5-DAY COURSE

Requirements Engineering

Transforming stakeholder input into clear, accurate, verifiable requirements

Why Requirements Engineering?

Developing the wrong thing is a bigger problem in development than making mistakes developing the right thing. This course addresses the single biggest cause of project failure: poor requirements. Learn to **capture**, **validate**, and **specify requirements** that are **sufficiently complete, correct, and verifiable**, enabling teams to deliver systems and products that truly meet stakeholder needs.

What You Will Learn

This course comprises two complementary modules: **Requirements Analysis** and **Specification Writing**. Together, you will learn practical, efficient techniques to identify and fix defective requirements, and produce high-quality requirements specifications.

You will learn to:

- **Capture and validate requirements** by analysis of stakeholder needs
- **Transform validated requirements** into clear, well-structured requirements specifications
- **Apply modeling-supported methods** of proven effectiveness across diverse industries and technologies.

Earn CE/CPD Credit

This course is recognized for professional development purposes:

INCOSE CSEP Renewal

- 40 Continuing Education PDUs

PMI Talent Triangle® Suggested PDUs

- 37 Ways of Working
- 1 Power Skills
- 2 Business Acumen

Who Should Attend and Why

This course is for professionals who define, capture, validate or specify requirements and want to make a substantial difference to project success via better requirements. You will learn to **uncover unrecognized needs**, **eliminate costly misunderstandings** and **achieve requirements sets that inspire confidence** as a sound basis for acquisition or development.

Ideal for:

- Anybody who receives requirements and needs to act on them, including systems and software engineers
- Business analysts, engineering and project managers
- Technical leads, product definition staff, and procurement or contracting professionals seeking worthwhile improvement in project outcomes through better requirements
- Test personnel (who are often victims of bad requirements).

20,000+ Professionals Trained Across 43 Countries

Interactive, Results-Focused Learning

Delivered through expert instruction, group discussion and hands-on workshops that form the core of the training, this course builds understanding through practice.

Participants receive:

- Comprehensive training manual, and a workbook for each module
- Model solutions, guides, checklists and templates for immediate use
- Complimentary access to PPI's **Systems Engineering Goldmine** and **Systems Engineering Tools Database**.

Available **in-person** and **online** for both **open-registration** and **corporate** groups.

Presenters

PPI's presenters are **internationally recognized** systems and requirements engineering practitioners and consultants who bring **decades of real-world experience**, ensuring every concept taught is value-adding, practical, relevant and immediately implementable.

PPI Training Reviews

"The training made me better at parsing and writing strong requirements."

Course participant,
USA

"The course demonstrated how poor requirements lead to waste and how being methodical avoids conflict."

Course participant,
Australia

"Learned a great deal about good versus bad requirement analysis and requirement specification writing."

Course participant,
USA

Trusted Worldwide

PPI delivers **outstanding training and consulting** to many **hundreds of enterprises worldwide**, from Fortune 100 companies (presently 19% of them) to small start-ups. PPI is a truly international company, with personnel based in eight countries, and clients across six continents benefiting from our work.

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Requirements Engineering 5-Day Course Outline

1. Why Emphasize Requirements?
- Issues and terminology
- Lessons from real projects

2. Requirements within the System Life Cycle
- The origin of requirements
- Concept of the system boundary
- The modeling boundary
- The systems engineering process
- Development of system architecture and detail design, related to requirements
- Requirements traceability
- Summary of terms relating to requirements
- Baselines and their use
- The waterfall life cycle paradigm
- Incremental acquisition/development
- Evolutionary acquisition/development
- ***Workshop – principles of requirements engineering***
- Common requirements pitfalls in the system life cycle

3. Types of Requirements
- Definitions and views
- Relationship to design
- Relationship to baselines
- Why categorize requirements by type?
- Eight basic types
- Differences between requirements for physical systems/ hardware, software, services
- Non-requirements
- ***Workshop – types of requirements***
- Other categories – architectural design drivers, critical, global, priority, importance, stability

4. The Quality of Requirements
- Correctness
- Completeness
- Consistency
- Clarity
- Non-ambiguity
- Traceability
- Testability
- Singularity
- Feasibility
- Balance
- Freedom from product/process mix

5. Requirements Analysis Methodology
- Contexts within which requirements analysis is performed
- Stakeholder identification
- Initial assessment by document (if any) review, and planning
- Measuring requirements quality
- Context flow analysis
- Context analysis
- ***Workshop – context analysis***
- Design requirements analysis
- ***Interactive exercise – design requirements analysis***
- States and modes analysis
- ***Workshop – states and modes analysis***
- Requirements parsing analysis
- ***Workshop – parsing analysis***
- Functional analysis – needs analysis, operational analysis, use cases
- ***Workshop – functional analysis in requirements analysis***
- Rest of scenario analysis
- ***Optional workshop – rest of scenario analysis***
- Out-of-range analysis
- ***Optional workshop – out-of-range analysis***
- Entity-Relationship-Attribute (ERA) analysis
- Other constraints search
- Stakeholder value analysis
- Methods of engaging in requirements dialog
- Verification requirements development
- Operational concept description
- Clean-up – keyword-based searching for residual requirements defects
- Example applications of AI to requirements analysis
- Special issues of the human interface
- Supplementary methods and notations
- Common pitfalls in requirements analysis

6. Coping with the Real World
- What to do when the user “doesn’t know”
- How to respond to “moving goalposts”
- Protecting yourself from the communication chasm

7. Tool Support to Requirements Analysis
- Tools supporting requirements analysis
- Tools supporting requirements management
- Examples of available tools
- Common pitfalls in using tools

8. Verification of Requirements Analysis Work Products
- Requirements reviews
- Keyword search techniques
- Use of metrics

9. Management of Requirements Analysis
- Management issues
- Using and managing “TBDs”
- Designing a requirements codification scheme
- Managing resolution of requirements issues
- Defining reviews and reports

10. Preparing for Transformation of Requirements into Requirements Specifications
- What is a requirements specification?
- How requirements specifications relate to requirements
- How requirements specifications relate to configuration baselines

Requirements Engineering 5-Day Course Outline (Continued)

- Preparing for the transition from requirements to requirements specification
- Using a requirements database to automate requirements specification production

11. Requirements Flowdown into System Element Requirements Specifications

- The specification tree
- Special considerations for interface requirements

12. Requirements Specification Types

- Types of requirements specification
- Institution of Electrical and Electronic Engineers (IEEE) specification standards
- United States (US) Military and other international specification standards
- Score sheet for public domain specification standards

13. Structuring your Requirements Specification

- What to put in your system requirements specification, the statement of work (or equivalent) and the conditions of contract
- ***Workshop – allocating requirements to solicitation documents***
- Structuring a statement of work
- Structuring a system requirements specification
- Dealing with variants
- ***Workshop – writing a scope section to deal with variants***
- States and modes
- ***Workshop – structuring a specification to deal with states, modes and functions***
- Functional versus design oriented specifications
  - Differences
  - When to use each type
- Function and performance
- ***Workshop – classifying specified requirements as functional or design***
- ***Workshop – writing a functionally-oriented requirements specification***
- ***Workshop – writing a design-oriented requirements specification***
- Other requirements types
- Annexes, appendices and applicable documents

14. Requirements Specification Writing

- Review of requirements quality
- Requirement structural template
- ***Workshop – writing requirements using the parsing template***
- Requirements constructs
  - Shall, should, will, and may
  - Linking
  - Cross-referencing
  - ***Workshop – using precedence***
  - Defining terms
  - ***Workshop – defining terms***
  - Context dependence
  - Reference to applicable documents
- Use of precedence
- ***Workshop – linking and cross-referencing***
- Using success criteria to express otherwise vague requirements
- ***Workshop – using success criteria***
- ***Workshop – a requirement specification in a sentence***
- Paragraph headings
- Use of supporting data
  - Mission profiles/use cases
  - Baseline designs
  - Benchmarks
- Linking the specification to the statement of work or conditions of contract
- Verification specifications
- ***Optional workshop – evaluation of example specifications***
- Example applications of AI to requirements specification of subsystems

15. In Closing

- Additional reference material

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