PROJECT PERFORMANCE INTERNATIONAL

1-DAY SEMINAR

A Business Introduction to Systems Engineering

A Concise, Powerful Introduction to Systems Engineering Principles and Practice

PART A **Part A: 2.5 hours – Overview of Business Value** *(for executives, managers and project personnel)*

PART B **Part B: 5.5 hours – Systems Engineering in Practice** *(for engineers, other project personnel and managers)*

Why Systems Engineering Matters

Systems engineering is a proven force multiplier for enterprises. It clarifies problems, defines solutions, and delivers value across the entire solution life-cycle. By integrating engineering practices with business goals, it reduces risk, avoids costly rework, and ensures that stakeholder needs are met effectively.

Part A: Overview of Business Value

- Demonstrates the business purpose of systems engineering, providing abundant evidence of its value for executives, senior managers, and other decision-makers.

Part B: Systems Engineering in Practice

- Exposes engineers and other stakeholders to major systems engineering practices, showing how they improve technical performance and strengthen project and business outcomes.

Earn CE/CPD Credit

This seminar is recognized for professional development purposes:

INCOSE Certified Systems Engineering Professional (CSEP)

- 8 PDUs toward INCOSE CSEP certification maintenance

PMI Talent Triangle® Suggested PDUs

- 3 hours Business Acumen
- 5 hours Ways of Working

Who Should Attend

This seminar is perfect for:

- **Part A:** Executives, senior managers, program managers, functional managers, project managers, engineering managers, and engineers in any role.
- **Part B:** Engineers in any role and other technical staff, as well as engineering managers, project managers, and other managers.

No technical background is needed. This seminar emphasizes **concepts**, **structure**, and **principles** over technical detail.

Key Learning Outcomes

By the end of the seminar:

Part A participants will:

- Understand the value of systems engineering at business, project, and technical levels.
- Appreciate how systems engineering reduces risk and improves outcomes.
- Be familiar with activities such as requirements capture and validation, design, trade-off studies, system integration, verification and validation, all in a business context.

Part B participants will:

- Be exposed to methods within requirements capture, validation, and specification; physical and logical design; trade-off studies; system integration; and verification & validation (V&V).
- Understand how these practices reduce risk, avoid costly rework, and improve technical outcomes.
- See how systems engineering provides a common language and framework across teams and disciplines.

Seminar Content Overview

Part A: Overview of Business Value

- The role of the engineer and systems engineering
- Systems engineering as a force multiplier
- Proof of the value of systems engineering to the enterprise
- Systems views and systems thinking
- Development strategies and life-cycle perspectives
- Product Line Engineering, Digital Engineering, Digital Twin and AI
- Principles, concepts, and process elements that deliver business value

Part B: Systems Engineering in Practice

- Requirements capture and validation: objectives, methods, and ROI
- Physical and logical design methods
- Simulation modeling, MBSE languages and tools
- Interface engineering and common pitfalls
- Effectiveness evaluation, decision-making, and design optimization
- Requirements specification principles and pitfalls
- System integration strategies and planning
- Verification and validation methods and technical reviews
- Systems engineering management: planning, managing risk, requirements, interfaces, design complexity, and configuration

Wrap-up: key points, pitfalls to avoid, process improvement, and PPI resources.

Training Method and Materials

The seminar 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?

Over 30 years, PPI has trained more than **20,000 professionals** in **43 countries** to apply systems engineering principles effectively. Our training combines **rigorous methods**, **real-world examples**, and **expert instruction** to maximize your professional impact.

> "The training was nothing short of excellent and given by a true authority in the field. We got absolutely outstanding support from PPI ahead of the training as well."
>
> *— Course participant*

A Business Introduction to Systems Engineering (1 Day)

Seminar Outline

PART A: OVERVIEW OF BUSINESS VALUE (MORNING SESSION)

0. Welcome
- Our time together
- The role of the engineer
- The role of systems engineering
- A force multiplier, not a rule book!
- Proof of the value of systems engineering to the enterprise

1. A Life-Cycle View of Value Delivery
- System views and system thinking
- Illustration of the application of systems engineering
- System/product development strategies
- SE and Product Line Engineering
- Digital Engineering, Digital Twin and AI

2. Principles, Concepts and Elements that Deliver Value
- Systems engineering principles and their relationship to value delivery
- SE process elements
- Concurrent (simultaneous) Engineering
- Traceabilities
  - Requirements traceability
  - Design traceability
  - Verification traceability
  - Everything-to-everything traceability

PART B: SYSTEMS ENGINEERING IN PRACTICE (AFTERNOON SESSION)

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

4. Physical Design Part A
- Physical design objective
- Architecting
- Technology and innovation in solution development
- Configuration items

5. Logical Design
- Logical design – why do it?
- Forms of logic
- Behavior modeling, MBSE languages and tools

6. Physical Design Part B
- What next?
- Pitfalls in architecting
- Interface engineering

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7. Effectiveness Evaluation, Decision and Design Optimization
- Approaches: AHP, MAUT
- Building a value model
- Using a value model
- Pitfalls

8. Requirements Specifications
- Requirement specification types and their roles
- Principles of effective requirements specification
- Pitfalls in the use of public domain requirements specification standards

9. System Integration
- Influences on successful system integration
- Integration planning – 9 alternative SI strategies
- System integration tasks

10. Verification and Validation
- V&V defined
- Technical reviews
  - Requirements reviews
  - Architectural design review (ADR) – PDR?
  - Detail design review (DDR) – CDR?
  - Requirements satisfaction audits (FCAs)
  - Design description (BS-BS) correspondence audits (PCAs)
- System/product verification and validation methods and tools

11. Engineering Management
- Planning
- Integrating engineering specialties
- Management frameworks – Project (Work) Breakdown Structure (PBS/WBS)
- Managing configuration
- Managing interfaces
- Technical performance measurement (TPM)
- Managing residual risk

12. Summary of Key Points
- Key points revisited
- 11 more keys to success

13. What now? – Moving Forward
- Pitfalls to avoid
- Process improvement: using CMMI and other benchmarks
- PPI resources

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systems/product engineering training & consulting for project success ...