



Model Curriculum

QP Name: Welding Operator Electronics

QP Code: ELE/Q0102

QP Version: 4.0

NSQF Level: 3

Model Curriculum Version: 4.0

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

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Training Parameters

Sector	Electronics
Sub-Sector	Semiconductor & Components
Occupation	Production- S&C
Country	India
NSQF Level	3
Aligned to NCO/ISCO/ISIC Code	NCO-2015/3122.4702
Minimum Educational Qualification and Experience	10th Grade Pass OR 8th Grade Pass + NTC (2 year after 8th) OR 8th Grade Pass + 2 year relevant experience and 18 Years
Pre-Requisite License or Training	NA
Minimum Job Entry Age	18 Years
Last Reviewed On	27/01/2022
Next Review Date	27/06/2025
NSQC Approval Date	27/01/2022
QP Version	4.0
Model Curriculum Creation Date	27/01/2022
Model Curriculum Valid Up to Date	27/06/2025
Model Curriculum Version	4.0
Maximum Duration of the Course	420 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:

- Describe the process of welding the copper lead wire to resistor.
- Explain the importance of following inclusive practices for all genders and PwD at work.
- Demonstrate various practices to be followed to maintain health and safety at work.

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 (Recommended)	On-the-Job Training Duration (Mandatory)	Total Duration
Bridge Module	30:00	30:00	00:00	00:00	60:00
Module 1: Introduction and orientation to the role of a Welding Operator Electronics	30:00	30:00	00:00	00:00	60:00
ELE/N0102 Weld the copper lead wire to resistor	30:00	90:00	00:00	150:00	270:00
Module 2: Process of welding the copper lead wire to resistor	30:00	90:00	00:00	150:00	270:00
ELE/N9972: Communicate and coordinate effectively with others	15:00	15:00	00:00	00:00	30:00
Module 3: Process of communicating and coordinating effectively with others	15:00	15:00	00:00	00:00	30:00
ELE/N1003: Work effectively, sustainably and safely	15:00	15:00	00:00	00:00	30:00
Module 4: Work Ethics, sustainability and safety practice	15:00	15:00	00:00	00:00	30:00

DGT/VSQ/N0101- Employability Skills (30 Hours)	30:00	00:00	00:00	00:00	30:00
Module 5: Employability Skills (30 Hours)	30:00	00:00	00:00	00:00	30:00
Total Duration	120:00	150:00	00:00	150:00	420:00

Module Details

Module 1: Introduction and orientation to the role of a Welding Operator Electronics

Bridge Module

Terminal Outcomes:

- Discuss the job role of a Welding Operator Electronics.

Duration: 30:00	Duration: 30:00
Theory – Key Learning Outcomes	Practical – Key Learning Outcomes
<ul style="list-style-type: none"> • Describe the size and scope of the electronics industry and its sub-sectors. • Discuss the role and responsibilities of a Welding Operator Electronics. • Describe various employment opportunities for a Welding Operator Electronics. 	<ul style="list-style-type: none"> • Welding operations • Welding Techniques
Classroom Aids	
Training Kit - Trainer Guide, Presentations, Whiteboard, Marker, Projector, Laptop	
Tools, Equipment and Other Requirements	
NA	

Module 2: Process of welding the copper lead wire resistor

Mapped to ELE/N0102

Terminal Outcomes:

- Explain the importance of identifying the work requirements.
- Demonstrate the process of setting up and operating the welding equipment.
- Describe the process of checking the welding quality.
- Explain the importance of undertaking preventive maintenance of welding equipment.
- Describe the process of achieving productivity and quality standards.

Duration: 30:00	Duration: 90:00
Theory – Key Learning Outcomes	Practical – Key Learning Outcomes
<ul style="list-style-type: none"> • Explain the company policies on acceptable limits of quality, delivery standards, safety practices and hazard, security and performance measurements. • Explain the work flow involved in production process of the company. • Explain the importance of the individual role in the workflow. • Explain the reporting structure. • Describe the basics of electronic components such as ohm value, tolerances, colour codes, polarity of components etc. • Describe different types of welding processes, parameters and associated equipment. • Explain the impact of welding parameters on the quality and quantity of output. • Explain the use and function of welding machine, equipment and accessories. • Explain how to program the welding machine. • Explain how to set and load the work pieces on the machine. • List different cleaning methods for electrodes, metal surfaces, etc. • Explain production processes, quality control, costs, and other techniques. 	<ul style="list-style-type: none"> • Show how to collect the required materials and equipment for welding. • Demonstrate how to compare the thickness of copper wire, filler material and flux required for the welding process. • Demonstrate the process of setting the welding machine, apparatus and accessories appropriately based on the size of cap and load on the machine. • Demonstrate the process of installing and aligning the work pieces on the welding apparatus appropriately. • Show how to add chemicals to work pieces to ensure bonding. • Demonstrate the process of setting or adjusting the welding parameters as per the job requirements. • Show how to adjust welding heads and tooling according to work specifications. • Demonstrate how to weld the electro tinned copper lead wire to the centre of steel and cap. • Demonstrate the process of using the appropriate tools for unloading the completed work pieces from the machine after completion of the welding process. • Demonstrate how to visually inspect the welded workpiece for various quality defects and to ensure

<ul style="list-style-type: none"> • Explain the use of machines and tools required during work. • List the maintenance and repair procedure of tools and machines. • State the Electro-Static Discharge (ESD) precautions and 5s standards. • List commonly occurring machine and component defects. • Explain basic math skills and computer operation. • Explain how to operate the welding machine and equipment to weld the copper lead wire to resistor. • Explain how to use measuring instruments like callipers, micro-meters for quality check. • Explain how to set the variance and voltage depending upon the cap size. • Explain how to choose and fix the bottom electrode according to cap size. 	<p>conformance to required specifications.</p> <ul style="list-style-type: none"> • Demonstrate the process of repairing the workpiece. • Demonstrate the process of cleaning of machine, equipment and work area as prescribed by machine manufacturer. • Prepare records and documents related to the outcome of weld performed as per the organisational standards and procedures.
<p>Classroom Aids</p>	
<p>Training Kit (Trainer Guide, Presentations). Whiteboard, Marker, Projector, Laptop</p>	
<p>Tools, Equipment and Other Requirements</p>	
<p>Different Types of Joints, Resistors, Diodes, Capacitors, Integrated Circuits, Signal Generators, Cathode Ray Oscilloscope (CRO), Multi-meters, LED, Batteries covered Electrode, TIG Welding rod, GMAW Solid Wire, GMAW flux cored wire, SAW wire, Strip Electrodes, Power Source, Electrode Holder and cables, Welder Protection, Fume Extraction, Welding Arc, Plasma, SMAW, welding electrodes, TIG Welding Machine, Torch with Nozzle, Work Clamp, Tungsten, Grinding Wheel, MIG Welder, AC or DC Sources Of Power Angle Grinders, Plasma Cutters, Drills, Flux, Filler Material, Thermoplastics/Metals, Chipping Hammer, Wire Brush, Hand File, Vice Grips, Pliers, Clamps, Adjustable Wrench, Micro- Computer, Welding Machine, Height Gauge, Co2 gas cylinder + Regulator + Gas Heater and Flow Meter, Argon Gas Cylinder, Hydraulic and Lubricating Oil, Consumables Like Electrodes Gas Cylinder and Similar Item, Defective and Good Samples of Weld, Calliper, Micrometre, Asbestos Gloves, Flame-Proof Aprons, Safety Helmets, Trousers, Safety Shoes, Protective Goggles, Safety Mask, Respirator</p>	

Module 3: Process of communicating and coordinating effectively with others

Mapped to ELE/N9972

Terminal Outcomes:

- Explain the importance of communicate effectively with supervisor and colleagues.
- Implement the practices related to gender and PwD sensitization.

Duration: 15:00	Duration: 15:00
Theory – Key Learning Outcomes	Practical – Key Learning Outcomes
<ul style="list-style-type: none"> • Explain the importance of personal grooming. • Explain the organisation's policy on code of conduct. • Explain the organisation's reporting structure and documentation policy. • Explain how to communicate effectively through all means including face-to-face, telephonic as well as written. • Explain different types of information that colleagues might need and the importance of providing the same as and when required. • Explain the rights and duties w.r.t PwD at workplace. • Explain the organisation policies and standards to support PwD. 	<ul style="list-style-type: none"> • Show how to maintain personal hygiene and professional appearance. • Show how to report work completed as per the schedule to superior and inform of any deviations or anomalies.
Classroom Aids	
Training Kit (Trainer Guide, Presentations). Whiteboard, Marker, Projector, Laptop	
Tools, Equipment and Other Requirements	
NA	

Module 4: Work Ethics, sustainability and safety practice

Mapped to ELE/N1003

Terminal Outcomes:

- Describe the process of achieving optimum productivity and quality.
- Explain the importance of implementing health and safety procedures.
- Demonstrate the process of organising waste management and recycling.
- Explain the importance of conserving resources.

Duration: 15:00	Duration: 15:00
Theory – Key Learning Outcomes	Practical – Key Learning Outcomes
<ul style="list-style-type: none"> • Explain the importance of time management. • Explain the organizational safety and health policy. • List different waste categories such as dry, wet, recyclable, non-recyclable and single-use plastic items. • Explain the usage of different colours of dustbins to dispose waste. • Explain the methods of waste disposal. • Explain the methods of recycling as well as repairing and reusing electronic components. • Explain the efficient utilisation of material and water. • Explain the basics of electricity and prevalent energy-efficient devices. • List ways to recognise common electrical problems. • List common practices of conserving electricity. 	<ul style="list-style-type: none"> • Show how to take ESD precautions while doing work. • Demonstrate the use of appropriate Personal Protective Equipment (PPE). • Show how to identify and segregate recyclable/non-recyclable and hazardous wastes. • Demonstrate the process of cleaning the tools, machines and equipment. • Show how to connect electrical equipment and appliances properly when in use and turn off when not in use.
Classroom Aids	
Training Kit (Trainer Guide, Presentations). Whiteboard, Marker, Projector, Laptop	
Tools, Equipment and Other Requirements	
NA	

Module 5: Employability Skills (30 Hours)

Mapped to DGT/VSQ/N0101

Terminal Outcomes:

- Discuss about Employability Skills in meeting the job requirements
- Describe opportunities as an entrepreneur.
- Describe ways of preparing for apprenticeship & Jobs appropriately.

Duration: 30:00	Duration: 00:00
Theory – Key Learning Outcomes	Practical – Key Learning Outcomes
<ul style="list-style-type: none"> • 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 6: On-the-Job Training

Mapped to Welding Operator Electronics

Mandatory Duration: 150:00	Recommended Duration: 00:00
Location: On Site	
<p>Terminal Outcomes</p> <ol style="list-style-type: none"> 1. Identifying the various welding parameters such as temperature, pressure, electrode type, electrode distance or gap, welding current, voltage, process time etc. before starting the welding process. 2. Setting the welding machine, apparatus and accessories appropriately. 3. Installing and aligning the work pieces on the welding apparatus appropriately 4. Setting or adjusting the welding parameters. 5. Adjusting welding heads and tooling. 6. Operating the welding machine as specified in work order and sop to weld the electro tinned copper lead wire to the centre of steel and cap. 7. Monitoring the welding process and machine constantly. 8. Performing regular cleaning of machine, equipment and work area. 9. Maintaining the records and documents related to the outcome of weld performed. 10. Communicating effectively at the workplace. 11. Applying health and safety practices at the workplace. 	

Annexure

Trainer Requirements

Trainer Prerequisites						
Minimum Educational Qualification	Specialization	Relevant Industry Experience		Training Experience		Remarks
		Years	Specialization	Years	Specialization	
Diploma/ I.T.I/ Certified in relevant CITS Trade	Electronics/ Mechanical/ Electrical	1	Welding Operations - Electronics	1 year preferably	Electronics	

Trainer Certification	
Domain Certification	Platform Certification
“Welding Operator Electronics”, “ELE/Q0102, v4.0”, Minimum accepted score is 80%	Recommended that the Trainer is certified for the Welding Operator - Electronics “Trainer (VET and Skills)”, mapped to the Qualification Pack: “MEP/Q2601, V2.0”, with minimum score of 80%

Assessor Requirements

Assessor Prerequisites						
Minimum Educational Qualification	Specialization	Relevant Industry Experience		Training/Assessment Experience		Remarks
		Years	Specialization	Years	Specialization	
Diploma/ I.T.I/ Certified in relevant CITS Trade	Electronics/ Mechanical / Electrical	2	Welding Operations - Electronics	1 year preferably	Electronics	

Assessor Certification	
Domain Certification	Platform Certification
<p>“Welding Operator Electronics”, “ELE/Q0102, v4.0”, Minimum accepted score is 80%</p>	<p>Recommended that the Assessor is certified for the Welding Operator - Electronics “Assessor (VET and Skills)”, mapped to the Qualification Pack: “MEP/Q2701, V2.0”, with minimum score of 80%</p>

Assessment Strategy

1. Assessment System Overview:

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

2. Testing Environment

To ensure a conducive environment for conducting a test, the trainer will:

- 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 10 a.m. and 5 p.m. respectively
- Ensure there are 2 Assessors if the batch size is more than 30.
- 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
- The assessor must be ToA certified and the trainer must be ToT Certified
- The 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:

To verify the details submitted by the training centre, the assessor will undertake:

- A surprise visit to the assessment location
- A random audit of the batch
- A random audit of any candidate

6. Method for assessment documentation, archiving, and access

To protect the assessment papers and information, the assessor will ensure:

- 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 on the Hard drive

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