Software Requirements Engineering Course
Offered by The Westfall Team

Software Requirements Engineering is a 3-day course designed to provide a comprehensive knowledge base and practical skills for anyone interested in implementing or improving Software Requirements Development and Management techniques and practices in their organization. This course starts with an overview of software requirements basics, including definitions of terminology, a discussion of the importance of software requirements, an overview of software standards and models related to requirements and an introduction to the requirements engineering process.

Course attendees will learn how to define the vision and scope of a software product, and how to identify the product's stakeholders. They will learn and practice utilizing various techniques for eliciting software requirements. Various models for analyzing requirements will be illustrated and applied to the course's case study. The course will also discuss translating higher-level business and user requirements into software product requirements.

This course includes an overview of the contents of various documents to specify requirements, including a concept of operations document, software requirements specification and a data dictionary. The requirements validation discussion in this course emphasizes peer reviews and test planning.

Course attendees will learn to establish requirements baselines, perform requirements traceability, and manage requirements change. This course also includes an overview of requirements related metrics.

Method of Instruction: This course is taught through lecture and interactive discussion. Actual examples from the software industry are utilized to make the information relevant. Throughout this course, learned skills are practiced using team exercises and case studies. For in-house courses, these exercises and case studies can be tailored to include actual examples from your organization in order to make the training even more relevant to your environment. The emphasis in this course is on techniques that allow the attendees to transition the skills learned in this course to their own work environments.

Target Audience: Business analysts, system and software requirements analysts, project managers, functional managers, software developers, testers, software quality engineers and other software stakeholders who will be involved in eliciting, analyzing, specifying, validating and./or managing requirements.

Course Objectives:

Upon successful completion of this course attendees will be able to:

- Understand the basic concepts of software requirements engineering
- Select the appropriate requirements elicitation techniques to identify their requirements
- Effectively analyze their requirements
- Create a requirements specification to communicate their requirements
- Utilize various requirements validation techniques to critically evaluate their requirements to identify defects
- Manage their requirements throughout the life cycle

Detailed Outline:

I: Software Requirements – The Basics

1. What, Why, When & Who
   a. What are Requirements
      - Requirements Defined
      - Levels of Requirements Information
   b. Why are Requirements Important
      - Why Are Requirements Important?
      - Issue: Project Failure
      - Issue: Incomplete Requirements
      - Issue: Lack of User Involvement
      - Issue: Requirements Defects
      - Issue: Requirements Churn
      - Issue: Wasted Resources
      - Issue: Gold Plating
      - Issue: Inaccurate Estimates
      - Benefits of Good Requirements
   c. When - Requirements & the Life Cycle
      - When – Requirements & the Life Cycle
      - Requirements Engineering is Iterative
   d. Who – Requirements Stakeholders
   e. "How To" of Requirements Engineering

For more information about these and other course offered by The Westfall Team:
Visit our website at: www.westfallteam.com
Send an email to: lwestfall@westfallteam.com
Or call: 972-867-1172

Software Requirements Engineering Course
Offered by The Westfall Team

2. Standards & Models Related to Requirements
   a. CMMI®
      - CMMI® Staged – Level 2 & 3 Process Areas
      - CMMI® Level 2 - Requirements Management
      - CMMI® Level 3 - Requirements Development
      - Generic Practices
   b. IEEE Software Engineering Standards
   c. ISO 9001 on Requirements
3. Requirements Engineering Process
      - Requirements Engineering Process
      - Incremental Requirements Development
      - Requirements Engineering Context

II: Software Requirements Elicitation

1. Business Level Requirements
      - Purpose of Business Level Requirements
      - The Idea!
      - Vision Statement
      - Vision Statement – Example
      - Vision Statement – Exercise
      - Defining Business Objectives
      - Business Objectives – Examples
      - Characteristics of "Good" Business Objectives
      - Product Scope & Limitations
      - Product Context Diagram
      - Product Context Diagram – Exercise
2. Stakeholders
      - Stakeholder Defined
      - Benefits of Identifying Stakeholders
      - Step 1: Identifying Stakeholders
      - User Types
      - Step 2: Prune the Stakeholder List
      - Step 3: Participation Strategy
      - Identify Stakeholders – Exercise
      - Stakeholder Conflict Management
      - Decision Criteria Alternatives
      - Customer's Bill of Rights
      - Customer's Bill of Responsibilities
3. Requirements Elicitation Techniques
      - Direct-Two-Way Communications
      - Before the Interview
      - Open-Ended Questions
      - Context-Free Questions
      - During the Interview
      - Listening Actively
      - Interviewing Tips
      - After the Interview
      - Focus Groups
      - Focus Group Meeting
      - Focus Group - Exercise
      - Facilitated Requirements Workshop
      - Benefits of Facilitated Requirements Workshops
      - Facilitator Do's & Don'ts
      - User Stories
      - User-Story - Examples
      - Storyboards
      - Documentation Studies
      - Human Factors Studies
      - Other Requirements Elicitation Techniques

III: Requirements Analysis

1. Requirements Modeling
   a. Requirements Modeling
      - Benefits of Models
      - Types of Models
   b. Object Oriented Models
      - Use Cases
      - Step 1-3: Use Case Diagram
      - Step 4: Develop a Use Case for Each Interaction
      - Use Case Steps
      - Use Case - Exercise
      - Other Use Case Information
      - Class Diagram
      - Sequence Diagram
      - Sequence Diagram – Exercise
      - Activity Network
   c. Structured Analysis Models
      - Data Flow Diagram
      - Entity Relationship Diagram
      - State Transition Diagram

Software Requirements Engineering Course
Offered by The Westfall Team

- State Transition Table

d. Other Models
- Process Flow Diagram
- Decision Tree
- Event/Response Table
- Event/Response Table – Exercise

2. Identifying Product Requirements
- Levels & Types of Requirements Information
- Use Case → Functional Requirements
- Use Case → Functional Requirements – Example
- Nouns → Data Requirements
- Data Requirements – CURDL
- Use Case → Nonfunctional Requirements
- Quality Attributes
- Reliability Requirements
- Availability Requirements
- Performance Requirements
- Usability Requirements
- Security & Access Control Requirements
- Safety Requirements
- Maintainability & Portability Requirements
- Product Requirements - Exercise
- External Interface Requirements
- Class Diagrams→ Product Requirements
- Data Flow Diagrams→ Product Requirements

3. Prototyping
- Prototype
- Prototyping Suggestions

4. Prioritizing Requirements
- Benefits of Prioritizing Requirements
- Prioritization Considerations
- Prioritization - 1st Pass
- Prioritization - 2nd Pass

IV: Requirements Specification

1. Concept of Operations
- Documenting Business & Stakeholder Level Requirements
- Concept of Operations Document

2. Software Requirements Specification
- System Requirements
- System vs.Software Requirements
- Software Requirements Specification
- Writing "Good" Requirements

3. Data Dictionary
- Data Dictionary
- Data Dictionary Notation
- Data Dictionary – Example

V: Requirements Validation

1. Requirements Review
- Reviews Defined
- Cost of Rework
- Informal vs. Formal Peer Reviews
- Types of Peer Reviews
- Which Type to Choose
- Hold Many Peer Reviews
- Inspection Process
- Inspection Meeting Process
- Who Should Inspect Requirements
- Requirements Completeness
- Requirements Checklist
- Requirements Checklist - Each Requirement
- Ambiguity
- Peer Review – Exercise

2. Requirements Test Planning
- Testability
- Writing Test Cases
- Test Matrix – Example

VI: Requirements Management

1. Establishing & Maintaining Baselines
- Baseline Defined
- Types of Baselines
- Requirements Specification Acquisition
- Sign-Off

2. Traceability
- Traceability Defined
- Benefits of Requirements Traceability
- Traceability Matrix

3. Requirements Change Management
- Configuration Control Procedures