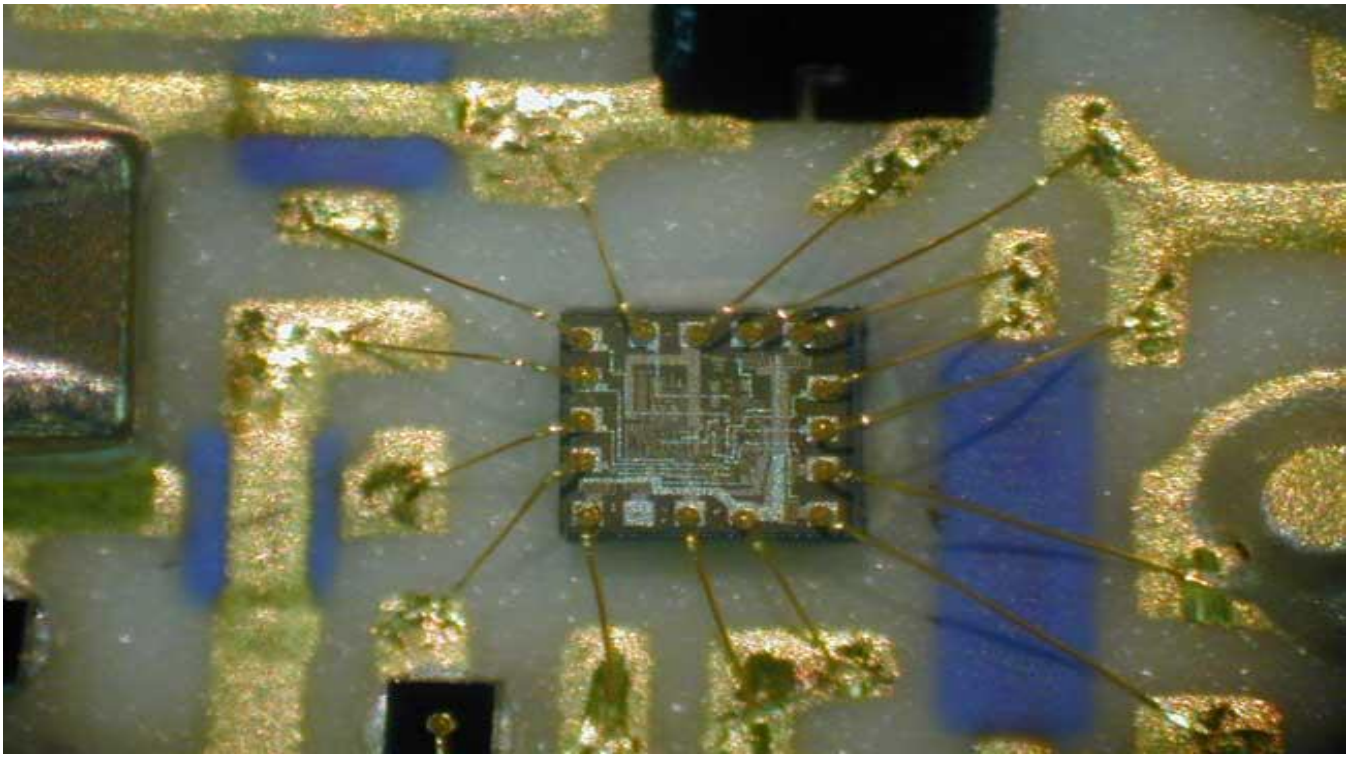

# Model Curriculum

**QP Name: Die Attach and Wire Bonding Supervisor**

**QP Code: ELE/Q0117**

**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** | Production - S&C |
| **Country** | India |
| **NSQF Level** | 5 |
| **Aligned to NCO/ISCO/ISIC Code** | NCO-2015/7223.2800 |
| **Minimum Educational Qualification and Experience** | Completed 2nd year of UG (UG Diploma) (Physics/Electronics/ Electrical/Mechanical) with 1.5 years of Relevant Experience<br>OR<br>Completed 3 year diploma after 10th (Electronics/Electrical/ Mechanical) with 3 Years of Relevant Experience<br>OR<br>Previous relevant qualification of NSQF level (4.5) with 1.5 years of Relevant Experience.<br><br>#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
- Demonstrate the evaluation process of customer requirements and semiconductors processing.
- Demonstrate the operations and uses of machineries used for Die Attach and Wire Bonding.
- Demonstrate the process of carrying out repair and maintenance of Die Attach & Wire Bonding Machines.
- 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/N0121: Assess the Recipe/Program Readiness for Die Attach and Wire Bond** | **66:00** | **54:00** | **30:00** | **00:00** | **150:00** |
| Module 1: Recipes/Program readiness for Die Attach | 66:00 | 54:00 | 30:00 | 00:00 | 150:00 |
| **ELE/N0122: Analysis Data, Yield, Cost & Productivity Improvement** | **30:00** | **60:00** | **30:00** | **00:00** | **120:00** |
| Module 2: Data Analysis & Yield, Cost & Productivity Improvement | 30:00 | 60:00 | 30:00 | 00:00 | 120:00 |
| **ELE/N0124: Verify the Design** | **30:00** | **30:00** | **60:00** | **00:00** | **120:00** |
| Module 3: Verification of Design | 30:00 | 30:00 | 60:00 | 00:00 | 120:00 |
| **ELE/N0123: Buy Machine Off/Tools & Consumables Qualification** | **30:00** | **30:00** | **60:00** | **00:00** | **120:00** |

| | | | | | |
|---|---|---|---|---|---|
| Module 4: Buy Machine off/Tools and Consumable Qualification | 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: Recipe and Program Readiness for Wire Bond

***Mapped to ELE/N0121***

**Terminal Outcomes:**

- Describe the process of Recipe & Program Preparation for wire bond
- Demonstrate the process of verification all Parameters

| **Duration: 66:00** | **Duration: 54:00** |
|---|---|
| **Theory – Key Learning Outcomes** | **Practical – Key Learning Outcomes** |
| • Descriptions on Process Parameters for Wire bond material properties & thickness.<br>• Description on structure of stacking.<br>• Explain bonding force, pick & place location, curing parameters inside oven<br>• Running functions of dummy samples and to get ready for mass production<br>• Explanation of SOP for understanding of operators through visuals and Datasheets | • Perform steps to examine Wire dimensions and Wire Bonding process<br>• Demonstrate the use of relevant PPE such as an ESD wrist strap to protect from Electrostatic Discharge (ESD) and other electrical hazards.<br>• Demonstrate structure of Stacking |
| **Classroom Aids** | |
| Training kit (Trainer guide, Presentations). Whiteboard, Marker, projector, laptop | |
| **Tools, Equipment and Other Requirements** | |
| Wire Bonding Machine Flow Charts, Semiconductor related input Products as well as Output products | |

## Module 2: Data Analysis & Yield, Cost & Productivity Improvement

***Mapped to ELE/N0122***

**Terminal Outcomes:**

- 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: 60:00** |
|---|---|
| **Theory – Key Learning Outcomes** | **Practical – Key Learning Outcomes** |
| • Describe the process of improvements for product quality by defining parameters<br>• Describe the process of Yield Tracking & Improvement<br>• Describe the process of Cost and productivity Improvement<br>• Describe all the die dimensions, Stacking Combinations & wire bonding parameters<br>• Describe the design of Experiments (DOE) Expertise<br>• Description on Understanding of working principal of machines to improve UPH | • Demonstrate the use of relevant tools and equipment for the Die Attach Process.<br>• Demonstrate the process of Wire Bonding Process<br>• Demonstrate the process of installing different types of computer OS and software.<br>• Demonstrate the process of testing for the correct functioning.<br>• 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** | |
| Tools Related to Die Attach & Wire Bonding Process | |

## Module 3: Verification of Design

***Mapped to ELE/N0124***

**Terminal Outcomes:**

- Awareness of Design Creation and Review
- Understanding of Stacking structure and Design Verification.

| **Duration: 30:00** | **Duration: 30:00** |
|---|---|
| **Theory – Key Learning Outcomes** | **Practical – Key Learning Outcomes** |
| • Explain the basics of Design Creation<br>• List various types of software like Auto CAD or equivalent design tools<br>• Description on knowledge of wafer structure and processing, wire materials properties<br>• Knowledge of JEDEC Standards<br>• How to read customer bonding diagram<br>• Verification of die attach staking structure<br>• Selection of substrate, wire bonding material that fulfill bonding drawing & Electrical, Mechanical & thermal specification | • Demonstrate the use of appropriate tools and equipment & Software's used in Design & Design Verifications.<br>• Prepare a sample work-report and relevant documents as per the organizational policy. |
| **Classroom Aids** | |
| Training kit (Trainer guide, Presentations) | |
| **Tools, Equipment and Other Requirements** | |
| Design Software & Tools | |

## Module 4: Buy Machine Off/Tools & Consumables Qualification

***Mapped to ELE/N0123***

**Terminal Outcomes:**

- Describe & complete the process of Factory Acceptance test at Equipment Manufacturing Site.
- Demonstrate & complete the process of site acceptance test at product manufacturer site

| **Duration: 30:00** | **Duration: 30:00** |
|---|---|
| **Theory – Key Learning Outcomes** | **Practical – Key Learning Outcomes** |
| • List of Machines & Tools required for process of Die Attach & Wire Bond<br>• FAT Report Creation<br>• Awareness on general Machine Specification like Operation, Controller, Panel etc<br>• Knowledge of characterization phase, feasibility phase, customer samples phase and qualification phase is must<br>• Collection of all the quality and realibity data for each characterization, feasibility and qualification build | • Demonstrate the generation of PCN<br>• Process of preparation of Solid Reports<br>• Description on All equipment consumables specifications, dimensions and other parameters should be clearly defined by process and equipment engineer |
| **Classroom Aids** | |
| Training kit (Trainer guide, Presentations) | |
| **Tools, Equipment and Other Requirements** | |
| Information on all Equipment's & Tools | |

## 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<br>• Discuss 21st century skills<br>• Explain use of basic English phrases and sentences.<br>• Demonstrate how to communicate in a well-behaved manner<br>• Demonstrate how to work with others<br>• Demonstrate how to operate digital devices<br>• Discuss the significance of Internet and Computer/ Laptops<br>• Discuss the need for identifying business opportunities<br>• Discuss about types of customers.<br>• Discuss on creation of biodata<br>• Discuss about apprenticeship and opportunities related to it. | • List different learning and employability related GOI and private portals and their usage<br>• Show how to practice different environmentally sustainable practices.<br>• Exhibit 21st century skills like Self-Awareness, Behavior Skills, time management, etc.<br>• Show how to use basic English sentences for everyday conversation in different contexts, in person and over the telephone<br>• Demonstrate how to communicate in a well-mannered way with others.<br>• Demonstrate how to communicate effectively using verbal and nonverbal communication etiquette<br>• Utilize virtual collaboration tools to work effectively<br>• Demonstrate how to maintain hygiene and dressing appropriately.<br>• 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<br>OR<br>Computer Lab | |

## Module 6: On-the-Job Training

***Mapped to Die Attach and Wire Bonding Supervisor***

| 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 | Semiconductor Assembly | 1 | Electronics | |

| Trainer Certification | |
|---|---|
| **Domain Certification** | **Platform Certification** |
| "**Die Attach and Wire Bonding Supervisor**", "ELE/Q0117, v3.0", Minimum accepted score is 80% | Recommended that the Trainer is certified for the **Die Attach and Wire Bonding Supervisor** "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 | Semiconductor Assembly | 1 | Electronics | |

| Assessor Certification | |
|---|---|
| **Domain Certification** | **Platform Certification** |
| **"Die Attach and Wire Bonding Supervisor", "**ELE/Q0117, v3.0**",** Minimum accepted score is 80% | Recommended that the Assessor is certified for the **Die Attach and Wire Bonding Supervisor** " 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 |