BaselineSkills

INTRODUCTION TO SYSTEMS ENGINEERING

2-DAY PRACTICAL COURSE

Learn it. Practice it. Apply it.

FROM SYSTEM CONCEPTS TO ENGINEERED SOLUTIONS

Understand the system. Engineer the solution. Sustain the result.

Systems engineering is an interdisciplinary approach to design, implementation and evaluation that holds the key to the successful development of complex human-made systems. It's a very broad discipline, so we aim to distill how the concepts and procedures could be applied to individual projects. In this course, we explore a framework encapsulating the entire systems engineering discipline, showing where the multitude of associated activities fits within the overall effort and how the activities relate to one another.

"Systems engineering is not about knowing every discipline. It is about making sure all of them add up to one coherent system."

Course at a Glance

Course	Introduction to Systems Engineering
Duration	2 full days
Delivery	In-person Classroom • Live Online available (same materials either way)
Learning approach	Instructor-led sessions • Case study • Course quizzes • Practical module exercises

Why This Course?

The course uses a structured yet flexible approach to provide a holistic, solid foundation to the understanding and development of complex systems. We take you step by step through the system life cycle, from design to development, production and management — and show how the different components of a system interrelate and contribute to a project's goals and success.

Three layers of learning

FOUNDATION	Build a holistic understanding of the systems engineering framework, from context to disposal.
CAPABILITY	Practice requirements, architecture, design, test and risk management through a running case study.
APPLICATION	Apply the SE framework to a real project or system you bring back to work.

Module 1 — Introduction and Overview of System Engineering

What exactly are we calling 'the system'?

You will learn

- Definition of a System
- Types of Systems
- System and its Environment (System Context)
- Hierarchical Descriptions of a System
- System-of-Systems (SoS)
- Problem Domain and Solution Domain
- System Life Cycle

Practical Application

Take a system you work with and define its boundary, its environment and where it sits in a hierarchy or system-of-systems.

Workshop: Draw a system context diagram for a real or case-study system.

"Before you design anything, agree on what the system actually is — and where it ends."

Module 2 — Systems Engineering and Development Approaches

Choosing where to start — and how to hold it all together

You will learn

- Where to start
- Top-Down Approach
- System Optimization and Balance
- Integration of Disciplines and Specializations
- Management Practices in Systems Engineering
- Analysis, Synthesis, and Evaluation
- Systems Engineering Framework (Processes, Management, Tools)

Practical Application

Apply a top-down approach to decompose your system, and identify where different disciplines and specializations need to be integrated.

Workshop: Map your system against the SE framework: processes, management and tools.

"A good development approach doesn't just organize the work — it holds the trade-offs together."

Module 3 — Requirements Engineering Framework

Capture the right requirement from the right source

You will learn

- What is a Requirement?
- What Is Requirements Engineering?
- Business Needs and Requirements
- Identify Major Stakeholders and Constraints
- Define Stakeholder Needs and Requirements
- Sources of Requirements

- Requirements Elicitation
- System Requirement Specification

Practical Application

Identify the major stakeholders and constraints for your system, and elicit requirements from at least two different sources.

Workshop: Draft a System Requirement Specification (SyRS) extract for your selected system.

"A requirement that traces to no stakeholder need is just an assumption in disguise."

Module 4 — System Architecture Development

From requirements to a defensible architecture

You will learn

- Define System Requirements
- Perform Requirements Analysis and Allocation
- Define Logical Architecture
- Define Physical Architecture

Practical Application

Allocate your requirements set to a logical architecture, then translate that into a physical architecture.

Workshop: Build a logical and physical architecture diagram for your system.

"Logical architecture asks what the system must do. Physical architecture asks what it will be."

Module 5 — System Design

Turn architecture into an evaluated design

You will learn

- Concurrent System Modeling Framework
- Subsystem Requirements Analysis
- Requirements Allocation
- Interface Identification and Design
- Subsystem-Level Synthesis and Evaluation
- Investigate Design Alternatives
- Selecting the Preferred Solution

Practical Application

Generate at least two design alternatives for a subsystem, identify its interfaces, and select a preferred solution with justification.

Workshop: Evaluate design alternatives and select a preferred solution for your case-study system.

"A design alternative you never evaluated is a design decision you never really made."

Module 6 — Systems Test Management

Plan how you'll prove the system actually works

You will learn

- Test and Evaluation During the Systems Lifecycle (DT&E, AT&E, OT&E)
- Test Management
- Testing Activities and the System Life Cycle
- Test and Evaluation Master Plan (TEMP)
- Technical Risk Management

Practical Application

Draft a Test and Evaluation Master Plan outline for your system, and identify its top technical risks.

Workshop: Build a TEMP outline and a risk register for your case-study system.

"If it isn't in the test plan, it isn't really a requirement yet."

Module 7 — Production, Utilization and Disposal

The system's life doesn't end at delivery

You will learn

- Preparation for the Construction and Production Plan
- System Maintenance and Support Requirements during the Utilization phase
- Disposal of the system

Practical Application

Plan the maintenance, support and eventual disposal requirements for your system, not just its production.

Workshop: Draft a utilization-phase support and disposal plan.

"A system engineered without a disposal plan is a liability engineered on a delay."

Module 8 — Management Practices for Systems Engineering

Keep the whole effort visible and under control

You will learn

- The need for planning
- Planning, tracking and controlling the SE effort: testing the system
- Managing the configuration of the system
- Managing technical risk
- Progressively reviewing the technical program
- Developing a workable technical strategy

Practical Application

Identify which management practice — planning, configuration management, risk, or review — is weakest in a program you know, and why.

Workshop: Draft a one-page technical management strategy for your case-study system.

"Systems engineering fails quietly first in the management practices, long before it fails visibly in the design."

The Systems Engineering Life Cycle

Each stage builds on the one before it, so the design in Module 5 answers requirements that trace back to a real stakeholder need, and the test plan in Module 6 verifies exactly that.

CONTEXT	Understand the system, its boundary and its environment.
REQUIREMENTS	Elicit, specify and trace stakeholder needs.
ARCHITECT	Define logical and physical architecture.
DESIGN	Evaluate alternatives and select a preferred solution.
TEST	Plan verification, validation and manage risk.
SUSTAIN	Produce, use, dispose and manage the effort throughout.

The End-to-End Systems Engineering Path

01 Define the system and its context — Module 1

02 Choose a development approach — Module 2

03 Identify stakeholders and elicit requirements — Module 3

04 Specify system requirements — Module 3

05 Allocate requirements to logical architecture — Module 4

06 Define physical architecture — Module 4

07 Evaluate design alternatives — Module 5

08 Select the preferred solution — Module 5

09 Plan test and evaluation (TEMP) — Module 6

10 Manage technical risk — Module 6

11 Plan production, utilization, disposal and technical management — Modules 7–8

"Systems engineering is not eleven separate activities. It is one thinking process applied eleven times."

What You Will Be Able to Do

- Learn the rationale for Systems Engineering as a formal and systematic discipline.
- Apply a structured yet flexible approach to provide a holistic, solid foundation to the successful development of complicated systems.
- Identify various sources of requirements and techniques to capture the required information.
- Navigate the system life cycle, from design to development, production and management.
- Examine the quality assurance aspects of system design and development.
- Explain how the different components of a system interrelate, and how each contributes to a project's goals and success.
- Manage requirements traceability.
- Test and evaluate a system through its design and development.

Who Should Attend?

- Project managers, engineers and quality assurance representatives.
- Integrated logistic support (ILS) practitioners, operators, managers and maintainers.
- Students through to seasoned professionals — novices and experienced practitioners alike.
- Technical and non-technical people who need a shared understanding of how complex systems come together.

The course is also suitable for organizations looking to establish a common systems engineering language and practice across their teams.

Prerequisites

There are no prerequisites for this course.

Course Format

Duration	2 full days
Delivery	In-person Classroom • Live Online (Traditional and Virtual classes use the same materials)
Learning	Instructor-led sessions • Case study running throughout • Course quizzes • Practical module exercises

Certificate of Completion

Introduction to Systems Engineering

The course provides a comprehensive introduction to the systems engineering framework and its practical application, reinforced by quizzes and a case study running throughout the two days.

PRACTICE, NOT JUST THEORY

Baseline Skills provides comprehensive study material, a certificate of completion, and an on-the-job reference. This course does not lead to an external certification; it provides the practical foundation for further specialization.

Why Learn with Baseline Skills?

- Practitioner-oriented learning rather than framework memorisation alone.
- Hands-on exercises and a running case study throughout both days.
- Content suitable for technical and non-technical participants alike — no prerequisites required.
- Real-world scenarios spanning the full system life cycle, not just design.
- Certificate of completion combined with workplace application.
- Delivered in-person or live online, with identical comprehensive materials either way.

"The real value of a systems engineering course is not the number of diagrams you can draw. It is the number of blind spots you no longer have in your next project."

For Organizations — Build a Common SE Capability

A corporate Baseline Skills Introduction to Systems Engineering program can combine the framework with organization-specific systems, realistic scenarios and team discussion.

- Common systems engineering vocabulary and framework
- Consistent requirements-to-architecture traceability practice
- Shared approach to test planning and technical risk management
- Stronger cross-discipline collaboration (engineering, QA, ILS, operations)
- A common case-study environment for learning and experimentation

"Don't just train people to describe a system. Train them to see the whole life cycle it will live through."

What Comes Next?

Introduction to Systems Engineering provides a foundation for further specialization in Requirements Engineering (IREB CPRE), Model-Based Systems Engineering, Automotive ASPICE and Functional Safety, as well as broader Baseline Skills learning paths in Business Analysis and Project Management.

Frequently Asked Questions

Do I need an engineering background to attend?

No. The course is designed for technical and non-technical people alike — from students to experienced professionals, novices to practitioners — with no prerequisites.

Is this course only for engineers?

No. It is relevant to project managers, engineers, QA representatives, integrated logistic support practitioners, operators, managers and maintainers.

Will I apply this to a real project during the course?

Yes. Quizzes, practical module exercises and a case study running throughout the course let you apply the concepts to authentic contexts.

Is the course available online as well as in person?

Yes. Both Traditional (classroom) and Virtual (live online) classes use the same comprehensive materials.

Can the course be delivered for a corporate team?

Yes. The case study and exercises can be adapted around a representative system for your organization.

UNDERSTAND THE SYSTEM • ENGINEER THE SOLUTION • SUSTAIN THE RESULT

BaselineSkills.com