Model Curriculum

QP Name: Electrician

QP Code: ELE/Q5804

QP Version: 1.0

NSQF Level: 4

Model Curriculum Version: 1.0

Electronics Sector Skills Council of India || 155, 2nd Floor, ESC House, Ohkla Phase 3 New Delhi-110020

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Training Parameters

Sector	Electronics
Sub-Sector	Industrial Automation
Occupation	Service
Country	India
NSQF Level	4
Aligned to NCO/ISCO/ISIC Code	NCO/2015-7411.0100
Minimum Educational Qualification & Experience	8th grade pass + NTC (2 years after 8th) with 2 years of NAC/relevant experience OR 10th grade pass with 2 years NTC/NAC/relevant experience OR 12th grade pass OR Certificate (NSQF Level-3 in the Electrical Technician) with 2 years of relevant experience
Minimum Job Entry Age	18 Years
Last Reviewed On	17/11/2022
Next Review Date	17/11/2025
NSQC Approval Date	NA
Version	1.0
Model Curriculum Creation Date	17/11/2022
Model Curriculum Valid Up to Date	17/11/2025
Model Curriculum Version	1.0
Minimum Duration of the Course	540 Hours
Maximum Duration of the Course	540 Hours

Program Overview

This section summarizes the end objectives of the program along with its duration.

Training Outcomes

At the end of the program, the learner should have acquired the listed knowledge and skills.

- Illustrate the concept of electricity and electronics.
- Plan the work schedule and assemble the entire electrical & electronics sub-system of the product.
- Check the PCB boards visually.
- Achieve productivity and quality standards for the assembly process.
- Interact and coordinate with the supervisor and colleagues etc.
- Follow safe and healthy work practices.

Compulsory Modules

The table lists the modules and their duration corresponding to the Compulsory NOS of the QP.

NOS and Module Details	Theory Duration	Practical Duration	On-the-Job Training Duration (Mandatory)	On-the-Job Training Duration (Recommended)	Total Duration
Bridge Module	**04:00**	**00:00**	**00:00**	**00:00**	**04:00**
Module 1: Introduction to Electrician	04:00	00:00	00:00	00:00	04:00
ELE/N5806 – Planning, Design & Installation of electrical & electronics sub system	**46:00**	**92:00**	**90:00**	**00:00**	**228:00**
Module 2: Planning , Design and Installation	46:00	92:00	90:00	00:00	228:00
ELE/N5805- Testing, Commissioning, Maintenance, Fault Finding & Repair	**24:00**	**94:00**	**90:00**	**00:00**	**208:00**
Module 3: Test and Commissioning	24:00	94:00	90:00	00:00	208:00
DGT/VSQ/N0102 – Employability skills	**60:00**	**00:00**	**00:00**	**00:00**	**60:00**
Module 4: Developing Employability skills	60:00	00:00	00:00	00:00	60:00

ELE/N1002 – Apply Health and Safety Practices at the Workplace	**16:00**	**24:00**	**00:00**	**00:00**	**40:00**
Module 5: Basic Health and Safety Practices	16:00	24:00	00:00	00:00	40:00
Total Duration	**150:00**	**210:00**	**180:00**	**00:00**	**540:00**

Module Details

Module 1: Introduction to Electrician

Bridge Module

Terminal Outcomes:

- Identify the roles, responsibilities, and scope of an Assembly Supervisor
- Describe the fundamentals of electricity

Duration: *04:00*	**Duration**: 00*:00*
Theory – Key Learning Outcomes	**Practical – Key Learning Outcomes**

• Describe the size and scope of the electronics industry and its various sub-sectors.
• Discuss the various opportunities for an Electrical Technician in the electronics industry.
• Explain the role and responsibilities of an Electrical Technician.
• List the Tools and Equipment needed in the work process.
• Discuss organisational policies on incentives, delivery standards, personnel management and public relations (PR).
  • Define the basics of electronics and related concepts.
  • Describe electrical circuits and their components.
  • List and define the parameters of an electric circuit such as voltage, current, and resistance.
  • Identify how to read and interpret the values of different components of a circuit.
  • Explain the following fundamental of electricity:
  1. Ohm's Law
  2. AC and DC
  3. Series and parallel connectors.
  • List the various principles of wiring and PCB assembly.
	NA

Classroom Aids	
White board, Marker, projector, laptop, PPT presentation.	

Tools, Equipment and Other Requirements
Electronic components such as the resistor, ICs, capacitor, transistor, diode, PCB and so on Desktop, OS software (Linux, Windows), different types of circuits.

Module 2: Planning Design and Installation
Mapped to ELE/N5806

Terminal Outcomes:

- Determine the production requirement.
- Demonstrate assembling of an entire electrical subsystem.

Duration: *46:00*	**Duration**: *92:00*
Theory – Key Learning Outcomes	**Practical – Key Learning Outcomes**
• Identify the work plan and work requirement after communicating with the supervisor. • List the specification of tools, equipment, and consumables needed for the work processes. • State the appropriate job instruction, drawing, work manual, etc. • Discuss the importance of following a contingency plan for process disruptions. • Interpret the circuit design and the diagram and functioning of the product modules. • Identify different modules of the sub system. • List the various principles of wiring and PCB assembly. • Explain the functions of the product modules. • Explain the assembly process	• Use the communication techniques while interacting with the supervisor. • Demonstrate planning a work schedule for the smooth workflow. • Demonstrate effective handling of different electrical and mechanical products. • Demonstrate how to design a circuit and apply block diagram of the product being assembled. • Demonstrate efficiency in assembling electromechanical products.
Classroom Aids	
Projector, PPT, whiteboard, markers, duster, desktop/laptop.	
Tools, Equipment and Other Requirements	
Electrical sub system of the final products with remote Screw Drivers, Spanners, Drill Machine, Multi-meter, Circuit Tester, Scissors, Pliers Pencil Electrical tape, piano wire, Wall Mount Kit Antenna, STB Measuring Tape, Hammer, Crimping Tools, Cutter/ knife, Digital IC tester with manual/Batch CRO Soldering Tool Kit, SMD Soldering Tools Manual Guide, Trainer Kit.	

Module 3: Test and Commissioning

Mapped to ELE/N5805

Terminal Outcomes:

- Check the PCB boards visually for defects.
- Perform corrective actions for faulty boards.

Duration: *24:00*	**Duration**: *94:00*
Theory – Key Learning Outcomes	**Practical – Key Learning Outcomes**
• Discuss the elements of 5S to maintain quality standards and productivity. • List the considerations for identifying failed and defective components/boards. • Discuss the importance of recording the observed outcomes and its use in rejecting the defective boards. • State the importance of timely preventive maintenance of the PCB boards. • Discuss the common problems arise in the production process and how to avoid them.	• Outline the organizational structure to provide work related feedback. • Calculate the repair estimate for commonly found defaults in the boards. • Demonstrate different methods to detect damage in parts of the electrical sub-system. • Analyse the sample debugging wire diagram, PCB design and interpretation of technical drawings. • Demonstrate preparing a sample report to document the inspection results.
Classroom Aids	
Projector, PPT, whiteboard, markers, duster, desktop/laptop	
Tools, Equipment and Other Requirements	
Tested board, bare board and assembled board, Digital IC tester with manual/Batch CRO Soldering Tool Kit, SMD Soldering Tools Manual Guide, Trainer kit.	

Module 4: Developing Employability Skills

Mapped to DGT/VSQ/N0102

Terminal Outcomes:

Duration: 60:00	Duration: 00:00
Theory – Key Learning Outcomes	**Practical – Key Learning Outcomes**
• Explain constitutional values, civic rights, responsibility towards society to become a responsible citizen • Discuss 21st century skills • Explain use of basic English phrases and sentences. • Demonstrate how to communicate in a well-behaved manner • Demonstrate how to work with others • Demonstrate how to operate digital devices • Discuss the significance of Internet and Computer/ Laptops • Discuss the need for identifying business opportunities • Discuss about types of customers. • Discuss on creation of biodata • Discuss about apprenticeship and opportunities related to it.	
Classroom Aids	
Training Kit (Trainer Guide, Presentations). Whiteboard, Marker, Projector, Laptop	
Tools, Equipment and Other Requirements	
Computer, UPS, Scanner, Computer Tables, LCD Projector, Computer Chairs, White Board OR Computer Lab	

Module 5: Basic Health and Safety Practices

Mapped to ELE/N1002

Terminal Outcomes:

- Apply health and safety practices at the workplace.

Duration: *16:00*	**Duration**: *24:00*
Theory – Key Learning Outcomes	**Practical – Key Learning Outcomes**
• Discuss job-site hazards, risks and accidents. • Explain the organizational safety procedures for maintaining electrical safety, handling tools and hazardous materials. • Discuss electronic waste disposal procedures. • List the name and location of concerned people, documents and equipment for maintaining health and safety in the workplace. • Describe how to interpret warning signs while accessing sensitive work areas. • Explain the importance of good housekeeping. • Describe the process of disposal of hazardous waste • Describe the importance of maintaining appropriate postures while lifting heavy objects. • List the types of fire and fire extinguishers. • Explain the importance of efficient utilisation of material and water. • Discuss common practices of conserving electricity. • List the common sources of pollution and ways to minimise it. • Describe the concept of waste management and methods of waste disposal. • List the different categories of waste. • Describe the procedures for minimising waste. • Explain the processes specified for disposal of hazardous waste.	• Demonstrate the use of protective equipment suitable as per tasks and work conditions. • Demonstrate the use of warning and safety signs. • Demonstrate the use of different methods of accident prevention at workplace. • Demonstrate the use of the correct procedure to report any abnormal situation/behaviour of any equipment/system to relevant authorities. • Demonstrate the use of first aid procedure and bandage to victims. • Demonstrate the steps to free a person from electrocution, and artificial respiration and the CPR Process. • Demonstrate how to use defined emergency procedures such as raising alarm, safe/efficient, evacuation, correct means of escape and so on. • Prepare a sample incident report. • Demonstrate the use of correct method to move injured people and others during an emergency. • Demonstrate how to use fire extinguishers at the time of emergency. • Demonstrate the correct techniques of lifting and handling heavy objects.

Classroom Aids
Training kit (Trainer guide, Presentations), White board, Marker, projector, laptop, flipchart.
Tools, Equipment and Other Requirements
Personal Protection Equipment: safety glasses, head protection, rubber gloves, safety footwear, warning signs and tapes, fire extinguisher, first aid kit, fire extinguishers and warning signs.

Module 6: On-the-Job-Training

Mapped to Electrician

Mandatory Duration: *180:00*	**Recommended Duration: *00*:00**
Location: On Site	
Terminal Outcomes • Apply the basic and fundamental concepts involved while working as an Electrical engineer. • Plan the work schedule and assemble the entire electrical & electronics sub-system of the product. • Demonstrate the process of visual inspection of the PCB board. • Perform corrective actions in faulty panel. • Follow the 5S principle at work premises and optimize resource usage. • Maintain a healthy, safe and secure working environment.	

Annexure

Trainer Requirements

Trainer Prerequisites						
Minimum Educational Qualification	**Specialization**	**Relevant Industry Experience**		**Training Experience**		**Remarks**
		Years	***Specialization***	***Years***	***Specialization***	
Diploma/ITI/ Certified in relevant CITS course	Electronics/Electrical/Mechanical	1	Electrical Technician	1	Trainer	

Trainer Certification	
Domain Certification	**Platform Certification**
Certified for Job Role: "Electrician" mapped to QP: "ELE/ Q5804, version1.0" Minimum accepted score is 60%.	Recommended that the Trainer is certified for the Job Role: "Trainer", mapped to the Qualification Pack: "MEP/Q2601" Minimum accepted score is 80%.

Assessor Requirements

Assessor Prerequisites						
Minimum Educational Qualification	**Specialization**	**Relevant Industry Experience**		**Training Experience**		**Remarks**
		Years	***Specialization***	***Years***	***Specialization***	
Diploma/ITI/ Certified in relevant CITS course	**Electrical/Electronics/Mechanical**	2	Electrical Technician	1	Assessor	

Assessor Certification	
Domain Certification	**Platform Certification**
"Certified for Job Role: "Electrician" mapped to QP: "ELE/ Q5804, version1.0" Minimum accepted score is 60%.	Recommended that the Assessor is certified for the Job Role: "Assessor", mapped to the Qualification Pack: "MEP/Q2701" Minimum accepted score is 60%

Assessment Strategy

1. Assessment System Overview:

    - Batches assigned to the assessment agencies for conducting the assessment on SDSM/SIP or email
    - Assessment agencies send the assessment confirmation to VTP/TC looping SSC
    - Assessment agency deploys the ToA certified Assessor for executing the assessment
    - SSC monitors the assessment process & records

2. Testing Environment:

    - Confirm that the centre is available at the same address as mentioned on SDMS or SIP
    - Check the duration of the training.
    - Check the Assessment Start and End time to be as 10 a.m. and 5 p.m.
    - If the batch size is more than 30, then there should be 2 Assessors.
    - Check that the allotted time to the candidates to complete Theory & Practical Assessment is correct.
    - Check the mode of assessment—Online (TAB/Computer) or Offline (OMR/PP).
    - Confirm the number of TABs on the ground are correct to execute the Assessment smoothly.
    - Check the availability of the Lab Equipment for the particular Job Role.

3. Assessment Quality Assurance levels / Framework:

    - Question papers created by the Subject Matter Experts (SME)
    - Question papers created by the SME verified by the other subject Matter Experts
    - Questions are mapped with NOS and PC
    - Question papers are prepared considering that level 1 to 3 are for the unskilled & semi-skilled individuals, and level 4 and above are for the skilled, supervisor & higher management
    - Assessor must be ToA certified & trainer must be ToT Certified
    - Assessment agency must follow the assessment guidelines to conduct the assessment

4. Types of evidence or evidence-gathering protocol:
    - Time-stamped & geotagged reporting of the assessor from assessment location
    - Centre photographs with signboards and scheme specific branding
    - Biometric or manual attendance sheet (stamped by TP) of the trainees during the training period
    - Time-stamped & geotagged assessment (Theory + Viva + Practical) photographs & videos

5. Method of verification or validation:
    - Surprise visit to the assessment location
    - Random audit of the batch
    - Random audit of any candidate

6. Method for assessment documentation, archiving, and access
    - Hard copies of the documents are stored
    - Soft copies of the documents & photographs of the assessment are uploaded / accessed from Cloud Storage
    - Soft copies of the documents & photographs of the assessment are stored in the Hard Drives

References

Glossary

Term	Description
Declarative knowledge	Declarative knowledge refers to facts, concepts and principles that need to be known and/or understood in order to accomplish a task or to solve a problem.
Key Learning	Key learning outcome is the statement of what a learner needs to know, understand and be able to do in order to achieve the terminal outcomes. A set of key learning outcomes will make up the training outcomes. Training outcome is specified in terms of knowledge, understanding (theory) and skills (practical application).
OJT (M)	On-the-job training (Mandatory); trainees are mandated to complete specified hours of training on site
OJT (R)	On-the-job training (Recommended); trainees are recommended the specified hours of training on site
Procedural Knowledge	Procedural knowledge addresses how to do something, or how to perform a
Training Outcome	Training outcome is a statement of what a learner will know, understand and be able to do **upon the completion of the training**.
Terminal Outcome	Terminal outcome is a statement of what a learner will know, understand and be able to do **upon the completion of a module.** A set of terminal outcomes help to achieve the training outcome.

Acronyms and Abbreviations

Term	Description
ISO	International Organization for Standardization
NCO	National Occupational Standards
NOS	National Skills Qualification Committee
NSQF	National Skills Qualification Framework
OJT	On-the-Job Training
OMR	Optical Mark Recognition
PC	Performance Criteria
PwD	Persons with Disabilities
QP	Qualification Pack
SDMS	Skill Development & Management System
SIP	Skill India Portal
SME	Small and Medium Enterprises
SOP	Standard Operating Procedure
SSC	Sector Skill Council
TC	Trainer Certificate
ToA	Training of Assessors
ToT	Training of Trainers
TP	Training Provider