

# Objective Summary Sheet

## Industry Foundations Training and Certification – Semiconductor

Student/Manager: \_\_\_\_\_ Class I.D.: \_\_\_\_\_  
Instructor: \_\_\_\_\_ Class Dates: \_\_\_\_\_  
Company/FAB: \_\_\_\_\_

**COURSE DESCRIPTION:** This course is given with lecture, visual aids, web-based training, and hands-on exercises. Lectures on safety and the system components are also included.

**TARGET AUDIENCE:** This course is designed for those individuals in the semiconductor industry who require the knowledge and skills to operate and perform maintenance (preventive or corrective) on semiconductor manufacturing equipment.

Use this form to track your completion of the course objectives. Initial each objective as it is completed. Use a METHOD CODE to identify the manner in which the objective was completed. At the end of the course, have your instructor sign at the bottom.

### METHOD CODES:

- P1** = completed procedure successfully individually or as a member of a two-person team
- P2** = completed procedure successfully as a member of a three/four person team (group)
- PW** = completed Project Work
- WE** = open book review questions and passed written exam
- D** = demonstrated only
- V** = Cleared Viva
- NA** = not applicable

Student Initial/ Date	Method Code	Module	Performance Objective	Comment	Instructor Initial
		<b>Unit 1.0</b>	<b>Hazchem Safety in Semiconductor Industry</b>		
	V, D, WE	1.1	List GHS of classification and Labeling of Chemicals with all 9 pictograms and their implications		
	P1	1.2	Identify the information contained in a Material Safety Data Sheet		
	WE	1.3	List, describe, and identify safety hazards, hazard alert symbols, and personal protective equipment associated with Manufacturing Systems		
		1.4	Describe each process stage of semiconductor manufacturing systems		
	WE	1.5	Describe the hazardous chemicals and gases associated with each process stage of semiconductor manufacturing systems		
	WE	1.6	Describe the hazardous wastes associated with Manufacturing Systems		
	D, P1, WE	1.7	List the storage hazards and demonstrate storage processes for liquid, solids and gases		
	P1	1.8	Locate all emergency machine off buttons and describe how to EMO Manufacturing Systems		
	P1,V	1.9	Describe and perform Lockout/Tagout procedures for Manufacturing Systems		
	P1	1.10	Safely perform tasks (including LOTO) while working on and around Manufacturing Systems		
	D/ P1; V /WE	1.11	Demonstrate PPE Selection, testing, correct use, disposal		
	V/WE; D/P1	1.12	List control systems (admin as well as system controls) in Hazchem practice/ identify the control systems deployed in practice site		
			<b>Abatement Systems</b>		
	WE	1.13	State the reasons that an inline scrubber or abatement system is used in semiconductor processing		
	WE	1.14	Identify the major components of abatement systems		
	WE	1.15	Identify the different abatement technologies for Manufacturing Systems		
	WE	1.16	Understand the safety hazards associated with abatement systems		
	P2	1.17	Locate the major components of an abatement system		
		<b>Unit 2.0</b>	<b>Electric Safety in Semiconductor Industry</b>		
		2.1	Describe electric safety risks for human		
		2.2	List Electric safety hazards in a fab/ manufacturing industry		
		2.3	List electric safety hazards including arc flash risks/ Identify and read warning signs and labels		
		2.4	Demonstrate capacity to identify electric hazards in a manufacturing facility/ workplace		

		2.5	List potential sources of latent (electric) energy in a site		
		2.6	Draw Arc flash boundaries, Select appropriate PPE as per specifications		
		2.7	List PPE for safe performance of different electric facility procedures		
		2.8	Demonstrate PPE selection, testing, correct use, disposal		
		2.9	Describe and perform Lockout/Tagout procedures for Manufacturing Systems		
		2.10	Describe/demonstrate testing for leakage current, latent energy sources, de-energisation		
		2.11	Locate all emergency machine off buttons and describe how to EMO Manufacturing Systems		
		2.12	Safely perform tasks (including LOTO) while working on and around Manufacturing Systems		
		2.13	Describe Emergency Guidelines and Procedures		
		2.14	Demonstrate how to handle emergencies: electric fires; disengaging an electrocuted person		
		2.15	Explain grounding; GFCI; electric safety standards		
		2.16	Create a properly grounded, well earthed system		
		2.17	Test and verify earthing as per standards		
		<b>Unit 3.0</b>	<b>Semiconductor Factory Operations safety (safety in engineering industries)</b>		
			Describe the mechanical hazards, safety and hazards associated with Manufacturing Systems, ladders, power tools, conveyor belts, fork lifts		
			Risk, Safety & Emergency Process while Working with hands/hands safety; ladder safety; working with semiconductor process chambers and tools, vacuum pumps, gas panels and delivery systems; Work Safety Procedures & Practices for Safe Handling of Gas & Chemicals.		
			Describe Safety Culture/ Explain Permit to Work System/ Conduct Safety audit		
			Describe fire triangle and principles of fire prevention and control		
			Identify the fire protection systems in place in a site / key parts/ precautions and basic maintenance		
			Demonstrate use of fire extinguishers and fire detection and protection systems		
			Identify key parts of fire extinguishers and key precautions for functionality/ maintenance of fire-extinguishers		

		<b>Unit 4.0</b>	<b>Semiconductor Office Ergonomics &amp; Environment, Health &amp; Safety (EHS) (Safety in office)</b>		
			List key Office EHS Risks		
			Describe medical risks faced by normal office computer users		
			Describe risk mitigations wrt different office ergonomic issues		
			Describe electric risks facing an office worker and risk mitigations		
			Describe Hazchem risks and associated protocols for office workers		
			Demonstrate Emergency Response Procedures for office staff		
		<b>Unit 5.0</b>	<b>Semiconductor Hazardous Energy Control</b>		
			List Hazardous Energy Sources in a fab ( electric, mechanical, Hazchem)		
			Demonstrate LOTO procedures and describe Work Permit guidelines		
			Test for latent energy risks		
			Safe and Reliable Discharge of latent hazardous energy and controls		
			Demonstrate Safety Procedures for control and for emergencies.		
		<b>Unit 6.0</b>	<b>Safety Basics and Law</b>		
			Describe Industrial Safety guidance as per Factories Act-1948 and beyond (including Washrooms, drinking water layouts, light, cleanliness, fire, guarding, pressure vessels, etc, Safety colour codes. )		
			Environment Act – 1986 and beyond		
			Manufacture, Storage & Import of Hazardous Chemical Rules 89		
			Other Acts and Rules (including Statutory Compliances in respect of Storage & Handling Bulk Gases, Gas Cylinders Rules, Petroleum Rules)		
			International Acts and Standards ( including OSHA, USA 2020) and SSHA (Semiconductor Environment, Safety, Health Administration)		
			List General Responsibilities, Safety Record Keeping, Accident Reporting procedures, On-site and Off-site emergency Plans		
			Introduction to Building Fire Safety Code requirements in India / International for setting up of semiconductor facility.		

		<b>Unit 7.0</b>	<b>Maintenance Engineering Basics -1</b>		
			Explain economics of preventive maintenance, Maintenance cost & its relationship with replacement economy,		
			Describe type of maintenance work in a typical process industry; precautions for the maintenance technician		
			Reliability engineering , redundancy and six sigma maintenance		
			Explain Failure Rates, Product life cycles and Mean time between failures/ Availability		
			Types and applications of tools used for maintenance, Service life of equipment.		
			Describe standard maintenance practice (SMP); O&M, maintenance work permit		
		<b>Unit 8.0</b>	<b>Maintenance Engineering Basics -2</b>		
			Maintenance and Repair jobs/ Trouble shooting		
			Monitoring failures		
			Describe Wear and techniques of prevention		
			Wear- types, causes, effects, wear reduction methods, lubricants-types and applications, Lubrication methods, general sketch, working and applications, i. Screw down grease cup, ii. Pressure grease gun, iii. Splash lubrication, iv. Gravity lubrication, v. Wick feed lubrication vi. Side feed lubrication, vii. Ring lubrication,.		
			Definition, principle, and factors affecting the corrosion. Types of corrosion, corrosion prevention methods		
		<b>Unit 9.0</b>	<b>Fault Tracing/ Safety Audits</b>		
			Describe Fault tracing: Fault tracing-concept and importance, decision tree concept, need and applications, sequence of fault-finding activities, show as decision tree, draw decision tree for problems in machine tools		
			List types of faults in machine tools and their general causes.		
			Demonstrate fault tracing in hydraulic, pneumatic, automotive, thermal, and electrical equipments ( at least one per case - like, i. Any one machine tool, ii. Pump iii. Air compressor, iv. Internal combustion		

			engine, v. Boiler, vi. Electrical motors, vacuum pumps)/		
		<b>Unit 10.0</b>	<b>Maintenance Engineering Basics -3</b>		
			Describe Periodic and preventive maintenance concepts and need. Steps/procedure for periodic and preventive maintenance of: I. Machine tools, ii. Pumps, iii. Air compressors, iv. Diesel generating (DG) sets, Program, and schedule of preventive maintenance of mechanical and electrical equipment, advantages of preventive maintenance. Repair cycle concept and importance.		
			Demonstrate/Describe degreasing, cleaning, and repairing schemes, overhauling of mechanical components, overhauling of electrical motor, common troubles and remedies of electric motor, repair complexities and its use, definition, need, steps, and advantages of preventive maintenance.		
			Demonstrate Steps/procedure for periodic and preventive maintenance of: I. Machine tools, ii. Pumps, iii. Air compressors, iv. Diesel generating (DG) sets, vacuum pumps.		
			Develop Program, and schedule of preventive maintenance of mechanical and electrical equipment, Describe advantages of preventive maintenance. Repair cycle concept and importance		
		<b>Unit 11.0</b>	<b>First Responder Team Basics</b>		
			ABC of first respondent / CPC hands-on 2023		
			Bleeding and Bandages		
			Slings, Splints, Stretchers, Fireman's Carry		
			Burns and Toxic Chemical Response		
			Neck and Back Injuries		
			Stroke/ fainting/Seizures		
			Choking		
			Use of defibrillator		
			Other Medical Emergencies		

		<b>3.0</b>	<b>Manuals and Documentation</b>		
	P1	3.1	Locate information related to a specific system in the correct manual: <ul style="list-style-type: none"> <li>• Site and System Preparation Specification</li> <li>• Safety</li> <li>• Startup</li> <li>• Preventive and Corrective Maintenance</li> <li>• Functional Description</li> </ul>		

ESSCI-ELCINA WFD Checklist

I agree that I have completed the training as indicated above.

**STUDENT NAME:** \_\_\_\_\_

STUDENT SIGNATURE: \_\_\_\_\_

I agree that the student has completed the training as indicated above.

**INSTRUCTOR NAME:** \_\_\_\_\_

INSTRUCTOR SIGNATURE: \_\_\_\_\_

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