



National Occupational Standards

INDUSTRIAL SAFETY FOR SEMICONDUCTOR MANUFACTURING HAZCHEM

Unit Code: ELE/N1006

Version: 1.0

NSQF Level: 5

Electronics Sector Skills Council of India || 155, 2nd Floor, ESC House Okhla Industrial Area-Phase 3
New Delhi- 110020 || email:ceo@essc-india.org

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Description

Industrial Safety in the Semiconductor Manufacturing Hazchem play a vital role in maintaining the safety and well-being of employees, protecting the environment, and ensuring the company's adherence to regulatory requirements

Scope

The scope covers the following :

- basic concepts/ understanding of HazChem safety
- various processes in semiconductor manufacturing
- awareness about various facilities available at the semiconductor manufacturing machines
- overview of ongoing activities at semiconductor manufacturing
- tool capabilities and specification
- enhancing the technical aptitude
- assessment of the understanding the concepts taught during the lectures

Elements and Performance Criteria

General

To be competent, the user/individual on the job must be able to:

- PC1.** Basic concepts of semiconductor manufacturing
- PC2.** Awareness about facilities available at the plant
- PC3.** Facilities available for each process & parts
- PC4.** Capabilities for handling the various tools
- PC5.** Chemical hazards in semiconductor industry
- PC6.** . GHS classification & labelling of Chemicals
- PC7.** Knowledge of SDK & how to use them
- PC8.** Awareness of the Chemical Safety & Process Guidelines

Safety

To be competent, the user/individual on the job must be able to:

- PC9.** Introduction to Safety
- PC10.** Safety Shower Systems; Hazardous chemicals and control systems
- PC11.** Safety Culture/ Safety audits/ Permit to Work System
- PC12.** Awareness of Health & Safety Environment (HSE)
- PC13.** • Fixed Toxic Gas Detection system, selection and positioning of Toxic Gas sensors and requirement for
 - portable personal gas detectors
- PC14.** Maintenance & its Types
- PC15.** Requirement for Safe Storage of Chemical & amp; Gas Cylinders in use in Semiconductor Fab, working with conveyors
- PC16.** • Hazardous Energy Sources; Lock Out/ Tag Out procedures; Testing for latent energy risks; discharge of
 - energy and control of hazardous energy



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PC17. Occupational Health Safety Code Act 2020 (OSHA), SSHA

PC18. Fault Tracing and Safety audits

PC19. First Responded Team Basics

Knowledge and Understanding (KU)

The individual on the job needs to know and understand:

- KU1.** System design modules and concepts of circuit design
- KU2.** Semiconductor physics, CMOS transistors, diodes, triodes, etc.
- KU3.** The Hardware description language (HDL) such as Verilog, VHDL
- KU4.** The basics on HDL simulation and synthesis
- KU5.** The design flow involved in design stages of various nano fabrication process
- KU6.** The circuit design, network analysis, control theory for analogue design requirement
- KU7.** The end-product application, i.e., industry for which sample is designed
- KU8.** Cleanroom safety and precautions
- KU9.** Basics of system-on-chip (SOC) design
- KU10.** Improving the understanding of the physics behind the semiconductor technologies
- KU11.** Understanding the importance of clean room, fabrication, characterization, and testing facilities related to nano fabrication
- KU12.** Understanding concepts, writing, and building a good patent document

Generic Skills (GS)

User/individual on the job needs to know how to:

- GS1.** maintain work-related notes and records
- GS2.** read the relevant literature to get the latest updates about the field of work
- GS3.** communicate politely and professionally
- GS4.** Listen attentively to understand the information being shared
- GS5.** Take quick decisions to deal with work emergencies or accidents
- GS6.** Identify possible disruptions to work and take appropriate preventive measures
- GS7.** Evaluate all possible solutions to a problem to select the best one

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Assessment Criteria

Assessment Criteria for Outcomes	Theory Marks	Practical Marks	Project Marks	Viva Marks
<i>General</i>	30	-	-	-
PC1. Basic concepts of semiconductor manufacturing	3	-	-	-
PC2. Awareness about facilities available at the plant	3	-	-	-
PC3. Facilities available for each process & parts	3	-	-	-
PC4. Capabilities for handling the various tools	3	-	-	-
PC5. Chemical hazards in semiconductor industry	5	-	-	-
PC6. . GHS classification & labelling of Chemicals	5	-	-	-
PC7. Knowledge of SDK & how to use them	3	-	-	-
PC8. Awareness of the Chemical Safety & Process Guidelines	5	-	-	-
<i>Safety</i>	70	-	-	-
PC9. Introduction to Safety	4	-	-	-
PC10. Safety Shower Systems; Hazardous chemicals and control systems	8	-	-	-
PC11. Safety Culture/ Safety audits/ Permit to Work System	8	-	-	-
PC12. Awareness of Health & Safety Environment (HSE)	4	-	-	-
PC13. • Fixed Toxic Gas Detection system, selection and positioning of Toxic Gas sensors and requirement for • portable personal gas detectors	8	-	-	-
PC14. Maintenance & its Types	4	-	-	-

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Assessment Criteria for Outcomes	Theory Marks	Practical Marks	Project Marks	Viva Marks
PC15. Requirement for Safe Storage of Chemical & Gas Cylinders in use in Semiconductor Fab, working with conveyors	8	-	-	-
PC16. • Hazardous Energy Sources; Lock Out/ Tag Out procedures; Testing for latent energy risks; discharge of • energy and control of hazardous energy	8	-	-	-
PC17. Occupational Health Safety Code Act 2020 (OSHA), SSHA	6	-	-	-
PC18. Fault Tracing and Safety audits	8	-	-	-
PC19. First Responded Team Basics	4	-	-	-
NOS Total	100	-	-	-



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National Occupational Standards (NOS) Parameters

NOS Code	ELE/N1006
NOS Name	INDUSTRIAL SAFETY FOR SEMICONDUCTOR MANUFACTURING HAZCHEM
Sector	Electronics
Sub-Sector	Semiconductor & Components
Occupation	Generic - Health Safety
NSQF Level	5
Credits	2
Minimum Educational Qualification & 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
Version	1.0
Last Reviewed Date	31/01/2024
Next Review Date	31/01/2027
NSQC Clearance Date	31/01/2024
Reference code on NQR	NG-05-EH-02094-2024-V1-ESSC
NQR Version	1.0
CCN Category	1