Model Curriculum

NOS Name: Industrial Safety for Semiconductor Manufacturing - Hazchem

NOS Code: ELE/N1006

NOS Version: 1.0

NSQF Level: 5

Model Curriculum Version: 1.0

Electronic Sector Skill 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	Safety
Country	India
NSQF Level	5
Aligned to NCO/ISCO/ISIC Code	NCO-2015/3119.1100
Minimum Educational Qualification and Experience	Completed 2nd year of UG (UG Diploma) (Graduation B.sc/B.tech/B.E-Electrical/Electronics/Mechanical) with 1 Year of experience Relevant Experience OR Diploma (After 10 Electronics/Electrical/Mechanical) with 1 Year of experience relevant Experience OR 12th grade Pass with 2 Years of experience relevant Experience OR 10th grade pass with 4 Years of experience relevant Experience
Pre-Requisite License or Training	NA
Minimum Job Entry Age	21
Last Reviewed On	31/01/2024
Next Review Date	31/01/2027
NSQC Approval Date	31/01/2024
NOS Version	1.0
Model Curriculum Creation Date	
Model Curriculum Valid Up to Date	

Model Curriculum Version	1.0
Maximum Duration of the Course	60

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:

Compulsory:

- Basic lecture introduces different aspects of Electronics and exposure to the current activities at a particular.
- Provides exposure to the infrastructure available at the Semiconductor in the form of series of lectures and application notes. This would provide in-depth information about the equipment and their capabilities.
- The lecture series is organized as modules, such as Industrial Safety/Hazchem and personnel Protective etc.

Compulsory Modules:
The table lists the modules and their duration corresponding to the Compulsory NOS of the QF.

NOS and Module Details	Theory / Demonstration Duration (In Hours)	Practical/OJT Duration (In Hours)	On-the-Job Training Duration (in hours) (Mandatory)	On-the-Job Training Duration (in hours) (Recommended)	Total Duration (In Hours)
*Module 1 (*Introduction to the Basics of semiconductor*)*	20:00	00:00	00:00	00:00	20:00
ELE/NXXXX	20:00	00:00	00:00	00:00	20:00
*Module 2 (*Industrial Safety for Hazchem*)*	10:00	30:00	00:00	00:00	40:00
ELE/NXXXX	10:00	30:00	00:00	00:00	40:00
Total Duration	**30:00**	**30:00**	**00:00**	**00:00**	**60:00**

Module Details

Module 1: Introduction to the Basics of semiconductor

Terminal Outcomes:

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- Explain the basic concepts of Electronics
- Explain the basic concepts of Semiconductor Physics

Duration: 20:00 hrs
Theory - Key Learning Outcomes
• Basic concepts of Electronics • Basics of Semiconductor Physics
Tools, Equipment and Other Requirements
Labs equipped with the following: • PCs/Laptops • Notepad and pens • Internet with Wi-Fi (Min 2 Mbps dedicated)

Module 2: Industrial Safety for Semiconductor manufacturing- Hazchem

Terminal Outcomes:

- Learning about the Hazchem safety and precautions
- Various Personnel Protective Equipment

Duration: 10:00 hrs
Theory - Key Learning Outcomes
• List GHS of classification and Labeling of Chemicals with all 9 pictograms and their implications • Identify the information contained in a Material Safety Data Sheet • List, describe, and identify safety hazards, hazard alert symbols, and personal protective equipment associated with Manufacturing Systems • Describe each process stage of semiconductor manufacturing systems
Duration: 30:00 hrs
Practical - Key Learning Outcomes

• Describe the hazardous chemicals and gases associated with each process stage of semiconductor manufacturing systems • Describe the hazardous wastes associated with Manufacturing Systems • List the storage hazards and demonstrate storage processes for liquid, solids and gases • Locate all emergency machine off buttons and describe how to EMO Manufacturing Systems • Describe and perform Lockout/Tagout procedures for Manufacturing Systems • Safely perform tasks (including LOTO) while working on and around Manufacturing Systems • Demonstrate PPE Selection, testing, correct use, disposal • List control systems (admin as well as system controls) in Hazchem practice/ identify the control systems deployed in practice site
Classroom Aids: (If Offline mode)
• Whiteboard and Markers • Chart paper and sketch pens • LCD Projector and Laptop for presentations
Tools, Equipment and Other Requirements
Labs equipped with the following: • PCs/ Laptops • Notepad and pens • Internet with Wi-Fi (Min 2 Mbps dedicated)

Annexure

Trainer Requirements

Trainer Prerequisites						
Minimum Educational Qualification	**Specialization**	**Relevant Industry Experience**		**Training Experience**		**Remarks**
		Years	**Specialization**	**Years**	**Specialization**	
Post Graduate Science & Engineering	Electrical/ Physics	2	Semiconductor Technology	1	Semiconductor Technology	

Trainer Certification	
Domain Certification	**Platform Certification**
"**Industrial Safety for Semiconductor Manufacturing - HazChem**, ELE/N1006, version 1.0". Minimum accepted score is 80%.	Recommended that the Trainer is certified for the **Industrial Safety for Semiconductor Manufacturing - HazChem** "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**	
Post Graduate Science & Engineering	Electrical/ Physics	3	Semiconductor Technology	2	Semiconductor Technology	

Assessor Certification	
Domain Certification	**Platform Certification**
"**Industrial Safety for Semiconductor Manufacturing - HazChem**, ELE/N1006, version 1.0". Minimum accepted score is 80%.	Recommended that the Assessor is certified for the **Industrial Safety for Semiconductor Manufacturing - HazChem** "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

Term	Description
Key Learning Outcome	Key learning outcome is the statement of what a learner needs to know, understand and be able to do 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/OJT application).
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.
National Occupational Standard	National Occupational Standard specify the standard of performance an individual must achieve when carrying out a function in the workplace

Persons with Disability	Persons with Disability are those who have long-term physical, mental, intellectual, or sensory impairments which in interaction with various barriers may hinder their full and effective participation in society on an equal basis with others

Acronyms and Abbreviations

Term	Description
QF	Qualification File
NSQF	National Skills Qualification Framework
NSQC	National Skills Qualification Committee
NOS	National Occupational Standards
SSC	Skill Sectors Councils
NASSCOM	National Association of Software & Service Companies
NCO	National Classification of Occupations
ISO	International Organization for Standardization
SLA	Service Level Agreement
IT	Information Technology
CRM	Customer Relationship Management
PC	Performance Criteria
PwD	Persons with Disability

SOP	Standard Operating Procedure