

Fundamentals

Semiconductor Manufacturing Associate



Level 1

This certification provides participants with foundational knowledge and hands-on skills related to semiconductor technology, cleanroom operations, contamination control, and wafer handling. The Fundamentals of Semiconductor Manufacturing certification introduces the principles of semiconductor electronics and the role of semiconductor devices in modern manufacturing. Participants gain knowledge of semiconductor materials, intrinsic and impurity conductivity, P-N junctions, and diodes while developing an understanding of the highly controlled environments required for semiconductor fabrication. The course emphasizes cleanroom safety, PPE and gowning procedures, contamination and electrostatic discharge (ESD) control, cleanroom classification standards, environmental monitoring, security and access control, and proper wafer handling. Through instructor-guided activities and hands-on laboratory exercises, learners develop practical skills applicable to entry-level semiconductor manufacturing and fabrication environments.

Industry Recognized Certification Topics

- Fundamentals of Semiconductor Electronics
- Semiconductor Materials, Doping, P-N Junctions, and Diodes
- Semiconductor Fabrication Safety and
- Cleanroom Procedures
- Cleanroom PPE, Gowning, and Degowning Protocols
- Contamination and Electrostatic Discharge (ESD) Control
- Cleanroom Classification Standards and Environmental Control
- Cleanroom Monitoring, Sensors, and Data Logging
- Cleanroom System Optimization
- Security, Access Control, and Compliance
- Semiconductor Wafer Handling and Vacuum Handling Technology

Pathway Credentials - required to earn Semiconductor Manufacturing Associate

- Fundamentals of Semiconductors
- Fundamentals of Industry 4.0
- Fundamentals of Production Automation
- Fundamentals of Robotics
- Fundamentals of PLC's (Siemens or Rockwell)
- Fundamentals of Sensors
- Fundamentals of Mechanical Systems
- Fundamentals of Electricity (AC/DC)
- Introduction to Mechatronics

Units - 6

Industry Recognized Certification Competencies

- Explain the basic properties and importance of semiconductor materials and devices.
- Describe intrinsic conduction, impurity conductivity, doping, P-type and N-type materials, P-N junctions, and semiconductor diode operation.
- Demonstrate safe working practices within a semiconductor manufacturing fabrication environment.
- Identify and properly use cleanroom PPE required for semiconductor manufacturing operations.
- Perform proper cleanroom gowning and degowning procedures.
- Apply contamination-control procedures to protect semiconductor wafers, equipment, and manufacturing environments.
- Apply electrostatic discharge (ESD) control practices during semiconductor manufacturing activities.
- Explain cleanroom classification standards and their relationship to particle control, product quality, and wafer yield.
- Identify the role of airflow, filtration, pressure, temperature, humidity, and particle monitoring in maintaining cleanroom conditions.
- Use environmental monitoring, sensors, and data logging concepts to support cleanroom operation and system optimization.
- Explain the importance of security, controlled access, and personnel monitoring within semiconductor manufacturing facilities.
- Demonstrate proper semiconductor wafer handling and transport procedures.
- Apply vacuum-handling principles and proper vacuum wand techniques when handling simulated semiconductor wafers.
- Demonstrate teamwork, equipment care, cleanroom discipline, and workplace practices appropriate for semiconductor manufacturing.

