COLLEGE of CHARLESTON

Systems Engineering: Design and Development

ENGR 387

Agenda

- **Course Introduction**
- **Course Objectives**
- **Lesson Plan**
- **Required Text**
- **Software Tools**
- **Assessment**

Course Introduction

The Introduction to Design and Development course using Model Based Systems Engineering provides an overview of what Model Based Systems Engineering (MBSE) is and how MBSE techniques can be applied to the Systems Engineering process to manage complexity, reduce risk, and potentially streamline the engineering design and development effort.

Course Objectives

At the end of this course, you should have an awareness of:

- model-based systems engineering approach
- SysML language and modeling abstract systems
- How SysML is used as part of an MBSE.

This course is not intended to make you a systems modeler! You must use the language.

Lesson Plan

This lectures are based on:

- OMG SysML available specification (formal/2007-09-01) http://www.omgsysml.org/ and
- SysML Distilled: A Brief Guide to the Systems Modeling Language 1st Edition

Lesson Plan

Week 1 MBSE, Architecture Languages, Frameworks and OOSM
What is MBSE? - Lecture 1
UML/MODAF, NAF, DoDAF, UPDM and UAF - Lecture 2
OOSM and Modeling SysML Overview - Lecture 3
Week 2 Modeling SysML Overview and Package Diagrams
Modeling SysML Overview - Lecture 4
Package Diagrams - Lecture 5
Lab 1 Exercise – Package Diagrams (pkg)
Week 3 Block Definition Diagrams and Internal Block Diagrams
Block Definition Diagram Blocks and Properties - Lecture 6
Internal Block Diagrams– Lecture 7
Lab 2 Exercise - Blocks and Block Definition Diagrams (bdd)
Week 4 Parametric Diagrams and Use Cases Diagrams
Parametric Diagrams – Lecture 8
Use Case Diagrams – Lecture 9
Lab 3 Exercise – Internal Block Diagrams (ibd)
Week 5 Analyze Stakeholder Needs activity in the OOSEM method
First Test – Structural Diagrams
Analyze Stakeholder Needs activity in the OOSEM method – Lecture 10
Lab 4 Exercise – Requirements Diagram
Week 6 Activity Diagrams and Sequence Diagrams
Activity Diagrams - Lecture 11
Sequence Diagrams – Lecture 12
Lab 5 Exercise – Activity Diagrams
Week 7 State Machine Diagrams
State Machine Diagrams – Lecture 13
Lab 6 Exercise – Sequence Diagrams
Week 8 Requirements Diagram and Traceability activity in the OOSEM method
Requirements Diagram – Lecture 14
Manage Requirements Traceability activity in the OOSEM method – Lecture 15
Lab 7 Exercise – State Machine Diagrams
Week 9 Optimize and Evaluate Alternatives
Optimize and Evaluate Alternatives activity in the OOSEM method – Lecture 16
Second Test – Behavioral Diagrams
Week 10 Using OOSEM to Integrate and Verify System
Integrate and verify System activity in the OOSEM method – Lecture 17
Final Test

Required Text

SysML Distilled: A Brief Guide to the Systems Modeling Language 1st Edition

Software Tools

https://www.3ds.com/products-services/catia/products/no-magic/magicdraw/

Assessments

Three Tests

- First Test – Structural Diagrams
- Second Test- Behavioral Diagrams
- Final Comprehensive Test – All the material in the lecture series