Caltech | Center for Technology & Management Education

Systems Engineering Fundamentals Certificate Program

Summer 2022—Open Enrollment Program

ctme.caltech.edu/se-open

Virtual Learning: Live-Online

Format: Live Instructor-led/On-demand
Live Session: JUL 30–AUG 27, 2022
On-Demand Session: AUG 01–SEP 11, 2022

Program Objectives

Caltech's *Systems Engineering Certificate Program* provides you with the key skills and knowledge essential for successful systems engineering. Our 40-hour curriculum focuses on practical methods and tools for eliciting user needs and requirements, defining robust system architectures and designs, and effectively verifying and validating that your product works as intended. The course covers current industry best practices to ensure robust, effective designs that meet stringent functional, performance, and cost requirements.

Our expert-led course combines action learning and hands-on activities using real-world cases—the skillset to hit the ground running in deployments. This program elevates you and your team's capacity to design complex products and platforms involving cross-discipline systems perspectives

Learning Objectives

The objective of this five-day program is to elevate your systems thinking perspective across the engineering process—from customer needs and requirements gathering to systems design to integrated verification and validation.

You will learn to:

- Explore systems thinking/systems engineering state-of-the-art and life-cycle challenges
- Analyze stakeholder needs and develop clearly stated requirements
- Conduct mission analysis and articulate a Concept of Operations
- Assess requirements through Context Diagrams, Functional Block Diagrams, and Design Structure Matrices (DSM)
- Architect systems, sub-systems, interfaces and interactions, hierarchies and hand-offs
- Evolve innovative design approaches for performance, trade-offs, and managing change
- Engineer for specialized outcomes, Design for Manufacturing, Design-to-Cost, Maintainability
- Define cost-effective verification and validation plans
- Effectively manage cost, schedule, and risk in engineering tasks
- Plan, assess, and control traditional and Agile technical programs
- Examine Model-Based Systems Engineering (MBSE) methods and approaches that use SysML

Participants

This program addresses the needs of systems engineering professionals and project managers in aerospace, defense, electronics, automotive/mobility, medical devices, and connected infrastructure for smart cities and environments. Senior and early-career engineers, analysts, designers, and developers will benefit from this course.

You will cover all the topics, tips, and tricks required for the **International Council on Systems Engineering (INCOSE) Certified Systems Engineering Professional (CSEP)** credentials.

Why CTME

Leaders who aspire to innovate and execute come to Caltech's Center for Technology and Management Education (CTME). Here, you will do more than attend a class. You will develop new mindsets, technology skills, and leadership capacity to master the complex issues that challenge your organization today.

Instructors with real industry insight—Each of our educators bring decades of real world experience and leadership from roles in research, engineering, commercialization, manufacturing, operations and executive accountability of technology-driven organizations and government agencies.

Action-learning is more than just experiential. We facilitate real impact through small groups working on actual problems which, with Caltech coaching and structure, grows individuals, teams, and organizations to adapt to new challenges.

Customization—We work with the client organization to understand your current challenges. Then, we integrate your specific context, cases, and methods with proven industry best-practices and insights to tailor the content to your needs.

Flexible formats allow us to deliver in the schedule most convenient for you. Programs can be delivered live at your locations in the US or Internationally. Many of our programs offer online formats, such as Live-Online or On-Demand. Unlike rigid term-based courses, Caltech's schedule flexibility is suited f or busy professionals like you.

About Caltech

Caltech is a world-renowned science and engineering institute that marshals some of the world's brightest minds and most innovative tools to address fundamental scientific questions and pressing societal challenges. Caltech prizes excellence and ambition. The contributions of Caltech's faculty and alumni have earned national and international recognition, including 39 Nobel Prizes. The Institute manages the Jet Propulsion Laboratory (JPL) for NASA.

EDUCATORS

Ken Preston, DBA, has 30 years of aerospace and defense experience with over 21 years in project management. As a lead for the Boeing C-17 Program, he has technical oversight of the parts management/obsolescence function and predictive obsolescence analytics. Dr. Preston was an engineering project manager of special projects in the Design Integration Office and project manager for supplier diversity.

Dr. Preston was selected Manager of the Year by the National Management Association (NMA) Southern California Area Council. He is a recipient of the NASA/American Society for Engineering Education Faculty Fellowship Program via Langley Air Force Base and served on the faculty at Hampton University. Dr. Preston received his DBA in business administration and MBA in project management from Columbia Southern University.

Rick Hefner, PhD, is currently the program director for Caltech's Center for Technology and Management Education, where he designs and develops learning programs for technology-driven organizations. He has over 40 years of experience in systems engineering, project management, and corporate management.

Dr. Hefner has also worked with companies in the aerospace, communications, electronics, and health sciences industries, including Aerospace Corporation, AeroVironment, Applied Physics Laboratory, Applied Materials, Ares Management, Boeing, DRS Technologies, Halliburton, Honeywell, Jet Propulsion Laboratory (JPL), John Deere, L3Harris Technologies, Maytag, Motorola, Northrop Grumman, AT&T, Raytheon, Schlumberger, Southern California Edison, St. Jude Medical, Toshiba, U.S. Navy, and Xerox.

Dr. Hefner is credited with over 200 publications and presentations. He earned his PhD from UCLA in applied dynamic systems control, and his MS and BS from Purdue University in interdisciplinary engineering.

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To customize this program for your organization, contact a program advisor. 626.395.4045

Email: execed@caltech.edu ctme.caltech.edu

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Programs, dates, fees, and instructors are subject to change.

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