

Course 415: Structured Systems Analysis and Design (4 days)

Course Description...

When there is high risk involved in developing software for mission critical systems the structured approach is chosen to provide the stability and security of systematic and time-proven techniques. This course details the tools and techniques used in the top-down structured approach and discusses the methods for ensuring quality in design and execution of software development.

Learning Objectives...

- Understand the principles of the phased approach to software development
- Apply modeling tools and techniques to the design and analysis of the business problem
- Review the various approaches to structured analysis and design
- Demonstrate structured analysis and design techniques

Who should attend...

Audience includes programmers, managers, designers, analysts and anyone interested in learning established methods for quality software development.

Prerequisites...

An understanding of the basics of software development is assumed in students attending this class.



Course Outline...

Introduction and Overview

Course Objectives

Unit 1: Analysis, Design, Modeling and Architecture

Systems and Software Engineering

- The Software Life Cycle
- The process of developing software
- The phased approach
- Analysis
 - Requirements analysis
 - Systems analysis
- Design

Modeling

- Analysis modeling
- Design modeling
- Answering questions
- Architecture

The Role of Documentation

Unit 2: Analyzing To Determine the Problem

Statement of Work

Problem Statement

- How to define the real problem
- Stating the vision

Business Case Overview

- Scope of work
- Justification
- Functional goals

Confirmation: How Do We Know It's the Right Problem?

Defining the Problem: The Requirements Process

- Requirements definition
- Requirements Analysis Process

Unit 3: Designing the Solution

What Is Design?

The System Design Process



Analysis and Design

- What is the difference?
- Examples

Design Process

- Design levels
- Flowdown and allocation
- Creating the design
- Exercise: Modeling a User Interface
- Design methods
- Documenting the design
- Verification

Unit 4: Design and Analysis Methods: Data Modeling

Overview

- Data modeling using E-R Diagrams
 - Entities
 - Attributes
 - Relationships
 - Many:many relationships
 - Entity subtypes
 - Participation
 - Recursive relationships
 - Exclusivity
- Chen and other related notations
- Binary and N-ary Relationships
 - Replacing N-ary relationships with binary
 - Relationships aids understanding
- Comparing notations
 - Notations that look different but have the same meaning

Creating and Applying the Data Model

- Find the noun technique
- Analytical processes
- Structure and approach
- Data modeling in the design

Application of Design Principles

- Functional dependency and normalization
 - Functional dependencies
 - Using functional dependencies
- Functional dependency and normalization
 - First normal form
 - Second normal form
 - Third normal form
 - Other forms
- When and where to use normalization



Unit 5: Design and Analysis Methods: Process Modeling

Overview

Entity-Activity Analysis

- Stimulus – response
- Event processing
- Cross reference matrices

Dataflow Diagrams

- Scope or Level 0 Diagram
 - Sources and sinks
 - Processes
 - Flows
- Structured Decomposition
 - Leveling the diagram
 - Quality checks
- Detail dataflow diagrams
- Verifications

State Transition Diagrams

- Application
- Format
- Events and triggers

Process Analytical Tools and Techniques

Program Specifications

Unit 6: Approaches to Software Development

Evolution of Software Engineering Practices

The Discipline of the Software Engineering Approach

- Structure
- Method
- Documentation

Structured Approaches

- Linear
 - Waterfall
 - U or V Model
 - Information engineering
 - When to use
 - Risks involved
- Incremental
 - Staged delivery
 - Incremental life cycle
 - When to use
 - Risks involved



Evolutionary

- Top-down Structured (Yourdon-DeMarco)
- Spiral- and risk-based (Boehm)
- Rapid application development
 - Prototyping
 - Iterative development
 - DSDM
- Exercise: planned iterations
- When to use
- Risks involved

Unit 7: Final Thoughts and Keys to Success

Where to go for more information
Industry keys to success summary

Please contact your ROI representative to discuss course tailoring!!!