Model Curriculum

QP Name: Assembly Line Operator

QP Code: ELE/Q4301

QP Version: 3.0

NSQF Level: 3

Model Curriculum Version: 3.0

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

Table of Contents

Training Parameters

Sector	Electronics
Sub-Sector	Electronics Manufacturing System
Occupation	Assembly-EMS
Country	India
NSQF Level	3
Aligned to NCO/ISCO/ISIC Code	NCO-2004/7242.10
Minimum Educational Qualification and Experience	10th Grade Pass OR 8th Grade Pass + NTC (2 years after 8th) OR 8th Grade Pass + 2 years relevant experience and 18 Years
Pre-Requisite License or Training	NA
Minimum Job Entry Age	18 Years
Last Reviewed On	24/02/2022
Next Review Date	02/06/2025
NSQC Approval Date	24/02/2022
QP Version	3.0
Model Curriculum Creation Date	24/02/2022
Model Curriculum Valid Up to Date	02/06/2025
Model Curriculum Version	3.0
Maximum Duration of the Course	450 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.

- Interpret assembly drawing/work instructions/SOPs for identification of material, tools and equipment required.
- Carry out kitting of tools, parts and modules for assembly of IT hardware.
- Carry out assembly of IT product.
- Carry out post-work operations such as testing, cleaning, inspection etc.
- 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 (Recommended)	On-the-Job Training Duration (Mandatory)	Total Duration
Bridge Module	**30:00**	**60:00**	**00:00**	**00:00**	**90:00**
Module 1: Introduction to the role of Assembly Line Operator	30:00	60:00	00:00	00:00	90:00
ELE/N4301 - Perform kitting of modules for assembling	**30:00**	**60:00**	**00:00**	**30:00**	**120:00**
Module 2: Perform kitting of modules for assembling	30:00	60:00	00:00	30:00	120:00
ELE/N4302 - Assemble modules to complete equipment	**30:00**	**60:00**	**00:00**	**60:00**	**150:00**
Module 3: Assemble modules to complete equipment	30:00	60:00	00:00	60:00	150:00
ELE/N9972 – Work Effectively at the Workplace	**15:00**	**15:00**	**00:00**	**00:00**	**30:00**
Module 4: Soft Skills and Work Ethics	15:00	15:00	00:00	00:00	30:00
ELE/N1003 – Apply Health and Safety Practices at the Workplace	**15:00**	**15:00**	**00:00**	**00:00**	**30:00**
Module 5: Basic Health and Safety Practices	15:00	15:00	00:00	00:00	30:00
DGT/VSQ/N0102- Employability Skills (30 Hours)	**30:00**	**00:00**	**00:00**	**00:00**	**30:00**
Module 6: Employability Skills (30 Hours)	30:00	00:00	00:00	00:00	30:00
Total Duration	**150:00**	**210:00**	**00:00**	**90:00**	**450:00**

Module Details

Module 1: Introduction to the role of Assembly Line Operator

Bridge module

Terminal Outcomes:

- List the role and responsibilities of an Assembly Line Operator.

Duration: *30:00*	Duration: *60:00*
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 Assembly Line Operator in the industry. • Define the basics of electronics and related concepts. • Discuss the role and responsibilities of an Assembly Line Operator. • Discuss organisational policies on incentives, delivery standards, personnel management and public relations (PR).	• Familiarization with the Assembly Line • To make aware about the processes used on Assembly Line • Familiarization with the tools used on Assembly Line • Familiarization with the Safety processes
Classroom Aids:	
Laptop, white board, marker, projector	
Tools, Equipment and Other Requirements	
NA	

Module 2: Perform kitting of modules for assembling

Mapped to ELE/N4301

Terminal Outcomes:

- Prepare for kitting of modules for assembling.
- Carry out kitting and assembly of modules.

Duration: *30:00*	Duration: *60:00*
Theory – Key Learning Outcomes	**Practical – Key Learning Outcomes**
- Describe organisational process or procedure for assembly of a product. - Discuss the information derived from the engineering drawing, BOM, blueprints, job sheet etc. - Recall basic electronics involved in the hardware. - List different types of IT hardware products and functionalities. - Describe functions of electrical and mechanical parts/ modules. - List the tools, measuring instruments, equipment and components required during assembling work. - Discuss the organisational process of collecting and arranging the tools, measuring instruments, equipment and components for assembly work. - Discuss the necessary precautions to avoid any hazard and accident during assembling activities. - Explain the safety mechanism, do's and don'ts of manufacturing process as per SOP. - List the steps to be performed for assembling the components of product as per drawing/WI. - List the steps to be performed for kitting the components and modules. - List modules required for assembling such as metal case for boxing, power supply, mother boards , other PCBs, displays, drivers, power supply, controllers, trays, fusers. - Explain the process of escalating the problems faced during assembly activities to the supervisor or concerned authority. - Describe post-assembling processes like cleaning, quality check etc.	- Read the drawing, work orders, BOM etc. for identifying work requirements, selecting and planning sequence of assembly operations. - Demonstrate the standard operating procedure to use tools, measuring instruments, equipment and components required during assembling work. - Show how to collect the required tools, measuring instruments, equipment and components from the store. - Show how to document the number of components and modules received and enter the inventory details in the internal process system as per company requirement example: SAP (ERP system). - Show how to segregate the components, modules, box and accessories as per SOP. - Apply appropriate ways to avoid any mismatch and wrong count of modules during kitting. - Demonstrate organisational procedure of assembling all the products and its components as mentioned in drawing/ blueprint. - Show how to place and fix various parts i.e. processor, RAM, cooling fan, print head, components such as wire house, armature, bobbin etc. in the cabinet. - Apply appropriate ways to fasten the mechanical components/ subassemblies together. - Show how to make the electrical connections of components with electrical panels by using wires strippers, crippling tool and other insulated tools. - Demonstrate organisational procedure of reporting defective or inadequate number of components and consumables in time.

• Discuss various documents and records need to be prepare and maintain related to work.	• Demonstrate post-assembly activities like cleaning, functionality check etc.

Classroom Aids:

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

Tools, Equipment and Other Requirements

Cable, Crimping Tool, Desktop, Digital Multimeter, Dot Matrix Printer, ESD Gloves, Ink Jet Printer, Insulation Tape, LanTester, Laptop, Lead Solder, Motherboard Diagnoser, Multi-Function Laser Printer, Network Switch, Post Cards, Router, Scanner, Screw Driver Set, Soldering Flux, Soldering Iron, job sheets, report formats

Module 3: Assemble modules to complete equipment

Mapped to ELE/N4302

Terminal Outcomes:

- Carry out assembly of modules in component.

Duration: *30:00*	Duration: *60:00*
Theory – Key Learning Outcomes	**Practical – Key Learning Outcomes**
• Describe organisational process or procedure for assembly of a IT hardware modules into complete equipment • Discuss the information derived from the engineering drawing, BOM, blueprints, job sheet etc. • Recall basic electronics involved in the hardware. • List different types of IT hardware products and functionalities. • Describe functions of electrical and mechanical parts/ modules. • List the tools, measuring instruments, equipment and components required during assembling work. • Discuss the organisational process of collecting and arranging the tools, measuring instruments, equipment and components for assembly work. • Discuss the necessary precautions to avoid any hazard and accident during assembling activities. • Explain the safety mechanism, do's and don'ts of manufacturing process as per SOP. • List the steps to be performed for assembling the components of product as per drawing/WI. • List the steps to be performed for kitting the components and modules. • List modules required for assembling such as metal case for boxing, power supply, mother boards , other PCBs, displays, drivers, power supply, controllers, trays, fusers. • Explain the process of escalating the problems faced during assembly activities to the supervisor or concerned authority. • Describe post-assembling processes like cleaning, quality check etc.	• Read the drawing, work orders, BOM etc. for identifying work requirements, selecting and planning sequence of assembly operations. • Demonstrate the standard operating procedure to use tools, measuring instruments, equipment and components required during assembling work. • Show how to collect the required tools, measuring instruments, equipment and modules. • Read the machine traveller sheet and ensure that the components in mother board are fixed. • Show how to document the number of components and modules received and enter the inventory details in the internal process system as per company requirement example: SAP (ERP system). • Show how to segregate the components, modules, box and accessories as per SOP. • Demonstrate organisational procedure of assembling all the modules together in a casing as mentioned in drawing/ blueprint. • Show how to place and connect various modules i.e. assembling for desktop, mother board, SMPS, Hard disk, Drivers, Wire connectors, LED display and PCB etc. in the casing. • Apply appropriate ways to fasten the mechanical components/ subassemblies together. • Show how to place stickers and labels wherever applicable as per the product specification. • Show how to make the electrical connections of components with electrical panels by using wires strippers, crippling tool and other insulated tools. • Demonstrate organisational procedure of completing box assembly.

• Discuss various documents and records need to be prepare and maintain related to work.	• Demonstrate organisational procedure of reporting defective or inadequate number of components and consumables in time. • Demonstrate post-assembly activities like cleaning, functionality check etc.

Classroom Aids:

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

Tools, Equipment and Other Requirements

Cable, Crimping Tool, Desktop, Digital Multimeter, Dot Matrix Printer, ESD Gloves, Ink Jet Printer, Insulation Tape, LanTester, Laptop, Lead Solder, Motherboard Diagnoser, Multi-Function Laser Printer, Network Switch, Post Cards, Router, Scanner, Screw Driver Set, Soldering Flux, Soldering Iron, job sheets, report formats

Module 4: Soft Skills and Work Ethics

Mapped to ELE/N9972

Terminal Outcomes:

- Work effectively at the workplace.
- Implement the practices related to gender and PwD sensitization.

Duration: *15:00*	**Duration**: *15:00*
Theory – Key Learning Outcomes	**Practical – Key Learning Outcomes**
• State the importance of work ethics and workplace etiquette • State the importance of effective communication and interpersonal skills. • Explain ways to maintain discipline at the workplace. • Discuss the common reasons for interpersonal conflict and ways of managing them effectively. • Discuss the importance of following organisational guidelines for dress code, time schedules, language usage and other behavioural aspects. • Explain the importance of working as per the workflow of the organisation to receive instructions and report problems. • Explain the importance of conveying information/instructions as per defined protocols to the authorised persons/team members. • Explain the common workplace guidelines and legal requirements on non-disclosure and confidentiality of business-sensitive information. • Describe the process of reporting grievances and unethical conduct such data breach, sexual harassment at the workplace, etc. • Explain the concept and importance of gender sensitivity and equality. • Discuss ways to create sensitivity for different genders and Persons with Disabilities (PwD). • Discuss ways of dealing with	• Develop a sample plan to achieve organisational goals and targets. • Create a sample feedback form to obtain feedback from customers, colleagues etc. • Roleplay to demonstrate the use of professional language and behaviour that is respectful of PwD and all genders. • Apply organisational protocol on data confidentiality and sharing only with the authorised personnel.
Classroom Aids	
Training kit (Trainer guide, Presentations), White board, Marker, projector, laptop, flipchart.	
Tools, Equipment and Other Requirements	
Sample of escalation matrix, organisation structure.	

Module 5: Basic Health and Safety Practices

Mapped to ELE/N1003

Terminal Outcomes:

- Apply health and safety practices at the workplace.

Duration: *15:00*	Duration: *15:00*
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. • Elaborate electronic waste disposal procedures. • Describe the process of disposal of hazardous waste • 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 importance of maintaining appropriate postures while lifting heavy objects. • List the types of fire and fire extinguishers. • Explain the importance of efficient utilisation of water, electricity and other resources. • List the common sources of pollution and ways to minimize it. • Describe the concept of waste management and methods of disposing hazardous waste. • Explain various warning and safety signs. • Describe different ways of preventing accidents at the	• Demonstrate the use of protective equipment suitable as per tasks and work conditions. • Prepare a report to inform the relevant authorities about any abnormal situation/behaviour of any equipment/system. • Administer first aid in case of a minor accident. • Demonstrate the steps to free a person from electrocution safely. • Administer Cardiopulmonary Resuscitation (CPR). • Demonstrate the application of defined emergency procedures such as raising alarm, safe/efficient, evacuation, moving injured people, etc. • Prepare a sample incident report. • Use a fire extinguisher in case of a fire incident. • Demonstrate the correct method 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: 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	

Mandatory Duration: *90:00*	**Recommended Duration**: *00:00*
Location: On Site	

Terminal Outcomes

1. Explain the fundamental concepts of electronics and electronics components
2. Identify tools and equipment required for preventive maintenance.
3. Prepare for kitting of modules for assembling.
4. Carry out kitting and assembly of modules
5. Carry out assembly of modules in component.
6. Interact and coordinate with supervisor and colleagues
7. Work as per the given timeline and quality standards
8. Maintain a safe, healthy and secure work environment

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	Electronics assembly line	1	Trainer	

Trainer Certification	
Domain Certification	**Platform Certification**
"Assembly Line Operator, ELE/Q4301, version 3.0". Minimum accepted score is 80%.	"Trainer, MEP/Q2601, version 1.0" Minimum accepted score is 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	Electronics assembly line	2	Assessor	

Assessor Certification	
Domain Certification	**Platform Certification**
"Assembly Line Operator, ELE/Q4301, version 3.0". Minimum accepted score is 80%.	"Assessor, MEP/Q2701, version 1.0" Minimum accepted score is 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

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