Model Curriculum

QP Name: Quality Analysis & Reliability Supervisor (Semiconductor)

QP Code: ELE/Q0120

QP Version: 3.0

NSQF Level: 5

Model Curriculum Version: 3.0

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	Quality Assurance
Country	India
NSQF Level	5
Aligned to NCO/ISCO/ISIC Code	NCO-2015/7543.0803
Minimum Educational Qualification and Experience	Completed 2nd year of UG (UG Diploma) (Physics/ Electronics /Electrical/Mechanical) with 1.5 years of Relevant Experience OR Completed 3 year diploma after 10th (Electronics /Electrical/ Mechanical) with 3 Years of Relevant Experience OR Previous relevant Qualification of NSQF Level (4.5) 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	01.05.2025
Next Review Date	31.10.2025
NSQC Approval Date	08.05.2025
QP Version	3.0
Model Curriculum Creation Date	01.05.2025
Model Curriculum Valid Up to Date	31.10.2025
Model Curriculum Version	3.0
Minimum Duration of the Course	570 Hours
Maximum Duration of the Course	570 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 Semiconductor Manufacturing, Assembly, Testing & Packaging evaluating customer requirements and computer issues.
- Demonstrate the evaluation process of customer requirements and semiconductors processing.
- Demonstrate the uses of all standards related to quality Analysis & Reliability
- Demonstrate the process of Implementation of all Quality Standards with Documentation
- 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 (Mandatory)	On-the-Job Training Duration (Recommended)	Total Duration
ELE/N0128: Check the Internal Quality	**66:00**	**54:00**	**30:00**	**00:00**	**150:00**
Module 1: Internal Quality Assurance	66:00	54:00	30:00	00:00	150:00
ELE/N0129: Check the Customer Quality	**30:00**	**60:00**	**30:00**	**00:00**	**120:00**
Module 2: Customer Quality	30:00	60:00	30:00	00:00	120:00
ELE/N0130: Analysis Data	**30:00**	**30:00**	**60:00**	**00:00**	**120:00**
Module 3: Data Analysis	30:00	30:00	60:00	00:00	120:00
ELE/N0131: Knowledge of Quality & Reliability Equipment	**30:00**	**30:00**	**60:00**	**00:00**	**120:00**
Module 4: Quality & Reliability Equipment Knowledge	30:00	30:00	60:00	00:00	120:00
DGT/VSQ/N0102: Employability Skills (60 Hours)	**24:00**	**36:00**	**00:00**	**00:00**	**60:00**
Module 5: Employability Skills (60 Hours)	24:00	36:00	00:00	00:00	60:00
Total Duration	**180:00**	**210:00**	**180:00**	**00:00**	**570:00**

Module Details

Module 1: Internal Quality Assurance

Mapped to ELE/N0128

Terminal Outcomes:

- State the role and responsibilities of an Internal Quality

Duration: 66:00	Duration: 54:00
Theory – Key Learning Outcomes	**Practical – Key Learning Outcomes**
• Define the process variation spec. for each step. • Support to Set Up process Tolerances • Understanding of Manufacturing Equipment's for Each process Step • Collect regular data using statistical software and Monitor Yield at each step	• Release DOE to fix • Set Up process Tolerances • Prepare quality flow and procedures for New and existing processes • 8D Reports, Statistical Tools JMP etc, DMAC, APQP, 7S etc
Classroom Aids	
Training Kit - Trainer guide, Presentations, Whiteboard, Marker, projector, laptop	
Tools, Equipment and Other Requirements	
NA	

Module 2: Customer Quality

Mapped to ELE/N0129

Terminal Outcomes:

- Describe the process of standard implementations for customer quality
- Demonstrate the process of verification all Parameters

Duration: 30:00	Duration: 60:00
Theory – Key Learning Outcomes	**Practical – Key Learning Outcomes**
• Fix Process Flow for related process Step for any customer failure if failure is real • Through Knowledge of JEDEC Standards. • Support to Set Up equipment's and tools calibrations • How to Get quality Certifications • Prepare quality flow and procedures for New and existing Products	• 8D Reports, Statistical Tools JMP etc, DMAC, APQP, 7S etc • Demonstrate the use of relevant PPE such as an ESD wrist strap to protect from Electrostatic Discharge (ESD) and other electrical hazards. • Collect regular data using statistical software and Monitor Yield at each step
Classroom Aids	
Training kit (Trainer guide, Presentations). Whiteboard, Marker, projector, laptop	
Tools, Equipment and Other Requirements	
Quality Tools and Standards	

Module 3: Data Analysis

Mapped to ELE/N0130

- Describe the process of Improvements for Product Quality by defining parameters.
- Demonstrate the process of Yield Tracking & Improvement
- Demonstrate the process of cost and Productivity Improvement

Duration: 30:00	Duration: 30:00
Theory – Key Learning Outcomes	**Practical – Key Learning Outcomes**
• Describe the process of improvements for product quality by defining parameters • Describe the process of Yield Tracking & Improvement • Describe the process of Cost and productivity Improvement • Describe all the die dimensions, Stacking Combinations & wire bonding parameters • Describe the design of Experiments (DOE) Expertise • Description on Understanding of working principal of machines to improve UPH	• Demonstrate the use of relevant tools and equipment for the Die Attach Process. • Demonstrate the process of Wire Bonding Process • Demonstrate the process of installing different types of computer OS and software. • Demonstrate the process of testing for the correct functioning. • Show how to carry out troubleshooting for the common issues identified after verification of Parameters
Classroom Aids	
Training kit (Trainer guide, Presentations). Whiteboard, Marker, projector, laptop	
Tools, Equipment and Other Requirements	
Data Analysis Reports	

Module 4: Quality & Reliability Equipment Knowledge

Mapped to ELE/N0131

Terminal Outcomes:

- Knowledge about all tools and equipment's useful for Quality Analysis and to implement Quality Standards.
- Knowledge about all tools and equipment's useful for Reliability Testing and to implement Quality Standards.

Duration: 30:00	**Duration: 30:00**
Theory – Key Learning Outcomes	**Practical – Key Learning Outcomes**
• MSL related to tool Operation and process set up • HAST (BHAST/UHAST) related to tool Operation and process set up • TCT related to tool Operation and process set up • STHT related to tool Operation and process set up • HALT related to tool Operation and process set up • Thermal Shock related to tool Operation and process set up	• TEST related to tool Operation and process set up • Burning related to tool Operation and process set up • Warpage Measurement (Shad moiré etc) related to tool Operation and process set up • DLR Board level reliability (Temp. & Voltage) related to tool Operation and process set up
Classroom Aids	
Training kit (Trainer guide, Presentations)	
Tools, Equipment and Other Requirements	
Equipment's related to Quality Analysis and Reliability	

Module 5: Employability Skills (60 Hours)

Mapped to DGT/VSQ/N0102

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: *24:00*	**Duration:** *36:00*
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.	• List different learning and employability related GOI and private portals and their usage • Show how to practice different environmentally sustainable practices. • Exhibit 21st century skills like Self-Awareness, Behavior Skills, time management, etc. • Show how to use basic English sentences for everyday conversation in different contexts, in person and over the telephone • Demonstrate how to communicate in a well -mannered way with others. • Demonstrate how to communicate effectively using verbal and nonverbal communication etiquette • Utilize virtual collaboration tools to workeffectively • Demonstrate how to maintain hygiene and dressing appropriately. • Perform a mock interview
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 Quality Analysis and Reliability Supervisor (Semiconductor)

Mandatory Duration: 180:00	Recommended Duration: 00:00
Location: On Site	

Terminal Outcomes

1. Explain the functions of a computer and its peripherals.
2. List the preliminary tasks involved in the repair and maintenance of a computer and its peripherals.
3. Demonstrate how to perform preliminary checks on a computer and its peripherals.
4. Perform steps to inspect the computer and its peripherals to identify defective modules/ components.
5. Perform repair and maintenance activities as per the Service Level Agreement (SLA).
6. Perform steps to test the functioning of computers and its peripherals after repair.
7. Communicate product and service-related information to the customer.
8. Employ appropriate practices to interact and coordinate with supervisor and colleagues.
9. Perform assigned work within the turnaround time and as per the defined quality standards.
10. Demonstrate how to 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/ Degree/ ITI/ Certified in relevant CITS Trade	(Electrical/Electronics/ Mechanical)	2	Quality Management - Electronics	1	Electronics	

Trainer Certification	
Domain Certification	**Platform Certification**
"Quality Analysis and Reliability Supervisor (Semiconductor)", "ELE/Q0120, v3.0**",** Minimum accepted score is 80%	Recommended that the Trainer is certified for the **Quality Analysis and Reliability Supervisor (Semiconductor)** "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/ Degree/ ITI/ Certified in relevant CITS Trade	(Electrical/Electronics/ Mechanical)	3	Quality Management - Electronics	1	Electronics	

Assessor Certification	
Domain Certification	**Platform Certification**
"**Quality Analysis and Reliability Supervisor (Semiconductor)"**, "ELE/Q0120, v3.0", Minimum accepted score is 80%	Recommended that the Assessor is certified for the **Quality Analysis and Reliability Supervisor (Semiconductor)** "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
    - 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
DC	Direct Current
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