



Semiconductor Packaging Manufacturing

This course is part of [Semiconductor Packaging Specialization](#)



Instructor: [Terry Alford](#)

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8 modules

Gain insight into a topic and learn the fundamentals.

4.7 ★

(67 reviews)

Beginner level

Recommended experience ⓘ

8 hours to complete

Flexible schedule

Learn at your own pace

What you'll learn

- ✓ Learn about the various stages of semiconductor package manufacturing.
- ✓ The role of Process Control Systems in semiconductor manufacturing.
- ✓ How Process control Systems can help identify and correct process problems.
- ✓ How to use control charts to monitor process performance.

Skills you'll gain

Test Engineering Electronics Engineering Verification And Validation Quality Assurance Product Testing Thermal Management Reliability
Process Improvement Manufacturing Processes Performance Testing Statistical Process Controls Process Analysis Process Control Semiconductors
Manufacturing Operations Electronics [View less skills](#)

Details to know



Shareable certificate

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Assessments

7 assignments



Taught in English

[Video subtitles available](#)

See how employees at top companies are mastering in-demand skills





Build your subject-matter expertise

This course is part of the [Semiconductor Packaging Specialization](#)

When you enroll in this course, you'll also be enrolled in this Specialization.

- Learn new concepts from industry experts
- Gain a foundational understanding of a subject or tool
- Develop job-relevant skills with hands-on projects
- Earn a shareable career certificate

There are 8 modules in this course

This course will provide information on the various stages of semiconductor package manufacturing, including sort, assembly, and final test. In addition, we will also describe how to select, build, and test the packages with the die and other components to ensure the quality of the package and total assembly performance. We will also discuss the role of Process Control Systems in semiconductor manufacturing as they relate to quality testing. Specifically, we will explore how Process Control Systems can help identify and correct process problems that cause variation and quality issues. Finally, we also demonstrate how to use control charts to monitor the process performance. These can assist in decision-making, specifically when to take action to improve the process.

[Read less](#)

Welcome

Module 1 • 21 minutes to complete

[Module details](#) ^

Welcome to Semiconductor Packaging Manufacturing, where we discuss the various stages of semiconductor package manufacturing, including sort, assembly, and final test. In addition, we will also describe how to select, build, and test the packages with the die and other components to ensure the quality of the package and total assembly performance. We will also discuss the role of Process Control Systems in semiconductor manufacturing as they relate to quality testing. Specifically, we will explore how Process Control Systems can help identify and correct process problems that cause variation and quality issues. Finally, we also demonstrate how to use control charts to monitor the process performance. These can assist in decision-making, specifically when to take action to improve the process.

What's included

 1 video  2 readings

[Hide info about module content](#) ^

 1 video • Total 1 minute

Welcome Video

-

1 minute

 2 readings • Total 20 minutes

Meet the Experts

-

10 minutes

How to use the Reference Guide

-

10 minutes




Introduction to Semiconductor Package Manufacturing 1

[Module details](#) ^

Module 2 • 58 minutes to complete

In this module you will watch a lecture video by Principal Engineer, Dr. Mitul Modi from Intel as he discusses semiconductor package manufacturing. He will explain how semiconductor packaging is a complex process and discuss the three primary phases: sort, assembly, and final test.

What's included

 1 video  2 readings  1 assignment

Hide info about module content ^

 1 video • Total 8 minutes

Introduction to Semiconductor Package Manufacturing 1 Lecture Video

-

8 minutes

 2 readings • Total 20 minutes

Introduction to Semiconductor Package Manufacturing Reference Guide


-

10 minutes

Semiconductor Manufacturing Process - Steps, Technology, Flow

-

10 minutes

 1 assignment • Total 30 minutes

Introduction to Semiconductor Package Manufacturing Quiz

-

30 minutes

Introduction to Semiconductor Package Manufacturing 2

[Module details](#) ^


Module 3 • 1 hour to complete

In this module, Dr. Mitul Modi discusses process flows for different types of semiconductor packages. He will explain how most process flows consist of three basic steps: sort, assembly, and final test. You will learn the details of how these steps vary depending on the package type. Mitul will give examples of process flows for BGA, LGA, 3D stacked LGA, and Stacked Hybrid packages. He will also mention that there are many more possible scenarios for process flows in semiconductor packaging.

What's included

 1 video  2 readings  1 assignment

Hide info about module content ^

 1 video • Total 9 minutes

Lecture Video: Introduction to Semiconductor Package Manufacturing 2

-

9 minutes

 2 readings • Total 30 minutes

Introduction to Semiconductor Package Manufacturing Reference Guide


-

10 minutes

BGA vs. LGA: The Difference between the Two Grid Arrays

-

20 minutes

 1 assignment • Total 30 minutes

Introduction to Semiconductor Package Manufacturing 2 Quiz

-

30 minutes




Assembly Part 1

[Module details](#) ^

Module 4 • 1 hour to complete

In this module, Dr. Mitul Modi discusses the assembly process of semiconductor packaging and their purposes. He explains how the die is prepared, attached to a substrate, and the importance of the epoxy process. He also discusses other assembly techniques for each of these steps.

What's included

 1 video  2 readings  1 assignment

Hide info about module content ^

 1 video • Total 7 minutes

Assembly Part 1 Lecture

-

7 minutes

 2 readings • Total 40 minutes

Assembly Reference Guide


-

10 minutes

Die Bonding, Process for Placing a Chip on a Package Substrate

-

30 minutes

 1 assignment • Total 30 minutes

Assembly Part 1 Quiz

-

30 minutes


Assembly Part 2

[Module details](#) ^


Module 5 • 1 hour to complete

In this module, Dr. Mitul Modi discusses the different types of assembly steps in semiconductor packaging and their purposes. You will learn about the optional steps of IHS attach and ball attach, and how they improve the performance and reliability of the packages.

What's included

 1 video  2 readings  1 assignment

Hide info about module content ^

 1 video • Total 4 minutes

Assembly 2 Lecture

-

4 minutes

 2 readings • Total 55 minutes

Assembly Reference Guide


-

10 minutes

Keeping IC Packages Cool

-

45 minutes

 1 assignment • Total 30 minutes

Assembly Part 2 Quiz

•

30 minutes




Test and Finish

[Module details](#) ^

Module 6 • 1 hour to complete

In this module, Dr. Mitul Modi discusses the test and final stages of semiconductor packaging and their importance. He also describes how sort, burn-in, test and finish operations ensure the quality, functionality and reliability of the packages before they are delivered to the customer.

What's included

 1 video  2 readings  1 assignment

Hide info about module content ^

 1 video • Total 6 minutes

Test and Finish Lecture

•

6 minutes

 2 readings • Total 45 minutes

Test and Finish Reference Guide


•

10 minutes

The Importance Of Product Burn-In Test

•

35 minutes

 1 assignment • Total 30 minutes

Test and Finish Quiz

•

30 minutes




Process Control Systems (PCS)

[Module details](#) ^


Module 7 • 1 hour to complete

In this module, Dr. Mitul Modi discusses the role and benefits of Process Control Systems (PCS) in semiconductor manufacturing. He will explain how PCS can detect and correct process problems that cause variation and quality issues. He will also define the concepts of targets, variation, common and special causes, control limits, and stability. Finally, he will demonstrate how to use control charts to monitor the process performance and to decide when to take action to improve the process.

What's included

 1 video  2 readings  1 assignment

Hide info about module content ^

 1 video • Total 10 minutes

Process Control Systems (PCS) Lecture

•

10 minutes

 2 readings • Total 45 minutes

Process Control Systems (PCS) Reference Guide


•

10 minutes

7 Rules For Properly Interpreting Control Charts

•

35 minutes

 1 assignment • Total 30 minutes

Process Control Systems (PCS) Quiz

-

30 minutes

Semiconductor Packaging Manufacturing Course Summary

[Module details](#) ^

Module 8 • 50 minutes to complete

In conclusion of Introduction to Semiconductor Packaging, we would like to summarize the main takeaways. We started by sharing various aspects of nanoelectronics, transistor action, reliability, and customer ease of use. Then, we explored how Moore's Law and market use conditions affect the packages' reliability needs and the materials/design choices. At the end, we saw how the common footprint of a motherboard or socket determines a package's substrate level interconnect. Thank you for joining us.

What's included

 1 video  1 assignment  1 plugin


Hide info about module content ^

 1 video

End of Course Summary

-

0 minutes

 1 assignment • Total 35 minutes

Semiconductor Packaging Manufacturing Exam

-

35 minutes

 1 plugin • Total 15 minutes

Video: Take A Sneak Peek Inside an Intel Sub Fab

-

15 minutes



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Instructor

Instructor ratings  4.1  (16 ratings)



Terry Alford

Arizona State University

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 Korea Advanced Institute of Science and Technology (KAIST)

 Introduction to Semiconductor Process 1


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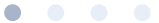




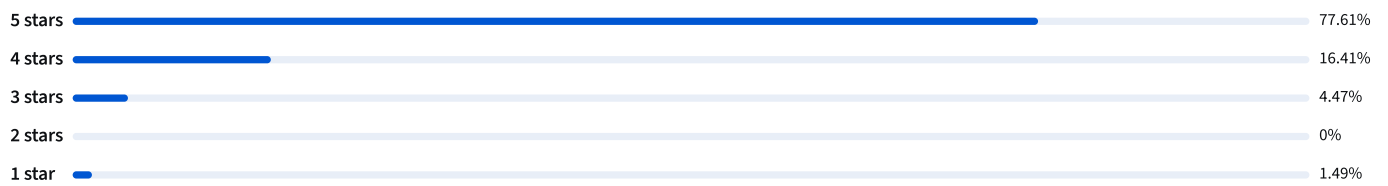
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"To be able to take courses at my own pace and rhythm has been an amazing experience. I can learn whenever it fits my schedule and mood."





★ **4.7** 67 reviews



DR

★ 5 · Reviewed on Dec 9, 2024

I appreciate This course and the insights you shared throughout the knowledge. This has been a rewarding learning experience, and I'm grateful for your guidance and support.

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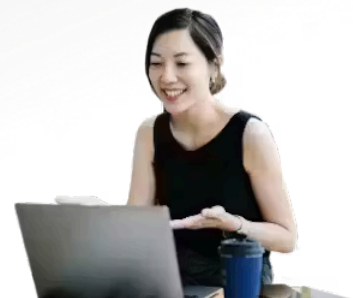
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Frequently asked questions

^ When will I have access to the lectures and assignments?

To access the course materials, assignments and to earn a Certificate, you will need to purchase the Certificate experience when you enroll in a course. You can try a Free Trial instead, or apply for Financial Aid. The course may offer 'Full Course, No Certificate' instead. This option lets you see all course materials, submit required assessments, and get a final grade. This also means that you will not be able to purchase a Certificate experience.

^ What will I get if I subscribe to this Specialization?

When you enroll in the course, you get access to all of the courses in the Specialization, and you earn a certificate when you complete the work. Your electronic Certificate will be added to your Accomplishments page - from there, you can print your Certificate or add it to your LinkedIn profile.



^ Is financial aid available?

Yes. In select learning programs, you can apply for financial aid or a scholarship if you can't afford the enrollment fee. If fin aid or scholarship is available for your learning program selection, you'll find a link to apply on the description page.

More questions

More questions
Visit the learner help center

Financial aid available, [learn more](#)

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Cybersecurity	Google Data Analytics Certificate	Computer Science	Examples of Strengths and Weaknesses for Job Interviews
Data Analytics	Google IT Support Certificate	Data Science	High-Income Skills to Learn
Digital Marketing	Google Project Management Certificate	Education & Teaching	How Does Cryptocurrency Work?
English Speaking	Google UX Design Certificate	Engineering	How to Highlight Duplicates in Google Sheets
Generative AI (GenAI)	IBM Data Analyst Certificate	Finance	How to Learn Artificial Intelligence
Microsoft Excel	IBM Data Science Certificate	Healthcare	Popular Cybersecurity Certifications
Microsoft Power BI	Machine Learning Certificate	Human Resources (HR)	Preparing for the PMP Certification
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