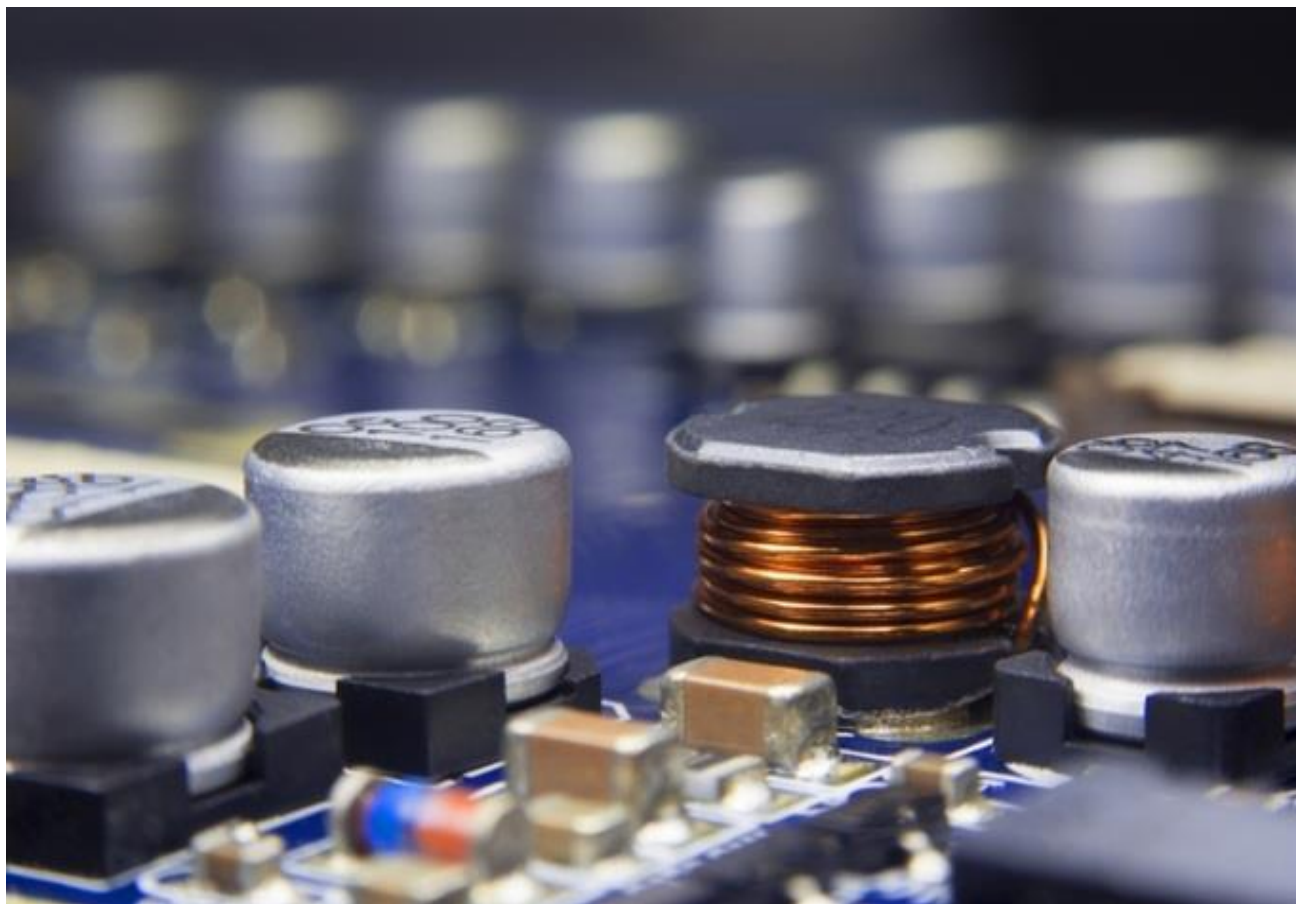




Model Curriculum

QP Name: Winding Machine Operator (Electronics Component)

QP Code: ELE/Q0101

QP Version: 4.0

NSQF Level: 4

Model Curriculum Version: 4.0

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

Sector	Electronics
Sub-Sector	Semiconductor & Components
Occupation	Production-S&C
Country	India
NSQF Level	4
Aligned to NCO/ISCO/ISIC Code	NCO-2015/8151.9900
Minimum Educational Qualification and Experience	12th grade Pass (or Equivalent in Science) with NA of experience OR 10th grade pass (or equivalent) with 3 Years of Relevant experience OR Certificate-NSQF (Level 3.5) with 1.5 years of Relevant experience # Relevant Experience in Semiconductor & Components
Pre-Requisite License or Training	NA
Minimum Job Entry Age	18 Years
Last Reviewed On	08/05/2025
Next Review Date	08/05/2028
NSQC Approval Date	08/05/2025
QP Version	4.0
Model Curriculum Creation Date	08/05/2025
Model Curriculum Valid Up to Date	08/05/2028
Model Curriculum Version	4.0
Minimum Duration of the Course	480 Hours
Maximum Duration of the Course	480 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.

- Demonstrate procedure to wind the wire or film on the resistor or capacitor by using a winding machine.
- Achieve productivity and quality standards for winding the correct specification output.
- 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
ELE/N0168: Perform Winding Operations for Resistors and Capacitors	75:00	90:00	60:00	00:00	225:00
Module 1: Perform Winding Operations for Resistors and Capacitors	75:00	90:00	60:00	00:00	225:00
ELE/N0169: Quality Assurance, Maintenance and Safety in Winding Operations	75:00	90:00	60:00	00:00	225:00
Module 2: Quality Assurance, Maintenance and Safety in Winding Operations	75:00	90:00	60:00	00:00	225:00
DGT/VSQ/N0101: Employability Skills (30 Hours)	30:00	00:00	00:00	00:00	30:00
Module 3: Employability Skills (30 Hours)	30:00	00:00	00:00	00:00	30:00
Total Duration	180:00	180:00	120:00	00:00	480:00

Module Details

Module 1: Perform Winding Operations for Resistors and Capacitors

Mapped to ELE/N0168

Terminal Outcomes:

- Interpret work instructions and specifications to determine product requirements and schedules.
- Collect and inspect materials, ensuring the functionality of tools, machines, and safety equipment.
- Operate manual, semi-automated, and automated winding machines to produce accurate windings.
- Configure and adjust machine settings to ensure smooth, wrinkle-free winding.
- Monitor environmental conditions and follow maintenance schedules to ensure machine efficiency.

Duration: 75:00	Duration: 90:00
Theory – Key Learning Outcomes	Practical – Key Learning Outcomes
• Interpret job sheets, work instructions, and SOPs to determine product specifications and schedules. • Describe procedures for collecting, inspecting, and handling materials like film, wire, and cores. • Verify availability and functionality of tools, machines, and safety equipment before starting work. • Explain the importance of checking resistivity and quality of wire or film used in winding. • Describe the setup and operation of manual and semi-automated winding systems. • Explain how to set up and adjust automated winding machines, including roller alignment. • Configure programmable winding machines using digital interfaces and precision settings. • Operate winding machines as per the winding chart to ensure stable and accurate performance. • Identify and maintain optimal environmental conditions like temperature, humidity, and cleanliness. • Follow machine stop times, maintenance schedules, and safety protocols as per manufacturer guidelines.	• Accurately read and interpret job sheets, SOPs, and work instructions to identify winding job requirements. • Collect and handle required materials (e.g., wire, film, cores) from the store following standard procedures. • Check and confirm the readiness and working condition of tools, machines, and safety equipment. • Visually inspect materials for defects or inconsistencies before initiating the winding process. • Test and record the resistivity and quality of film or wire prior to use. • Properly fix wire terminals on cores and load them onto shafts for manual or semi-automated winding. • Operate manual/semi-automated winding systems using control software and foot-hand coordination for precision winding. • Set up automated winding machines and adjust rollers to ensure wrinkle-free winding. • Configure programmable winding machines with accurate parameters for material type, winding cycle, and electrical properties. • Monitor machine operation as per the winding chart, maintain environmental conditions, and follow maintenance schedules.

Classroom Aids:

Whiteboard, marker pen, computer or laptop attached to LCD projector, scanner, computer speakers

Tools, Equipment and Other Requirements

Job sheet, Sample winding chart, Ball Peen Hammer, Needle Nose Plier, Lineman's Plier, Tape Measure, Combination Square, Wire Brush, Chipping Hammer, Flat Cross-Cut Bastard File, Round Cross-cut Bastard File, Resistor, Capacitor, Hacksaw, Screw Driver, Multi meter, Ohmmeter, Wrench, Winding Machine, PPE, First-aid kit

Module 2: Quality Assurance, Maintenance and Safety in Winding Operations

Mapped to ELE/N0169

Terminal Outcomes:

- Perform testing and documentation of wound components using appropriate measuring instruments.
- Carry out preventive and predictive maintenance of winding machines as per guidelines.
- Ensure quality compliance and improve productivity through effective monitoring and corrective actions.
- Maintain workplace safety by identifying hazards, using PPE, and following emergency procedures.
- Implement waste management practices through proper segregation and disposal of materials.

Duration: 75:00	Duration: 90:00
Theory – Key Learning Outcomes	Practical – Key Learning Outcomes
• Understand procedures for sampling wound components and documenting them for traceability and quality control. • Explain how to record lot details and maintain documentation in prescribed formats or digital systems. • Describe the use of testing instruments (capacitance meters, ohmmeters, multimeters) for measuring electrical values of windings. • Identify variances in measurements and explain proper escalation and documentation practices. • Explain preventive maintenance tasks such as machine cleaning, calibration, and inspection of key components. • Understand the use of predictive maintenance tools like vibration analyzers and thermal cameras for fault detection. • Describe how to assess winding quality against specifications and document outcomes, rejections, and corrective actions. • Understand continuous improvement practices aimed at enhancing product quality and operational efficiency. • Recognize workplace hazards and outline safety procedures, including use of PPE, emergency responses, and first aid. • Explain proper waste segregation and disposal methods for recyclable, non-	• Collect and label samples of wound capacitors/resistors from machines, ensuring proper documentation and traceability. • Accurately record lot details and sample information in prescribed formats or digital systems. • Use instruments like capacitance meters, ohmmeters, and multimeters to check values and identify variances in winding components. • Document any deviations from specifications and promptly escalate issues to supervisors as per protocol. • Perform routine preventive maintenance tasks such as cleaning machines, calibrating sensors, and inspecting tension controls. • Adjust rollers and machine parameters for smooth winding and replace worn-out parts to avoid breakdowns. • Use predictive maintenance tools (e.g., vibration analyzers, thermal cameras) to identify potential faults and prevent failures. • Verify winding quality by checking against specified electrical and physical parameters to ensure compliance. • Wear appropriate PPE, identify workplace hazards, and perform basic first aid and emergency response actions. • Segregate and dispose of different types of waste materials responsibly, maintaining a clean and safe work environment.

recyclable, and hazardous materials to maintain a clean and safe workplace.	
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 3: 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
• 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 4: On-the-Job Training

Mapped to Winding Machine Operator (Electronics Component)

Mandatory Duration: 120:00

Recommended Duration: 00:00

Location: On Site

Terminal Outcomes

1. Explain the fundamental concepts of electronics and electronics components
2. Identify the requirements for winding work.
3. set the winding machine and its apparatus
4. Load the resistor and film on the winding apparatus for wrinkle free winding
5. Select the winding program and set the winding parameters on the winding machine as per the output requirements.
6. Perform winding of wire or film on the resistor or capacitor manually or by winding machine
7. Make the electrical connections of components with electrical panels by using wires strippers, crippling tool and other insulated tools.
8. Perform post-assembly activities like cleaning, functionality check etc.
9. Interact and coordinate with supervisor and colleagues
10. Work as per the given timeline and quality standards
11. Maintain a safe, healthy and secure work 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 Trade	Electronics	2	Winding Operator	1	Trainer	

Trainer Certification	
Domain Certification	Platform Certification
“Winding Machine Operator (Electronics Component), ELE/Q0101, version 4.0”. Minimum accepted score is 80%.	Recommended that the Trainer is certified for the Winding Machine Operator (Electronics Component) “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/ITI/ Certified in relevant CITS Trade	Electronics	3	Winding Operator	2	Assessor	

Assessor Certification	
Domain Certification	Platform Certification
“Winding Machine Operator (Electronics Component), ELE/Q0101, version 4.0”. Minimum accepted score is 80%.	Recommended that the Assessor is certified for the Winding Machine Operator (Electronics Component) “Assessor (VET and Skills)”, mapped to the Qualification Pack: “MEP/Q2701, V2.0”, with minimum score of 80%

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
- 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

Sector	Sector is a conglomeration of different business operations having similar business and interests. It may also be defined as a distinct subset of the economy whose components share similar characteristics and interests.
Sub-sector	Sub-sector is derived from a further breakdown based on the characteristics and interests of its components.
Occupation	Occupation is a set of job roles, which perform similar/ related set of functions in an industry.
Job role	Job role defines a unique set of functions that together form a unique employment opportunity in an organisation.
Occupational Standards (OS)	OS specify the standards of performance an individual must achieve when carrying out a function in the workplace, together with the Knowledge and Understanding (KU) they need to meet that standard consistently. Occupational Standards are applicable both in the Indian and global contexts.
Performance Criteria (PC)	Performance Criteria (PC) are statements that together specify the standard of performance required when carrying out a task.
National Occupational Standards (NOS)	NOS are occupational standards which apply uniquely in the Indian context.
Qualifications Pack (QP)	QP comprises the set of OS, together with the educational, training and other criteria required to perform a job role. A QP is assigned a unique qualifications pack code.
Unit Code	Unit code is a unique identifier for an Occupational Standard, which is denoted by an 'N'
Unit Title	Unit title gives a clear overall statement about what the incumbent should be able to do.
Description	Description gives a short summary of the unit content. This would be helpful to anyone searching on a database to verify that this is the appropriate OS they are looking for.
Scope	Scope is a set of statements specifying the range of variables that an individual may have to deal with in carrying out the function which have a critical impact on quality of performance required.

Knowledge and Understanding (KU)	Knowledge and Understanding (KU) are statements which together specify the technical, generic, professional and organisational specific knowledge that an individual needs in order to perform to the required standard.
Organisational Context	Organisational context includes the way the organisation is structured and how it operates, including the extent of operative knowledge managers have of their relevant areas of responsibility.
Technical Knowledge	Technical knowledge is the specific knowledge needed to accomplish specific designated responsibilities.
Core Skills/ Generic Skills (GS)	Core skills or Generic Skills (GS) are a group of skills that are the key to learning and working in today's world. These skills are typically needed in any work environment in today's world. These skills are typically needed in any work environment. In the context of the OS, these include communication related skills that are applicable to most job roles.
Electives	Electives are NOS/set of NOS that are identified by the sector as contributive to specialization in a job role. There may be multiple electives within a QP for each specialized job role. Trainees must select at least one elective for the successful completion of a QP with Electives.
Options	Options are NOS/set of NOS that are identified by the sector as additional skills. There may be multiple options within a QP. It is not mandatory to select any of the options to complete a QP with Options.

Acronyms and Abbreviations

NOS	National Occupational Standard(s)
NSQF	National Skills Qualifications Framework
QP	Qualifications Pack
TVET	Technical and Vocational Education and Training
IPR	Intellectual Property Rights