Conduit	PVC, 25 mm diameter, 2mm thick, for 1.5 mm^2 Al wire	20 Nos.
59.	Conduit bend	20 mm	20 Nos.
60.	Saddle	20 mm, metallic	50 Nos.
61.	Junction box	25 mm, two way	10 Nos.
62.	Socket	5 Pin, 240V, 16A	10 Nos.
63.	Contactor	3-phase, 440volt,16amp, 2NO+ 2NC auxiliary contacts	10 Nos.
64.	Thermal overload relay	3-phase, 0-15 A, 440V	10 Nos.
65.	Timer relay	On delay type, 240V, 1NO+1NC	10 Nos.
66.	Timer relay	Off delay type, 240V, 1NO+1NC	10 Nos.
67.	Push button switch	10A, 240V	10 Nos.
68.	M.C.B.	4 pole, 16 A, 440V	10 Nos.
69.	DC 4-point starter	5 HP, 240V DC	5 Nos.
70.	Different parts of a DC motor for assembling	Dismantled DC Motor	1 No
71.	Different parts of a 3-phase squirrel cage induction motor for assembling	Dismantled 3-phase squirrel cage induction motor	1 No
72.	Different parts of a single phase induction motor for assembling	Dismantled single phase induction motor	1 No
73.	DC shunt motor	2 HP, 220V	1 No
74.	3-phase squirrel cage induction motor	3-phase 400 volt, 50 Hz, 2 HP, 1440 rpm	1 No
75.	Single phase induction motor	1 HP, 230 volt, 50 Hz, capacitor run	1 No
76.	Single phase induction motor	1 HP, 230 volt, 50 Hz, capacitor run	1 No
77.	D.O.L starter	3-phase, 400 V, 50 Hz, 5HP	2 Nos.
78.	Automatic Star-Delta starter	3-phase, 400 V, 50 Hz, 7.5HP	2 Nos.
79.	Manual Star-Delta starter	3-phase, 400 V, 50 Hz, 7.5HP	2 Nos.
80.	Electrical control panel	Control panel components – voltmeters, ammeter, wattmeter, RPM meter, frequency meter, contactor, relay, switch, indicator lamp, MCB, Main switch, Bus bar	1 Set
81	EOT cranes with control panel		1 No.
82	Different parts of an EOT crane	Dismantled EOT crane	1 No.

Marks Distribution

Outcome	Outcome Code	Total Th marks	Total Pr. marks	Total OJT marks
Identify and select tools and measuring instruments required for electrical machine maintenance, fittings and testing.	PWR/3107/OC1	20	100	0
Identify and use of electrical wiring with accessories, cables, electrical machines and its different parts including starters, protective devices and other electrical components.	PWR/3107/OC2	50	140	0
Draw and interpret power circuit and control circuit for electrical motor installation and lighting circuit.	PWR/3107/OC3	20	100	0
Assemble and install Motor, Generator, Compressor, Pump and EOT crane.	PWR/3107/OC4	40	180	0
Ensure Occupational safety and quality of work maintaining all applicable regulations.	PWR/3107/OC5	20	130	0
Work in real job situation with special emphasis on basic safety and hazards in this domain (OJT).	PWR/3107/OC6	0	0	150
Employability Skills – 60 Hrs	DGT/VSQ/N0102	50	0	0