Semiconductor Cleanroom Operation

COURSE OUTLINE

Category	**Semiconductors**
Duration	16 hours

This course provides a comprehensive introduction to the operation and maintenance of semiconductor cleanrooms. It focuses on the cleanroom environment itself—its design, infrastructure, classifications, and safety protocols—rather than fabrication processes. Participants will learn about cleanroom layout, behavior and best practices, personal protective equipment (PPE), cleaning procedures, and contamination control. Additional topics include floating floor systems, hazards, particle filtration, and certification standards. By the end of the course, students will understand how to safely and effectively work within cleanroom environments across semiconductor and related industries.

Lesson 1: Introduction to Semiconductor Cleanrooms

Overview of what cleanrooms are, their role in semiconductor manufacturing, and the critical need for maintaining controlled environments free from contaminants.

Lesson 2: Cleanroom Standards and Certification

Explains ISO and Federal standards, cleanliness classifications, and certification processes for ensuring compliance in semiconductor cleanroom environments.

Lesson 3: Cleanrooms Across Industries

Compares cleanroom usage in pharmaceuticals, aerospace, biotechnology, and semiconductor industries to highlight differences in contamination control requirements.

Lesson 4: Cleanroom PPE and Clothing

Describes personal protective equipment, gowns, gloves, and masks used to minimize contamination and protect personnel in semiconductor cleanrooms.

Lesson 5: Donning and Doffing Procedures (Lab)

Step-by-step instructions on correctly putting on and removing cleanroom garments to maintain cleanliness and prevent introduction of contaminants.

Lesson 6: Behavior and Best Practices

Outlines movement, posture, and operational etiquette required to minimize particle generation and ensure safety while working in controlled environments.

Lesson 7: Hazards in Semiconductor Cleanrooms

Identifies chemical, physical, and ergonomic hazards specific to semiconductor cleanrooms and introduces basic safety measures and emergency procedures.

Lesson 8: Cleanroom Layout and Types

Covers the various classifications of cleanrooms, their structural divisions such as bays and chases, and how these affect workflow and contamination control.

Lesson 9: Cleanroom Equipment and Tools

Discusses specialized tools and monitoring equipment used in cleanrooms, including particle counters, ionizers, and clean benches.

Lesson 10: Cleanroom Infrastructure and Systems

Introduces HVAC, HEPA/ULPA filters, air pressure differentials, and other supporting systems required to maintain strict contamination control and safety.

Lesson 11: Filtering, Filters, and Particle Counts

Focuses on how filters work, measuring airborne particles, interpreting particle counts, and maintaining proper filtration to meet cleanroom requirements.

Lesson 12: Particle Counting (Lab)

Students learn how to work a particle counter and use it to identify the concentration of particles in their cleanroom.

Lesson 13: Floating Floor Systems

Explains the purpose and design of floating floors, vibration control, and their role in minimizing mechanical disturbance during precision semiconductor work.

Lesson 14: Cleaning and Maintenance of Cleanrooms

Explains cleaning schedules, approved materials, and techniques for maintaining contamination control without damaging sensitive semiconductor equipment.

Lesson 15: Sub fab Overview and Hazards

Describes the sub fab area, associated hazards like gas handling and vibration, and specialized PPE needed for working safely below cleanroom floors.

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ⓘ ***Important Note:*** *This outline is subject to change.*