

A foundation for designing effective, reliable, and sustainable systems

Fundamentals of Systems Engineering

The Fundamentals of Systems Engineering course introduces the essential principles and processes for designing systems that meet customer needs and operate reliably throughout their lifecycle. Participants learn how to identify and translate stakeholder needs into clear, actionable requirements, and how to apply leading systems engineering models and methods. Throughout the training, students work in small teams on an in-house company assignment that serves as a running example. This assignment is used continuously to illustrate concepts, methods, and techniques as they are introduced in the course.

Why this course?

This course equips participants with the essential mindset, methods, and language needed to operate effectively in complex, multidisciplinary environments. For individuals, it accelerates professional growth by strengthening systems thinking, improving the ability to translate stakeholder needs into clear requirements, and building confidence in collaborating across domains. For organizations, it develops a shared way of working that enhances consistency, improves decision-making, and enables teams to deliver integrated solutions with greater predictability and quality. By combining solid foundations with hands-on application to real use cases, the course creates lasting impact at both the personal and organizational level.

Who should attend?

This training is designed for early- to mid-career engineers as well as non-technical professionals who operate in a technical environment and want to strengthen their understanding of systems engineering. It supports individuals who are beginning to work across disciplines, interact with requirements or integration topics, or collaborate closely with engineering teams. By providing a clear foundation in systems thinking and the role of systems engineering in product development, the training helps both technically oriented and supporting professionals engage more confidently and effectively in complex, multidisciplinary environments.

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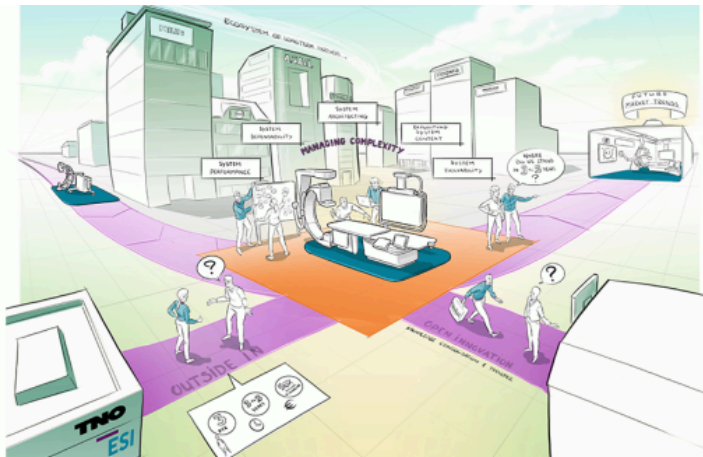
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INFORMATION

www.esi.nl

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What you will learn

Participants will gain a comprehensive understanding of how to design, develop, and manage complex systems across their lifecycle. Key learning topics include:

- Systems Engineering Fundamentals: core concepts, terminology, and the role of systems engineering.
- Systems Thinking: approaches to understanding complexity and interdependencies within systems.
- Customer & Business Context: how organizational, customer, and lifecycle factors influence system development.
- Scoping & Lifecycle Planning: defining system boundaries and aligning with business objectives.
- Stakeholder Needs & Requirements: eliciting, analyzing, and translating needs into structured requirements.
- System Architecting & Concept Development: designing architectures, selecting concepts, and using models.
- System Design & Decomposition: partitioning systems, defining interfaces, and performing functional analysis.
- Verification & Validation (V&V): ensuring systems meet specifications and intended use.
- Lifecycle Qualities & Trade-offs: managing system qualities and making balanced engineering decisions.
- Systems Engineering Management & Trends: planning, risk management, professional skills, and future developments.

This course prepares you to apply systems engineering principles effectively in real-world, multidisciplinary environments.

Format and delivery

- Training setup: offered in in-house and multi-company formats to maximize relevance and impact.
- Learning approach: flipped classroom - online materials upfront, combined with interactive workshops.
- Team assignment: participants collaborate on a sponsored design case from their own organization, ensuring strategic relevance, commitment, and strong internal support.
- Schedule: five full-day, in-person workshops plus a half-day concluding session where teams present outcomes.
- Materials: all course materials are provided online in advance of the workshop series.