

Semiconductor Packaging: Fundamental Concepts and Drivers



Overview

Learn the basics of semiconductor packaging and design, including managing heat and durability, common materials used and the processes that create tiny chips.

Gain practical insights with a curriculum that bridges theory and industry application. This course equips you to adapt to evolving electronics landscapes, enabling familiarity with semiconductor packaging concepts and drivers.

Key Skills Covered

- Understanding of semiconductor packaging and design
- Knowledge of electrical concepts in semiconductor packaging
- Fundamentals of thermal management and mechanical properties of packages
- Insights into packaging materials, manufacturing, testing, and reliability

Live instruction by ASU Associate Director & Professor Terry Alford and Faculty Associate David Theodore



Earn an ASU Engineering Badge to showcase your new skills



See each micro-badge for student pricing



Live via Zoom



Take one micro-badge or complete all four to earn the badge! More details about each micro-badge below.

<p>Introduction to Semiconductor Packaging and Design Sept. 3–5, 2024 5:30–9 p.m. Tue, Wed, Thu</p>	<p>Equip yourself with vital skills required in semiconductor design and packaging, essential for revolutionizing electronic component assembly and performance. This course provides an overview of semiconductor structures, packaging types, and the latest technological advancements, catering to those new to the field or looking to enhance their expertise.</p>
<p>Introduction to Electrical Concepts in Semiconductor Packaging Sept. 9–12, 2024 5:30–9 p.m. Mon, Tue, Thu</p>	<p>Dive deep into the world of semiconductor packaging and grasp the essential electrical concepts that drive innovation in this specialized sector. Explore topics such as power delivery network design, advanced power delivery schemes, and signal integrity methodologies, using state-of-the-art tools and platforms.</p>
<p>Introduction to Thermal Management and Mechanical Properties of Packages Sept. 16–19, 2024 5:30–9 p.m. Mon, Tue, Thu</p>	<p>Explore the fundamentals of managing heat and the mechanical behavior of semiconductor packages—key components in sustaining and enhancing the performance of electronic devices.</p>
<p>Introduction to Packaging Materials, Manufacturing, Test, and Reliability Sept. 23–26, 2024 5:30–9 p.m. Mon, Tue, Thu</p>	<p>Gain an understanding of the applications and core principles driving semiconductor industry operations and packaging material utilization. Dive into the world of polymers and thermal interface materials, explore cutting-edge manufacturing processes, and harness the power of process control systems.</p>

What you'll earn!

Participants will earn a digital micro-badge from the Ira A. Fulton Schools of Engineering for each micro-badge completed and the full badge when completing all four micro-badges. Participants will also qualify for Continuing Education Units (CEU).



Start your **Semiconductor Packaging** journey today!

Microelectronics

Introduction to Semiconductor Packaging and Design



Overview

Equip yourself with vital skills required in semiconductor design and packaging, essential for revolutionizing electronic component assembly and performance.

Course Description

The Introduction to Semiconductor Packaging and Design—Level 1 micro-badge offers an accessible entry point for those new to the field. Through a series of lectures, discussions, and interactive activities, you will explore Moore’s Law, the structure and function of various semiconductor packages, and the critical role packaging plays in the evolution of advanced electronics. You’ll learn to differentiate between package types, understand the challenges and future solutions in semiconductor packaging, and recognize the importance of packaging in heterogeneous integration and interconnect scaling.

Ideal for aspiring semiconductor packaging technicians, this course equips you with the foundational knowledge and skills needed to navigate and contribute to the rapidly advancing semiconductor industry. By the end of the course, you’ll be well-prepared to discuss key principles and anticipate future trends in semiconductor packaging.

Session Topics:

- Nanoelectronics
- What is packaging?
- Anatomy of a package
- Packaging trends
- Heterogeneous integration

Key Skills Covered:

- Understanding of Moore’s Law and its implications
- Differentiation of semiconductor package types
- Recognition of the role of packaging in technological advancements
- Exploration of advanced semiconductor packaging solutions

\$399 ~~\$75~~ for current ASU students!



20 SWAP Hub scholarships are available to make this program free! [Click here to complete your application.](#)

[SWAP Hub Scholarship](#)

Instructional sessions will be offered via Zoom:

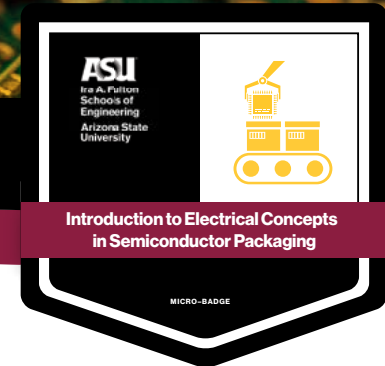
- Tuesday, Sept. 3, 2024, 5:30–9 p.m.
- Wednesday, Sept. 4, 2024, 5:30–9 p.m.
- Thursday, Sept 5, 2024, 5:30–8:30 p.m.

Spots are limited!

[Register today](#)

Microelectronics

Introduction to Electrical Concepts in Semiconductor Packaging



Overview

Dive deep into the world of semiconductor packaging and grasp the essential electrical concepts that drive innovation in this specialized sector.

Course Description

The Introduction to Electrical Concepts in Semiconductor Packaging—Level 1 micro-badge covers essential topics such as Ohm's and Kirchoff's Laws, resistance, capacitance, and inductance, along with signal integrity and power delivery. You'll explore the intricacies of voltage regulators, decoupling capacitors, and power delivery network design, understanding their roles in ensuring optimal microprocessor performance. The course also delves into advanced power delivery schemes and the latest technologies driving future advancements. Additionally, you'll learn about signal integrity, transmission line theory, and the methods used to evaluate and maintain signal quality in semiconductor systems.

Ideal for entry-level semiconductor packaging technicians, this course equips you with the knowledge to describe, analyze, and discuss electrical package design processes and trends, preparing you for a successful career in the semiconductor industry.

Session Topics:

- Introduction to power supply
- Voltage regulators
- Decoupling capacitors
- Power delivery network design
- Advanced power delivery schemes
- Advanced technologies for power delivery
- Introduction to signal integrity
- Signal integrity metrologies validation
- Transmission line theory

Key Skills Covered:

- Design and analysis of power delivery networks
- Understanding and applying signal integrity principles
- Implementation of voltage regulators and decoupling capacitors
- Analysis of electronic signals and noise reduction techniques

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SWAP Hub Scholarship

Instructional sessions will be offered via Zoom:

- Monday, Sept. 9, 2024, 5:30–9 p.m.
- Tuesday, Sept. 10, 2024, 5:30–9 p.m.
- Thursday, Sept 12, 2024, 5:30–8:30 p.m.

Microelectronics

Introduction to Thermal Management and Mechanical Properties of Packages



Overview

Delve into the essential techniques and principles required to manage thermal properties and mechanical integrity within electronic packages, a crucial aspect for any professional in the semiconductor industry.

Course Description

The Introduction to Thermal Management and Mechanical Properties of Packages - Level 1 micro-badge covers essential topics such as thermal resistance for conduction, convection, and radiation, various thermal management technologies, and the impact of design on heat spreader effectiveness. You'll explore the significance of structural mechanics in semiconductor packaging, understanding how design, processes, and materials affect mechanical behavior.

Perfect for college students aspiring to enter fields like electrical engineering or materials science, this course equips you with foundational knowledge essential for understanding advanced electronics. Jumpstart your career with practical skills and in-depth understanding of thermal management and mechanical properties—the keys to innovation in modern electronics.

Session Topics:

- Intro to thermal management
- Thermal management fundamentals
- Thermal resistance and package heat transfer
- Package cooling techniques
- Mechanics of electronic packaging
- Mechanics fundamentals
- Modeling and simulation
- Measurement metrologies
- Fatigue and life prediction
- Fracture and life prediction

Key Skills Covered:

- Thermal management in electronic components
- Categorizing thermal resistance (conduction, convection, radiation)
- Mechanical integrity in semiconductor packaging
- Analysis of design and material impacts on mechanical behavior

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SWAP Hub Scholarship

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Instructional sessions will be offered via Zoom:

- Monday, Sept. 16, 2024, 5:30–9 p.m.
- Tuesday, Sept. 17, 2024, 5:30–9 p.m.
- Thursday, Sept 19, 2024, 5:30–8:30 p.m.

Microelectronics

Introduction to Packaging Materials, Manufacturing, Test, and Reliability



Overview

Gain an understanding of the applications and core principles driving semiconductor industry operations and packaging material utilization.

Course Description

The Introduction to Packaging Materials, Manufacturing, Test, and Reliability - Level 1 micro-badge covers essential topics such as material properties, manufacturing processes, and reliability testing in semiconductor packaging. Learn how materials are selected based on manufacturability, cost, and performance, with a focus on polymers and thermal interface materials. Discover the intricacies of assembly processes and quality control systems critical for ensuring product reliability.

Perfect for college students entering the engineering or materials science fields, this micro-badge prepares you to discuss industry terminology and anticipate future challenges in semiconductor packaging. Join us to gain vital skills in materials, manufacturing, and reliability testing that are pivotal for a successful career in the semiconductor packaging industry.

Session Topics:

- Introduction to package materials
- Polymers in packaging
- Thermal interface materials
- Introduction to manufacturing
- Manage assembly
- Process control systems
- Test and finish

Key Skills Covered:

- Material selection and properties in IC packaging
- Manufacturing processes for semiconductor packaging
- Quality assurance and reliability testing in production
- Process control and statistical analysis techniques

\$399 ~~\$75~~ for current ASU students!



20 SWAP Hub scholarships are available to make this program free! [Click here to complete your application.](#)

SWAP Hub Scholarship

Instructional sessions will be offered via Zoom:

- Monday, Sept. 23, 2024, 5:30–9 p.m.
- Tuesday, Sept. 24, 2024, 5:30–9 p.m.
- Thursday, Sept 26, 2024, 5:30–8:30 p.m.

Spots are limited!

Register today