PROJECT PERFORMANCE INTERNATIONAL

Systems Engineering Introduction 1-Day Course

A concise, powerful introduction to systems thinking and practice

Why Systems Engineering Matters

In a world of growing complexity, systems engineering provides the essential foundation for solving the right problems, designing effective solutions, and delivering outcomes that matter. This fast-paced one-day course gives decision-makers, team members, and stakeholders a clear, structured overview of what systems engineering is, how it works, and why it underpins project success.

Through accessible explanations, real-world examples, and interactive exercises, you will develop the ability to think in systems—and recognise how a systems approach can transform the way your organisation designs, delivers, and sustains technology-based products and services.

Who Should Attend

This course is perfect for:

- Project managers and technical leaders new to systems concepts
- Engineers and technical specialists transitioning to multidisciplinary roles
- Business analysts, product managers, and operational managers supporting complex developments
- Quality, assurance, testing, and support personnel
- Procurement, HR, and finance professionals who work alongside engineering teams.

No technical background is needed.
This course emphasises **concepts**, **structure**, and **principles** over technical detail.

Earn CE/CPD Credit

This course qualifies for:

- 8 Professional Development Units (PDUs)

INCOSE CSEP Renewal

- 8 PDUs

Engineers Australia & IPENZ CPD

- 8 Hours

PMI Talent Triangle® Suggested PDUs

- Ways of Working – 7
- Power Skills – 0.5
- Business Acumen – 0.5

Key Learning Outcomes

By the end of the course, participants will:

- Understand what systems engineering is—and is not
- Grasp the **life cycle perspective** on engineering development
- Appreciate the role of r**equirements capture**, **solution design**, **trade studies**, and **validation** in delivering effective systems

- Recognise **key systems engineering processes** and how they interact
- Identify when and why **systems thinking** adds value to technical and organisational challenges
- Become familiar with **model-based systems engineering (MBSE)** in simple terms.

20,000 Professionals Trained Across 43 Countries

Course Content Overview

Introduction to Systems Engineering

- The challenge of complexity
- Why systems engineering exists
- Systems thinking versus traditional engineering approaches

The System Life Cycle

- Understanding life cycle phases: from concept to retirement
- How stakeholder needs translate into engineered solutions
- Waterfall, incremental, agile, and spiral development models

Core Processes Explained

- Requirements capture and validation
- Logical and physical solution development
- Integration, verification, and validation
- Trade-off studies and decision-making

Systems Engineering in Practice

- Real-world case studies of systems engineering success and failure
- Interactive mini-workshops to reinforce concepts
- Introduction to model-based approaches (MBSE) simplified

Wrap-Up

- How systems engineering connects with project management and other disciplines
- Tailoring systems engineering to different projects and domains

Training Method and Materials

The course combines:

- **Short, impactful presentations** to build understanding
- **Mini-workshops** to apply key concepts
- **Discussion sessions** to explore practical implications.

Participants will receive:

- A printed or digital **training manual**
- **Workshop activities** and worked examples
- Access to **supplementary checklists** and reference materials
- Complimentary access to PPI's Systems Engineering Goldmine.

Why Learn with PPI?

For over 30 years, PPI has trained more than 20,000 professionals in 43 countries to apply systems engineering principles effectively. Our courses combine rigorous methods, real-world examples, and expert instruction to maximise your professional impact.

Systems Engineering 1-Day Course Outline

0. The Business Case For Systems Engineering?
- evidence of the value of systems engineering to the enterprise

1. The System Life Cycle And Solution Development
- defining the problem domain
- handling conflict of interest between customer and developer
- the solution domain: key concepts, relationships, and work products

2. Principles, Concepts And Elements
- systems concepts
- SE process
- traceabilities
    - requirements traceability
    - design traceability
    - test traceability
- relationship to ISO 9001, Six Sigma, Lean, Agile

3. Problem Definition - Requirements Analysis
- RA methodology
- RA return on investment

4. Physical Design Part A
- technology and innovation in solution development
- configuration items

5. Logical Design
- functional design – why do it?
- behaviour modelling, SysML v2

6. Physical Design Part B
- interface engineering
- object oriented design

7. Effectiveness Evaluation, Decision & Design Optimisation
- approaches: AHP , MAUT , QFD
- building a value model
- using a value model
- pitfalls

8. Requirements Specifications
- requirement specification types and their roles
- pitfalls in the use of use of public domain specification standards

9. System Integration
- influences on successful system integration
- integration planning
- integration
- integration testing
- design interaction with hardware and software production
- configuration audits
- qualification

10. Verification And Validation
- V&V defined
- technical reviews
    - requirements reviews
    - principles of design review
    - architectural design review (ADR)
    - detail design review (DDR)
    - requirements satisfaction audits (FCAs)
    - design description (BS-BS) audits (PCAs)
    - technical reviews and incremental builds
    - administration of technical reviews
- technical performance measurement
- test and evaluation
- other verification and validation methods and tools

11. Engineering Management
- planning
- integrating engineering specialties
- engineering team structure
- management frameworks – Project Breakdown Structure
- managing configuration
- managing interfaces
- managing residual risk

12. Summary
- key points revisited
- tailoring of methods to specific activities or projects
- getting the most out of systems engineering methods
- process improvement: using CMMI and other benchmarks

13. Systems Engineering Education
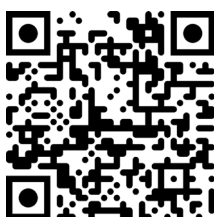
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