Course 342:
Systems Engineering with SysML
(3 days)

Course Description…

Compared with traditional, document-based systems engineering, model-based systems engineering offers several significant advantages: enhanced communication; reduced development risk; improved quality; increased productivity; and enhanced knowledge transfer. This course focuses on the syntax and semantics of SysML, a general-purpose graphical modeling language for representing systems, along with a set of examples and workshops illustrating how each graphic element can be used to help construct a system model. SysML is an extended subset of the Unified Modeling Language, which has seen widespread use in software engineering.

Prerequisites…

None

Who should attend…

This course is designed for systems engineers, software engineers, managers, testers, maintainers, and any others who have an interest in or responsibility for the systems engineering process.

Learning Objectives…

- Understand the principles of model-based systems engineering
- Understand how to use SysML components and features in the systems engineering process
- Be aware of standards that apply to SysML
- Gain experience interpreting and constructing SysML symbols and components

See next page for a detailed course outline…

Course Outline…

Chapter 1: Introduction

Chapter Objectives

Systems Engineering Overview

- Systems and systems engineering in the project/program environment
- The system development life cycle
- The systems engineering process

Principles of Model-Based Systems Engineering

- Modeling principles
- Document-based vs. model based methods

SysML Overview

- SysML role in systems engineering
- Requirements diagrams
- Structure diagrams
- Behavior diagrams
- SysML standards

Chapter Summary and Best Practices

Chapter 2: Package Diagram

Chapter objectives

Package Diagram Concepts

- Using packages to organize models
- Package types
- Containers
- Namespaces
- Model libraries
- Views and viewpoints

Drawing Package Diagrams

- Example
- Syntax
- Semantics
- Class exercise: interpreting a package diagram

Workshop: Drawing a package diagram

Chapter Summary and Best Practices

Chapter 3: Block Diagram

Chapter objectives

Block Diagram Concepts

- Block diagrams in the systems engineering process
- Block definition diagram
- Internal block diagram

Drawing Block Definition Diagrams

- Example
- Syntax
- Semantics

Drawing Internal Block Diagrams

- Example
- Syntax
- Semantics
- Class exercise: interpreting a block definition diagram and an internal block diagram

Workshop: Drawing a block definition diagram and an internal block diagram

Chapter Summary and Best Practices

Chapter 4: Parametric Diagram

Chapter objectives

Parametric Diagram Concepts

- Parametric diagrams in the systems engineering process
- Relationship to block diagrams

Drawing Parametric Diagrams

- Example
- Syntax
- Semantics
- Class exercise: interpreting a parametric diagram

Workshop: Drawing a parametric diagram

Chapter Summary and Best Practices

Chapter 5: Activity Diagram

Chapter objectives

Activity Diagram Concepts

- Activity diagrams in the systems engineering process
- Input and output parameters
- Object flows
- Control flows
- Events

Drawing Activity Diagrams

- Example
- Syntax
- Semantics
- Class exercise: interpreting an activity diagram

Workshop: Drawing an activity diagram

Chapter Summary and Best Practices

Chapter 6: Sequence Diagram

Chapter objectives

Sequence Diagram Concepts

- Sequence diagrams in the systems engineering process
- Lifelines

Drawing Sequence Diagrams

- Example
- Syntax
- Semantics
- Class exercise: interpreting a sequence diagram

Workshop: Drawing a sequence diagram

Chapter Summary and Best Practices

Chapter 7: State Diagram

Chapter objectives

State Diagram Concepts

- State diagrams in the systems engineering process
- Transitions
- State hierarchies
- Discrete and continuous states

Drawing State Diagrams

- Example
- Syntax
- Semantics
- Class exercise: interpreting a state diagram

Workshop: Drawing a state diagram

Chapter Summary and Best Practices

Chapter 8: Use Case Diagram

Chapter objectives

Use Case Diagram Concepts

- Use case diagrams in the systems engineering process
- Actors
- Context diagrams
- Use case descriptions

Drawing Use Case Diagrams

- Example
- Syntax
- Semantics
- Class exercise: interpreting a use case diagram

Workshop: Drawing a use case diagram

Chapter Summary and Best Practices

Chapter 9: Requirements Diagram

Chapter objectives

Requirements Diagram Concepts

- Requirements diagrams in the systems engineering process
- Derived requirements
- Verifying requirements
- Rationale

Drawing Requirements Diagrams

- Example
- Syntax
- Semantics
- Class exercise: interpreting a requirements diagram

Workshop: Drawing a requirements diagram

Chapter Summary and Best Practices

Chapter 10: The Bottom Line

Course Summary

Highlights

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