# Model Curriculum

**QP Name: Electrician – Smart Energy and IoT-enabled Systems**

**OEM Qualification Name: Electrician**

**QP Code: ELE/Q5804**

**QP Version: 2.0**

**NSQF Level: 4**

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

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# Training Parameters

| | |
|---|---|
| **Sector** | Electronics |
| **Sub-Sector** | Industrial Automation |
| **Occupation** | Engineering-I&A |
| **Country** | India |
| **NSQF Level** | 4 |
| **Aligned to NCO/ISCO/ISIC Code** | NCO/2015-7411.0100 |
| **Minimum Educational Qualification & Experience** | 12th Grade or equivalent<br>OR<br>10th grade or equivalent with 3 Years of relevant experience<br>OR<br>Certificate-NSQF (Level-3 in the relevant domain) with 3 years of relevant experience<br><br># Relevant experience in Electronics & Electrical Domain |
| **Minimum Job Entry Age** | 18 Years |
| **Last Reviewed On** | 16/12/2025 |
| **Next Review Date** | 18/11/2028 |
| **NSQC Approval Date** | 16/12/2025 |
| **Version** | 2.0 |
| **Model Curriculum Creation Date** | 16/12/2025 |
| **Model Curriculum Valid Up to Date** | 18/11/2028 |
| **Model Curriculum Version** | 2.0 |
| **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.

- Plan, design, install, test, commission, and maintain electrical, smart/IoT, and renewable systems.
- Troubleshoot and repair faults using proper tools, diagnostics, and standard-compliant practices.
- Apply safety, fire, first-aid, and energy-efficient work practices.
- Maintain documentation and digital logs for installations and maintenance activities.
- Demonstrate employability skills including teamwork, communication, and problem-solving.
- Suggest improvements for energy efficiency and smart system upgrades.

## 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 |
|---|---|---|---|---|---|
| **ELE/N5806 – Planning, Design & Installation of electrical & electronics sub system**<br>**NOS Version No. 2.0**<br>**NSQF Level 4** | **60:00** | **120:00** | **90:00** | **00:00** | **270:00** |
| Module 1: Planning, Designand Installation | 60:00 | 120:00 | 90:00 | 00:00 | 270:00 |
| **ELE/N5805- Testing, Commissioning, Maintenance, Fault Finding& Repair**<br>**NOS Version No. 2.0**<br>**NSQF Level 4** | **30:00** | **120:00** | **90:00** | **00:00** | **240:00** |
| Module 2: Test and Commissioning | 30:00 | 120:00 | 90:00 | 00:00 | 240:00 |
| **DGT/VSQ/N0101 – Employability skills**<br>**NOS Version No. 1.0**<br>**NSQF Level 4** | **30:00** | **00:00** | **00:00** | **00:00** | **30:00** |
| Module 3: Developing Employability skills | 30:00 | 00:00 | 00:00 | 00:00 | 30:00 |
| **Total Duration** | **120:00** | **240:00** | **180:00** | **00:00** | **540:00** |

# Module Details

## Module 1: Planning Design and Installation

***Mapped to ELE/N5806 &V2.0***

**Terminal Outcomes:**

- Identify electrician roles in residential, commercial, and industrial setups.
- Plan and design electrical sub-systems using drawings and digital tools.
- Install and integrate smart, IoT, and renewable energy components.
- Ensure safety and maintain accurate digital documentation.

| **Duration**: *60:00* | **Duration**: *120:00* |
|---|---|
| **Theory – Key Learning Outcomes** | **Practical – Key Learning Outcomes** |
| • Understand the scope, functions, and responsibilities of an electrician across residential, commercial, and industrial setups.<br>• Learn about safety standards, energy-efficient solutions, smart and IoT-enabled systems, and renewable energy components.<br>• Comprehend planning and designing electrical sub-systems using approved drawings, specifications, and digital tools like AutoCAD or BIM.<br>• Gain knowledge of materials, tools, and components required for electrical installations, including smart and renewable modules.<br>• Learn inspection techniques for boards, panels, and components, including surge protection and solar PV systems.<br>• Identify workplace hazards and apply personal protective equipment (PPE), fire safety, and ESD practices.<br>• Understand assembly, wiring, and installation of electrical sub-systems according to SOPs and standards.<br>• Interpret and implement IoT, automation, and smart system schematics accurately.<br>• Learn proper earthing, surge protection, and isolation measures for various setups.<br>• Maintain accurate digital documentation, including logs and BIM updates, for audits and future maintenance. | • Identify and classify electrical components, tools, and consumables for residential, commercial, and industrial setups.<br>• Inspect and test boards, panels, wiring, and smart/IoT modules for defects or damage.<br>• Demonstrate safe handling of electrical equipment using PPE and applying fire, ESD, and first-aid practices.<br>• Assemble and wire electrical sub-systems following SOPs, ensuring correct installation of smart, automation, and renewable energy components.<br>• Interpret and implement electrical drawings, job instructions, and digital schematics (AutoCAD/BIM).<br>• Install control panels, distribution boards, and wiring systems according to setup type and energy-efficient standards.<br>• Implement proper earthing, surge protection, and isolation measures for all setups.<br>• Configure, test, and troubleshoot smart, IoT-enabled, and renewable energy devices to ensure functional performance.<br>• Maintain accurate practical records and digital logs of installations for audits and maintenance.<br>• Coordinate with other trades during installation and guide peers or trainees in safe work practices.<br>• Respond appropriately to emergency situations and apply first-aid procedures during electrical |

| | |
|---|---|
| • Understand testing, commissioning, and troubleshooting of electrical sub-systems.<br>• Learn emergency, rescue, and first-aid procedures relevant to electrical work.<br>• Develop basic supervisory and coordination skills to work with other trades and guide junior staff. | tasks. |
| **Classroom Aids** | |
| Projector, PPT, whiteboard, markers, duster, desktop/laptop. | |
| **Tools, Equipment and Other Requirements** | |
| Essential tools for electrical sub-system work include screwdrivers, spanners, pliers, wire cutters, scissors, hammers, measuring tape, pencils, piano wire, wall mount kits, antennas, STBs, multi-meters, circuit testers, digital IC testers, solar PV tester, soldering kit (including SMD tools), crimping tools, connectors, breadboards, jumper wires, labeling materials, PPE kit, ESD wrist strap, ESD mat, and basic fire safety equipment. | |

## Module 2: Test and Commissioning

***Mapped to ELE/N5805 &V2.0***

**Terminal Outcomes:**

- Test, commission, maintain, and repair electrical, smart/IoT, and renewable systems.
- Troubleshoot faults safely, following standards and proper documentation.
- Ensure operational efficiency and energy compliance.

| **Duration**: *30:00* | **Duration**: *120:00* |
|---|---|
| **Theory – Key Learning Outcomes** | **Practical – Key Learning Outcomes** |
| • Understand testing procedures using modern test kits and power quality analyzers.<br>• Verify correct operation of energized systems, including smart MCCBs, RCDs/RCBOs, digital relays, and renewable devices.<br>• Configure and program bus-systems and IoT/cloud-based automation.<br>• Ensure installations are fully functional and demonstrate operations, including remote control and energy monitoring.<br>• Identify hazards during testing, troubleshooting, and repair.<br>• Apply fire safety practices during commissioning and maintenance.<br>• Troubleshoot faults in electrical systems, including smart/IoT and renewable components.<br>• Repair or replace faulty components such as smart sensors, IoT modules, and EV/renewable devices.<br>• Ensure compliance with IEC/IS codes and energy-efficient guidelines.<br>• Perform maintenance across residential, commercial, and industrial setups.<br>• Use diagnostic tools including multimeters, clamp meters, and power quality analyzers.<br>• Maintain proper documentation, including digital logs for smart systems.<br>• Follow emergency, rescue, and first-aid procedures.<br>• Apply waste management and recycling practices.<br>• Suggest improvements for energy efficiency and smart system upgrades. | • Test electrical installations safely using multimeters, clamp meters, and power quality analyzers.<br>• Verify operation of energized systems, including smart MCCBs, RCDs/RCBOs, digital relays, and renewable devices.<br>• Configure and program bus-systems, IoT modules, and app-controlled automation.<br>• Demonstrate installation functionality and remote/app-based control to customers.<br>• Identify and manage hazards during testing, troubleshooting, and repair.<br>• Apply fire safety, PPE, and ESD practices during energized work.<br>• Troubleshoot faults in wiring, circuits, smart/IoT modules, and renewable systems.<br>• Repair or replace faulty components, sensors, modules, and renewable energy devices.<br>• Ensure compliance with standards and energy-efficient guidelines during maintenance.<br>• Perform maintenance across residential, commercial, and industrial setups.<br>• Document tests, repairs, and upgrades digitally for audits and future reference.<br>• Follow emergency, rescue, and first-aid procedures during maintenance tasks.<br>• Apply proper disposal, recycling, and waste management practices.<br>• Suggest and implement energy efficiency and smart system improvements in existing installations. |
| **Classroom Aids** | |

| |
|---|
| Projector, PPT, whiteboard, markers, duster, desktop/laptop |
| **Tools, Equipment and Other Requirements** |
| Essential tools for testing, commissioning, and maintenance include multimeters, clamp meters, power quality analyzers, circuit testers, digital IC testers, solar PV tester, screwdrivers, spanners, pliers, wire cutters, scissors, hammers, measuring tape, pencils or markers, soldering kit (including SMD tools), crimping tools, connectors, breadboards, jumper wires, and labeling materials. Safety equipment includes PPE kits, ESD wrist straps and mats, and basic fire safety equipment. |

## Module 3: Developing Employability Skills

***Mapped to DGT/VSQ/N0101 &V1.0***

*Terminal Outcomes:*

| Duration: 30:00 | Duration: 00:00 |
|---|---|
| **Theory – Key Learning Outcomes** | **Practical – Key Learning Outcomes** |
| • Explain constitutional values, civicrights, responsibility towards society to become a responsible citizen<br>• Discuss 21st century skills<br>• Explain use of basic English phrasesand sentences.<br>• Demonstrate how to communicate ina well-behaved manner<br>• Demonstrate how to work withothers<br>• Demonstrate how to operate digitaldevices<br>• Discuss the significance of Internetand Computer/ Laptops<br>• Discuss the need for identifyingbusiness opportunities<br>• Discuss about types of customers.<br>• Discuss on creation of biodata<br>• Discuss about apprenticeship andopportunities 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 BoardOR<br>Computer Lab | |

## Module 4: On-the-Job-Training

***Mapped to Electrician***

| **Mandatory Duration: *180:00*** | **Recommended Duration: *00*:00** |
|---|---|
| **Location: On Site** | |

**Terminal Outcomes**

- Plan, design, install, test, commission, and maintain electrical, smart/IoT, and renewable systems.
- Apply safety, fire, first-aid, and standard compliance practices.
- Troubleshoot and repair faults using proper tools and diagnostics.
- Maintain documentation and digital logs of work.
- Demonstrate teamwork, communication, problem-solving, and employability skills.
- Suggest energy-efficient and smart system improvements.

# 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 toQP: "ELE/ Q5804, version2.0" Minimum accepted score is 80%. | Recommended that the Trainer is certified for theJob 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 toQP: "ELE/ Q5804, version2.0" Minimum accepted score is 80%. | Recommended that the Assessor is certified forthe 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 tobe 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. Aset 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 completespecified hours of training on site |
| **OJT (R)** | On-the-job training (Recommended); trainees are recommended thespecified 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, understandand be able to do **upon the completion of the training**. |
| **Terminal Outcome** | Terminal outcome is a statement of what a learner will know, understandand 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 |