



SEMI University On-Site Trainings

Unlock the Power of In-Person Learning: SEMI University On-Site Trainings

As valued talent development professionals, you understand the importance of investing in your team's skills and knowledge. That's why SEMI University is excited to partner with PT International, LLC to bring our comprehensive training programs directly to your doorstep. Our on-site training solutions provide a unique opportunity for your team to learn from semiconductor industry experts in a personalized and interactive environment.

We offer a range of courses suitable for groups of 10+ attendees. Choose from our standard curriculum or work with us to create a customized training program that meets your specific needs.

Maximize Your Impact: The Benefits of On-Site Training

- Increased Engagement: Face-to-face interactions with instructors and peers foster a more engaging and effective learning experience.
- Customized Content: Our courses can be tailored to meet your company's objectives.
- Cost-Effective: Reduced travel costs and increased productivity make on-site trainings an attractive option for large groups.
- Improved Retention: Participants are more likely to retain information when trained in a familiar environment, away from distractions.
- Flexibility: We can accommodate your schedule and preferences to ensure minimal disruption to your operations.

Webinar Alternative

If on-site training isn't feasible, we also offer webinars as an alternative. Our experienced instructors can deliver high-quality virtual training sessions tailored to your company's requirements.

Partner with Us

Build the team you need to ensure long-term competitiveness and close the talent gap. Explore our course offerings and contact us today to schedule an on-site training that meets your needs and enhances your organization's performance.

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Assembly & Packaging Courses

Fan Out Packaging (1 Day). This one-day course provides an overview of fan-out packaging. Key concepts, advantages, the history, processes, are discussed. Intended for anyone that is involved in the manufacturing of Fan Out Packages, builds tools used in Fan Out Packaging or provides packaging services to the industry.

Learning Objectives

- Describe fan-out packaging and its advantages and history
- Describe key concepts related to fan-out packaging
- Explain concepts related to advanced fan-out packaging

Course Topics. Advantages of fan-out packaging, history, Infineon/freescale/others, simpler single-chip fan out packages, high volume production examples, design, process flow, equipment materials, advanced fan-out packaging, multi-chip, package-on-package (PoP), apple application processor in TSMC InFO-PoP Package, bridge chips through-mold interconnects, adaptive patterning, wafer vs. panel processing, landscape, and OSAT providers.

Flip Chip Packaging (2 Days). This course provides industry professionals with an understanding of flip chip interconnection and packaging. By partaking in this training, you will walk away with a solid understanding of the fundamentals of Flip Chip technology and where it is used in semiconductor field. For anyone interested in flip chip technology, including those working in: Design, application, process, field, equipment engineers who need an in-depth review of flip chip - could be from fab, packaging, equipment or materials companies, as well as sales, marketing, bus dev or other business professionals who need to know enough about flip chip to converse with customers or internal groups.

Learning Objectives

- Examine the structure, materials and processes used in Flip Chip
- Gain knowledge about what type of Flip Chip is applicable for certain uses.
- Review historical and state of the art flip chip products as the trends in Flip Chip technology change.

Course Topics. The structure of flip chip interconnects and how they are made, the types of substrates that flip chips attach to and the bonding processes used, performance advantages of Flip Chip - I/O density, electrical and thermal, Flip Chip reliability and issues to be aware of, Flip Chip history and trends, and application examples of flip chip in many different product.



Advanced IC Packaging and Assembly: Techniques and Trends (2 Days). This course addresses IC packaging, assembly, and chip/substrate interconnections. It stresses the impact of the IC and end product requirements, i.e., “smaller, better, cheaper” and their influence on the manufacturing processes. This course is suitable for anyone seeking a better understanding of the assembly and packaging of semiconductor devices.

Learning Objectives

- Identify the wide variety of package types and how they align with different application uses.
- Understand chip interconnection technologies and chip encapsulation
- Identify the materials and processes used in packaging.
- Summarize the current state of the art packages.
- Gain a foundational understanding of what packaging is and its importance to the microelectronics industry.

Course Topics. All types of packages including ball grid arrays, flip chip, fanout, leadframe, stacked die, stacked packages, System-in-Package, and chip scale packages, and assembly technologies – Chip & Wire, Tape Automated Bonding, and Flip Chip. The growing importance of packaging to deliver high integration and performance in today's products through heterogeneous integration of chiplets or 3D hybrid bonding will be discussed. This course is suitable for anyone seeking a better understanding of the assembly and packaging of semiconductor devices.

Fundamental Semiconductor and Electronic Courses

Fundamentals of Basic Electronics (1 Day). This course introduces basic electronic concepts such as current, voltage, resistors, capacitors, inductors, diodes, and transistor fundamentals. Essentially, this course covers all that you need to know to get started in the electronics and semiconductor industry. Great for anyone wanting a basic understanding of basic electronics working in the semiconductor industry.

Learning Objectives

- Summarize fundamental concepts about electronics
- Describe AC and DC power, digital and analog circuits, reverse and forward bias, CMOS, nMOS, pMOS, and types of transistors
- Read a data sheets and schematics for electronic components

Course Topics. Voltage, current, resistors, capacitors, inductors, diodes, transistors, AC circuits, DC circuits, semiconductor materials, digital circuits, analog circuits, integrated chips, bipolar devices, CMOS, NMOS PMOS devices, forward and reverse bias, logic gates, amplifiers, memory devices such as RAM, Flash, EPROM, EEPROM, microprocessors, microcontrollers, DSPs, I/O Ports, data sheets, and electronic schematic.

Fundamentals of MEMS Design and Fabrication (1 Day). This introductory course is designed to educate people from any background on the exciting new technologies and markets being developed in MEMS. The course begins with basic fabrication technologies, including traditional methods and the latest techniques. Next is an explanation of the governing equations of these devices, where many things are different from macro-scale electromechanical systems. Fabrication and design are illustrated with examples of existing and future products in inertial sensors, optical fiber switching, displays, and sensor networks. This course is designed for anyone wanting an understanding of MEMS design and fabrication.

Learning Objectives

- Discuss new technologies and markets being developed for Micro Electro Mechanical Systems (MEMS)
- Explain basic fabrication technologies for MEMS

Course Topics. MEMS Fabrication, deposition, lithography, and etching, surface micromachining, bulk micromachining, deep reactive ion etching, MEMS design, Micromechanics and electrostatics, MEMS applications, accelerometers and gyros, pressure sensors, micro optics, fiber switches, projection displays, wireless sensor networks, CAD for MEMS, finite elements, boundary elements, and nodal analysis

Electronic Troubleshooting (3 Days). This highly interactive, hands-on course teaches learners how to troubleshoot basic electronic problems. Basic electronic concepts will be taught, and learners will be provided materials in the training to support the completion of learning objectives. Class size is limited to 14 students. Intended for employees new to the electronic industry, engineers that need more basic electronic knowledge, equipment engineers, repair and maintenance technicians, customer service personnel, process technicians, manufacturing personnel, and anyone needing an understanding of electronic trouble shooting techniques.

Learning Objectives

- Describe AC and DC power, digital and analog circuits, reverse and forward bias
- Discuss CMOS, nMOS, pMOS and bipolar transistor types
- Read a data sheet for electronic components
- Summarize the theory of operation, use, and special applications of the Volt-Ohm-Meter, the Digital Multi-Meter and the Oscilloscope
- Build bread board circuits and do hands on trouble shooting using multi-meters, oscilloscopes and signal generators

Course Topics. Voltage, current, resistors, capacitors, inductors, diodes, transistors, AC Circuits, DC Circuits, semiconductor materials, digital circuits, analog circuits, integrated circuits, bipolar devices, CMOS, NMOS, PMOS devices, forward and reserve bias, logic gates, amplifiers, memory devices such as RAM, Flash, EPROM, EEPROM, microprocessors, microcontrollers, modems, I/O Ports, and data sheets.

Overview of Semiconductor Manufacturing (1.5 Day). The purpose of this course is to provide a comprehensive understanding of the semiconductor industry and the manufacturing process of an integrated circuit (IC). The course is designed for new personnel entering the field or individuals who are looking for a well-rounded understanding of all the jargon, tools, and materials used in the IC manufacturing process. New personnel entering the field and anyone wanting an understanding of semiconductor manufacturing should attend this course.

Learning Objectives

- Gain a comprehensive understanding of the semiconductor industry and the manufacturing process, design and eco-system of the semiconductor industry and understand the jargon, tools, and materials used in the design and fabrication of an IC
- Effectively be able to communicate semiconductor manufacturing concepts with other associates and industry professionals

Course Topics. Basic electronics and microelectronics terms and definitions, microelectronics and the role of integrated circuits, define process nodes: explanation of process nodes and how they relate to device performance and cost, device physics and transistor operation: understanding of the physical principles behind device operation and the functioning of transistors, crystal growth and wafer prep: overview of crystal growth techniques used in semiconductor manufacturing, explanation of wafer preparation techniques and materials used, FDSOI, fin fets, gate all around (GAA) transistors, circuit design and layout, mask making techniques and materials used in lithography, clean rooms, lithographic techniques, plasma etch, wet etch and cleaning processes, Ion implantation, diffusion techniques, RTP, CVD, ALD, ALE techniques and their impact on device performance, electro-plating, sputtering, testing, wire bonding, packaging techniques, metrology tools and applications, and the major players in the semiconductor ecosystem.

Sustainability in Semiconductor Wafer Processing (1 Day). This course will equip attendees with the necessary knowledge and skills to contribute to more sustainable practices in the semiconductor industry. It covers the fundamental steps involved in semiconductor wafer processing. Specific health hazards and environmental effects of semiconductor manufacturing, and techniques and technologies for reclaiming and recycling materials and resources, and best practices for reducing the environmental footprint of semiconductor fabs. Intended for new professionals in the semiconductor industry, engineers with some experience in related fields looking to transition into semiconductor manufacturing, engineers transitioning to semiconductor manufacturing, environmental, health, and safety (EHS) professionals in the semiconductor industry, and managers and supervisors looking to implement sustainable practices.

Learning Objectives

- Understand the basic semiconductor wafer processing steps
- Identify the major health hazards and environmental impacts associated with semiconductor manufacturing
- Explain the various gases, chemicals, water, and electricity that can be recovered and recycled
- Develop strategies for improving sustainability in semiconductor wafer processing
- Foster a culture of sustainability and environmental responsibility in the workplace

Course Topics. Health hazards in semiconductor manufacturing, environmental impacts, reclaiming and recycling gases, chemicals, water, and electricity, basic semiconductor wafer processing steps, strategies for sustainable manufacturing, and developing a culture of sustainability

Understanding Semiconductor Technology and Business (1 Day). Embark on a journey through semiconductor design, manufacturing, and business in this illuminating course. Explore IC design techniques, transistor evolution, and market dynamics. Delve into substrate types and industry economics, discovering the fastest-growing markets and key players shaping the semiconductor landscape. This course is suitable for anyone seeking a better understanding of the semiconductor industry, market leaders, terminology, business, and the semiconductor ecosystem.

Learning Objectives

- Understand the fundamental principles and theories semiconductor technology.
- Communicate with other associates and understand wafer processing steps.
- Understand semiconductor business aspects such as silicon economics, wafer processing costs, semiconductor revenue forecasts, driving forces in the industry, top semiconductor IDMs, market competitors based on market share, OEMs, foundries, top tool vendors, and Fabless companies.
- Review the semiconductor eco-system as it relates to design and fabrication of a semiconductor device.
- Gain knowledge of major semiconductor markets like Automotive, PC, Mobile, Memory, Wireless, Cell phones, Consumer, Gaming, AI, IoT, Automotive, MEMS, and Emerging Technology & Impact on Industry.
- Demonstrate effective communication skills through written reports, presentations, and discussions related to semiconductor subjects.
- Collaborate effectively with peers in group projects or discussions regarding semiconductor subjects.
- Analyze and evaluate research literature within the field of semiconductor technology.
- Develop critical thinking and problem-solving skills applicable to semiconductor technology.

Course Topics. IC design techniques, wafer processing steps, assembly, packaging, industry terms, substrate types, transistors, silicon economics, wafer processing costs, semiconductor revenue forecasts, and markets.

Introduction to Semiconductor Design & Fab for Non-Techies (1 Day). Discover the essential secrets behind semiconductor devices! Dive into the intricate world of integrated circuit fabrication and design with our comprehensive course. Ideal for both technical and non-technical professionals, this training has been a cornerstone for the industry for over four decades, attracting over 120,000 eager learners since 1978. Join us and equip yourself with the vital knowledge needed to thrive in the semiconductor industry. New employees in: Manufacturing, Engineering, Finance, Sales, Marketing, Semiconductor tool personnel, Material suppliers, Training, Operators, Customer service, Attorneys, and anyone else wanting a basic understanding of the semiconductor industry should attend.

Learning Objectives

- Review of the semiconductor industry and technology in laypeople terms.
- Understand the basics of semiconductor devices and how they work.
- Identify the processing technologies and the equipment used to produce them, materials used, and circuit design techniques.

Course Topics. Electronic fundamentals, crystal growth and wafer types (Si, SiGe, SOI, SiG, SiC, GaAs), transistor types such as (bipolar, nMOS, pMOS, CMOS, bi-CMOS, FinFet, Gate All Around transistors), high-k and low-k materials, metal gates and High k gate oxide, basic design and layout concepts, mask making, wafer processing, materials used for fabricating the wafer, tools used for processing the wafer, contamination control, clean room standards, test, assembly, packaging, metrology, and various types of semiconductor devices and applications such as memories, MEMS, microprocessors, DSP, analog and power ICs, etc.

Patents and Intellectual Property for Technical Companies (1 Day). This course covers patents and intellectual property concepts that are important for technology companies to be informed of. By taking this course, you will gain an understanding of the different type of intellectual properties (IP), associated terms, the patent filing process for both US and international markets, and insight as to how to patent inventions. If you're an industry member who wants to learn more about trademarks, copyrights, patents, and other legal rights related to technology innovations, this is a great course to take for anyone in a high-tech industry that would like to understand the procedure of creating and filing a patent and IPs should attend this course.

Learning Objectives

- Identify the different types of Intellectual Properties.
- Define the terminology used in patent claims.
- Understand the patent filing process, both US and international.
- Gain knowledge in analysis of others' patents or in patenting their own inventions.

Course Topics. IP, trademarks, copyrights, trade secrets, patents, value of IP, ownership, term/duration, registering/patent application process

Silicon Substrate Preparation, Identifying and Preventing Defects of the Substrates for ICs and MEMS Devices (1 Day). This course is about the device yield-related aspects of the Silicon Wafer. It is designed to give engineers working in yield improvement, as well as all process engineers and others who are involved in specifying Silicon in IC and MEMS devices, a working knowledge of the defects associated with the Silicon that arise

from the vendor as well as those generated through device processing. Throughout the course, practical knowledge of specific silicon defect and yield-related manufacturing examples will be introduced through a series of short, one page "Applications Notes" covering topics of interest. All personnel who want to gain a fundamental understanding of how the Silicon wafer impacts device process yields, including Yield Improvement Engineers, Process Engineers, Quality Engineers involved with Silicon, and Supply Chain Management would benefit from taking this class.

Learning Objectives

- Explain why sacrificial oxide reduces defect densities
- Describe why thermal heat treatments near 750 C may result in a higher silicon defect density
- Identify what a defect is and compare of N/N+ or P/P+ epi in process design
- Define what vendor "remelt" usage is and the "Phantom P layer" in EPI
- Define what "shelf life" of stored silicon wafers is

Course Topics. Review of the Fundamental Properties of Silicon Silicon Applications Engineering, CZ manufacturing techniques Epitaxial Silicon Manufacturing Techniques SOI Manufacturing Techniques, Grown-in and Process-Induced Defects in CZ, Defects associated with Epitaxial Silicon and SOI materials, Extrinsic Gettering Intrinsic Gettering by Oxygen, Future Gettering Techniques, Diodes and Defect Interactions, Bipolar Transistors and Defect Interactions, MOS, Transistors and Defect Interactions, Review of the Device advantages of Epitaxial, Silicon, Epitaxial, Silicon Selection for Process Optimization, Oxide, Quality and Epitaxial silicon, Latch-Up and Epitaxial Silicon, Implant Replacement of Epi, The Device Advantages of Silicon-On-Insulator Materials Choices, Future Applications of Silicon-On Insulator, Silicon Wafer Characterization Techniques, Process/Device/Materials Analysis and Design, Wafer cooling effects, Silicon Specifications for Optimum device Performance, Silicon Wafer Requirements for MEMS Devices, Silicon Wafer requirements for Bulk Micro-Machining Silicon Wafer Requirements for Surface Micromachining, Cavity Wafers, Trough-Silicon Tracks.

MEMS Development for Current and Emerging Markets (1 Day). This 2-day course will use real-world case studies to provide detailed insights into MEMS markets, products and technologies. In addition to reviewing MEMS devices and their materials and fabrication technologies, other topics such as interface circuits, packaging, test and reliability and product qualification are covered in a practical manner that can be used as a foundation for successful a product development effort. Designed for Managers, Product planners, Engineers, Designers, Technicians looking to develop MEMS products or are incorporating MEMS devices into their products, and those supplying materials, tools or services to the MEMS industry.

Learning Objectives

- Review MEMS devices and their materials and fabrication technologies
- Identify interface circuits, packaging, test and reliability and product qualification of MEMS devices
- Understand foundational concepts needed for successful product development of MEMS devices
- Explain how to develop low-cost, manufacturable and high-yield design into MEMS development

Course Topics. MEMS Markets and Products, MEMS Operating Principles, MEMS Device Fabrication, MEMS Product Designs, MEMS Packaging, Test and Product Qualification, Summary Discussion, and Case Studies.

Semiconductor Fabrication Courses

Atomic Layer Deposition (ALD) (1 Day). This course introduces learners to atomic layer deposition (ALD) and its purpose in semiconductor manufacturing. ALD tools, gases used in ALD, the operations of ALD, the operations and processes of ALD are also discussed. Towards the end of the class, learners can also discover emerging technologies and technological trends related to ALD. If you're looking to learn more about ALD and all topics related, this training is highly recommended! Process engineers, Technicians, Production personnel involved in semiconductor manufacturing should attend.

Learning Objectives

- Describe the fundamentals of atomic layer deposition (ALD) and its importance in semiconductor manufacturing
- Identify the architecture and operation of ALD tools
- Define the gases used in ALD and their properties
- Explain the operation and control of the ALD process
- Identify the various applications of ALD in semiconductor manufacturing
- Describe common process issues and defects caused by ALD and strategies for prevention and mitigation
- Identify the major ALD tool providers and compare ALD tool technologies

- Review emerging ALD technologies and trends in semiconductor manufacturing.

Course Topics. Introduction to Atomic Layer Deposition (ALD), ALD Tool Architecture, Gases Used in ALD, Operation of ALD, Control of ALD, Applications of ALD in Semiconductor Manufacturing, Process Issues and Defects in ALD, and ALD Tool Makers.

EUV Lithography (1 Day). This course provides attendees with an overview of the fundamentals, status, and technical challenges of EUV Lithography. It begins with a review of lithography in general drawing parallels between EUV and DUV lithography. The course then covers EUV specific challenges/solutions including sources (lithography and metrology), optics, metrology, masks, and patterning materials. Two areas where EUV specific challenges are particularly significant are patterning materials and photomasks; this course will cover these two areas in more detail including topics such as resist stochastics, radiation chemistry, reflective thick masks, off-axis mask illumination, phase shift masks, and mask stochastics. The course is intended to be a general overview and the deeper dive topics of resist, and masks will also be kept at the generalist level making the course accessible to a broad technical audience. This course is intended for anyone who is involved or interested in the development of EUV Lithography, needs to understand the core technologies related to EUV Lithography, or is interested in learning the fundamentals of this leading patterning technology.

Learning Objectives

- Explain the basics of EUV Lithography and of EUV source brightness and its implications on lithography and metrology
- Explain the fundamentals of EUV multilayer optics and of EUV optics, patterning, and EUV systems
- Describe the fundamentals of EUV resist materials and stochastics, and of EUV mask technology
- Recognize the current technical challenges with EUV lithography

Fundamentals of Plasma Generation (2 days). This 2-day introductory course provides maintenance, equipment engineers, and technicians with a basic working knowledge of radio frequency (RF) technology as it is applied to semiconductor processing equipment. The role of RF in the various deposition processes, including sputter deposition and etching systems, is discussed. The characteristics and uses of various components that make up an RF system are described. The differences between resistive and reactive components and series and parallel resonance are explained. The course also covers tuning circuits, filter circuits, and the plasma chamber itself. Intended for Maintenance personnel, equipment engineers, and technicians with a basic working knowledge of radio frequency (RF).

Learning Objectives

- Summarize the fundamentals of plasma generation and applications
- Design and troubleshoot plasma systems
- Explain the impact of plasma systems in semiconductor processing tools and how they affect the product

Course Topics. The role of RF in the various deposition processes, characteristics and uses of various components in RF systems, resistive and reactive components, and difference between series and parallel resonance.

Fundamentals of Chemical Vapor Deposition (CVD) (2 Days). This introductory course provides maintenance, equipment engineers, and technicians with a basic working knowledge of radio frequency (RF) technology as it is applied to semiconductor processing equipment. The role of RF in the various deposition processes, including sputter deposition and etching systems, is discussed. The characteristics and uses of various components that make up an RF system are described. The differences between resistive and reactive components and series and parallel resonance are explained. The course also covers tuning circuits, filter circuits, and the plasma chamber itself. Great for maintenance personnel, equipment engineers, and technicians with a basic working knowledge of radio frequency (RF).

Learning Objectives

- Summarize the fundamentals of plasma generation and applications
- Design and troubleshoot plasma systems
- Explain the impact of plasma systems in semiconductor processing tools and how they affect the product

Course Topics. The role of RF in the various deposition processes, characteristics and uses of various components in RF systems, resistive and reactive components, and difference between series and parallel resonance.

Advanced Wet Etching & Cleaning (1 Day). This one-day course provides a working knowledge of surface conditioning and cleaning techniques used in the manufacture of integrated circuits. Fundamentals of the techniques used for cleaning the wafer surface will be discussed. Practical applications and methods for cleaning will be presented. Upon completing this course participants will have an understanding of all types of cleaning processes used in IC manufacturing; surface conditioning for pre-diffusion clean, in particular pre-gate oxide clean, post-etch and post-implant photoresist removal, particle removal, post-CMP clean. Participants will be able to understand the cleaning roadmaps and limitations of clean technologies as the node sizes decrease. The course participant should be able to make informed decisions on the surface conditioning and cleaning processes and techniques to utilize for IC manufacturing. This course is intended for anyone involved in wet etch or cleaning in the wafer processing of semiconductor devices, such as process engineers, process techs, R&M techs or tool vendors.

Learning Objectives:

- Describe basic knowledge of various surface conditioning and cleaning technologies used in the manufacture of integrated circuits
- Summarize an overview of the processes and equipment used for wet, plasma, and dry cleaning.
- Discuss the chemistry used for the cleaning steps
- Compare the established surface conditioning and cleaning techniques
- Review new technologies and specific techniques
- Describe how the cleaning effects low-k dielectrics and copper
- Identify cleaning challenges for new materials

Course Topics. Surface conditioning and cleaning technologies, Processes and equipment, Wet, plasma, and dry cleaning, surface conditioning and cleaning techniques, cleaning technologies, effects, and challenges.

Statistical Process Control (1 Day). This course is designed for the semiconductor manufacturing employees to better understand SPC, control charts and the impact on quality and business. The course will teach the basics of creating control charts, implementing them into production and appropriate action for out-of-control conditions. The course level is introductory and non-technical. Some familiarity with manufacturing processes is helpful but not essential. The target audience includes fab operators, manufacturing operators, manufacturing supervisors, process engineers, process technicians, maintenance technicians, equipment engineers, quality control and assurance personnel, sales/marketing staff, customer service personnel, field service engineers, and technical support personnel. Everyone who is interested in understanding the fundamentals of Statistical Process Control (SPC) methods. Everyone would like to know more about what their SPC software package is doing for them.

Learning Objectives

- Describe general knowledge of the Statistical Process Control (SPC) methodologies for semiconductor manufacturing
- Explain the principles of SPC, how to implement SPC, how SPC increases quality, how SPC effectively monitors the production line and aids in production control
- Describe how to read variable control charts, attribute control charts, how to set up a new SPC program, how to start initial data collection, make a control chart, how to interpret SPC control charts, standard chart patterns, and chart pattern interpretation

Course Topics. Basics of SPC and terms, Benefits of SPC manufacturing and impact to quality, Normal distributions and the bell curve, 6 Sigma, Calculation of Sigma and determining control limits, Gage Capability, Types of data (Variable, Attribute), Control charting of variable data and out of control conditions, Attribute data, Binomial distributions, and histograms.

Business Skills for the Semiconductor Professional Courses

Introduction to Project Management. In today's fast-paced and dynamic business environment, the ability to manage projects with precision and efficiency is crucial. This course, inspired by the gaps identified in existing study materials, is tailored for both current and aspiring project managers seeking success in assignments, industry and certification exams like the Project Management Professional (PMP). The course offers comprehensive guidance that combines technical and managerial processes, applicable across diverse industries such as Semiconductor, Engineering etc. Key tips promote SMART and efficient study methods, helping the targeted audiences excel in mindset and scenario-based questions. Aligned with PMI process areas and integrating PMP and Agile principles, this course ensures participants are well-prepared to become a Project Manager while equipping them with transferable skills for modern project management practices. Ideal for aspiring project managers, current project managers, industry professionals, those preparing for a PMP or Agile certification, and post grad students studying engineering, business, management, and related disciplines.

Learning Objectives

- Comprehend fundamental project management principles, processes, and best practices as outlined in the PMBOK Guide
- Develop effective strategies and study techniques to successfully pass the PMP certification exam on the first attempt
- Incorporate Agile practices into project management to enhance flexibility and responsiveness in dynamic business environments
- Gain transferable skills fostering a balanced approach to project management, ensuring readiness for practical application in real-world situations

Course Topics. Project Management processes, initiating, planning, executing, monitoring and controlling, closing, standards for project management, modules/methods/artifacts, and agile management.

Production Testing Courses

Introduction to High-Volume Production Semiconductor (1 Day). The course will cover the basic segments of today's high volume production test as found in Outsourced Assembly and Test contractors (OSATs), as well as internal Integrated Device Manufacturers (IDMs). Participants will learn basic, but powerful, aspects about the semiconductor industry. This course offers insight into the *Fundamentals of High-Volume Production Test*. We focus on the test development process, choosing automated test hardware, and the analysis of test data, to provide the key insights into the successful fielding of high-volume semiconductor components that work properly in the customers application with high levels of quality. During a semiconductor product life cycle, there is a launch into high volume production test that provides sufficient test coverage to meet customer requirements, yet still meet cost targets. Design and test are closely linked, and there is a push to always implement test during the design process to determine what can be designed into the chip to fit seamlessly with test flows/outcomes. Products are typically guaranteed to meet performance in terms of design for testability, test coverage, and operational conditions such as voltage, frequency, and temperature. Test engineers must select automated test equipment (ATE), along with wafer probers, and packaged part handlers that can meet these requirements. There are many nuances to wafer probers and handlers depending on the wafer type and the package. There may be additional requirements associated with production test, such as accelerated life testing (burn-in), and system-level test (SLT). Many applications require testing across temperature and thermal management of dissipated power. All product lifecycles need to include continuous improvements to the point of diminishing return. For production testing, engineers primarily focus their efforts to improve test through test cost reduction and higher test coverage. Furthermore, production testing generates extremely high volumes of data, so the key is how to harvest this data and reduce it to meaningful information for action. Engineers from Design, Device, Packaging, Product, Industrial Engineering, Business Operations Professionals, and Test Engineers at early career stages should attend.

Learning Objectives

- Explain the test development process, including how to balance the need for coverage with the costs to perform the testing.
- Choose appropriate test hardware that meet the requirements for testing the semiconductor component without being too expensive.
- Analyze test data and discuss strategies for what information should be extracted from the test data to provide these insights into a semiconductor component's performance, quality, and reliability.

Course Topics. Test development, the importance of test, the link between design and design for test, how test differs by application and market segment, basic test elements and sequences used across the manufacturing process flow, which includes fab, bump, probe, and final test, different types of test and their outcomes, along with appropriate actions, become familiar with the next steps after test, overview of various test systems, material handling, and connections between the component and the tester (known as "contact"), reducing test data to actionable information, how test supports continuous improvement over product lifecycle, trends in test, as well as the future of test

Business Aspects of High-Volume Semiconductor Production Test (1 Day). This course covers the basic economics of testing as found in Outsourced Assembly and Test contractors (OSATs), test equipment & service providers, as well as the end customer – the internal Integrated Device Manufacturers (IDMs). During a semiconductor product life cycle, there is a launch into high volume production test that provides sufficient test coverage to meet customer requirements, yet still needs to meet cost & profitability targets. To support capability and capacity – critical business analysis and decisions must be made across capital investment, factory makeup, cost analysis, pricing and ongoing operational excellence. All product lifecycles need to include continuous improvements to the point of diminishing return. Managers in Business Operations & profit and loss roles, engineers in Test, product staff, and industrial employees should attend this course.

Learning Objectives

- Describe the components of test economics including business strategy, stakeholder points of view, the impact of market, application, device types, across the product lifecycle, capital spend decision making, cost analysis, pricing, and win-win business models.
- Identify the current and potential future trends in production testing.

Equipment & Hardware Used for High-Volume Semiconductor Production Test (1 Day). This course will teach you how to choose appropriate test equipment: ATE & SLT systems, the handler or prober. You'll also learn to choose the appropriate systems that meet the requirements for testing the semiconductor component without being too expensive. Lastly, topics related to testing hardware are also covered.

In today's semiconductor test – key steps start upstream as wafers enter advanced packaging steps or reach end stages of mainstream packaging. Products are guaranteed to meet performance in design for testability, test coverage, and operational conditions such as voltage, frequency, and temperature. Test engineers must select testers, along with wafer probers, and packaged part handlers that can meet these requirements. There are nuances to probers & handlers depending on wafer type & package. There may be additional requirements such as accelerated life testing & system-level test. This course offers insight into eq and hw (boards, kits, probe cards & sockets). This course is intended for engineers from test, design, device, packaging, product, industrial and business ops professionals including test operators, technicians, and maintenance.

Learning Objectives

- Explain how testing differs by application and market segment
- Identify basic test elements and sequences used across the manufacturing process flow, which includes fab, bump, probe, and final test
- Identify various tester types
- Describe wafer probers including the standard, film frame, special variants, and interface boards
- Identify probe cards including the Standard PCB, Ceramic, Vertical, Membrane, MEMS, and Microcantilever
- Describe the components of package part handler
- Identify production metrics including first pass yield, wear out, maintenance of hardware
- Describe the current and potential future trends in test equipment and hardware

Optimized Test Flows – Turnkey Mainstream & Advanced Packaging (1 Day). This course teaches how to optimize test flows. During a semiconductor product life cycle, there is a launch into high volume production test that provides sufficient test coverage to meet customer requirements, yet still meet cost targets. Packaging and test are closely linked – given various form factors & complexities (wafers, panels, strip, partially or fully packaged parts) and distributed test flows. There may be additional requirements such as accelerated life testing (burn-in), and system-level test (SLT). The consequences and benefits are all amplified – mainstream package example (multi SiC FET modules) and advanced packaging (xNN chiplet systems where SoC(s) are disintegrated or cores are duplicated, 2.5/3/3.5/4D packaging and of course mention high bandwidth memory (HBM), high performance computing (HPC) for artificial intelligence (AI) and machine learning (ML). Many applications require testing across temperature and thermal management of dissipated power. End results of optimized flows – include lowest scrap costs, screening for known good die (KGD), known tested die (KTD), characterized KGD (cKGD), defect screening, parametric screening / matching, traceability, infant mortality / time zero and more. include isolating defective parts, triggering repair algorithms and intelligent product binning. Engineers from Design, Device, Packaging, Product, Industrial Engineering, Business Operations Professionals, and Test Engineers at early career stages should attend this course.

Learning Objectives

- Explain how testing differs by application and market segment.
- Identify basic test elements and sequences used across the manufacturing process flow, which includes fab, bump, probe, and final test
- Identify form factors, including wafers, singulated die, panels, strips, partially & full packaged
- Explain basic test segments and sequences across the fab/bump/probe/test flow
- Identify the next steps after testing
- Identify different types of testing and their outcomes, along with appropriate actions
- Explain How testing supports continuous improvement over product lifecycle.
- Describes current and potential future trends in testing