Course Overview, Objective, Approach, and Details

Section Overview

- This section will cover:
  - Course Overview
  - Course Objectives
  - Course Approach
  - Course Details

Course Overview

- This course will address the following topics:
  - High level overview of Systems Engineering
  - Introduction to Model-Based Systems Engineering (MBSE)
  - Introduction to the OMG Systems Modeling Language (OMG SysML™)
  - Introduction to the SysML Tool – Sparx Enterprise Architect (EA™)
  - Applying Sparx EA ™ to modeling of sample systems

Course Overview

- The course is intended for:
  - Associate, Senior, and Principal Professional staff interested in learning about MBSE and SysML, and in investigating the possible use of MBSE with SysML tools in systems engineering and architecting projects.
- Assumptions
  - Systems Engineering background
  - No prior SysML or UML knowledge required or assumed

Course Overview

- Course Text:
  - "A Practical Guide to SysML: The Systems Modeling Language"; Friedenthal, Moore, and Steiner; 2009, Elsevier, Inc.
- Software:
  - Visual Paradigm Community Edition, version 17.2 with SysML

Course Objective

- Primary course objective is:
  - Gain an understanding of the use of SysML and SysML tools to develop systems models and artifacts in support of MBSE

What's Covered?

- Three things you need to learn about modeling:
  - Language
  - Tool
  - Methodology
- Focus of this course is:
  - Language (SysML)

- Various Methods available
  - Traditional structured analysis
  - Object-oriented

Course Approach

- The course will focus on providing the student with a working knowledge of MBSE and its value in the overall development of systems.
- Each class will include PowerPoint-based lectures and class discussions on SysML concepts.
- Each class will also include hands-on training in the basic use of MBSE with the SysML tool (Visual Paradigm)

Course Schedule

Section	Hour	Topic	Chap
1	1&2	Course Overview, Systems Engineering Overview, Model Based Systems Engineering Overview, and SysML Overview	1, 2, 3
2	1&2	Organizing the Model with Packages and EA Basics	5
3	1&2	Modeling Functionality with Use Cases	11
4	1&2	Modeling Requirements and their Relationships	12
5	1&2	Modeling Structure with Blocks (Block Definition Diagrams)	6
6	1&2	Modeling Structure with Blocks (Internal Block Diagrams)	6
7	1&2	Modeling Flow-Based Behavior with Activities	8
8	1&2	Modeling Event-Based Behavior with State Machines	10
9	1&2	Modeling Message-Based Behavior with Interactions	9
10	1&2	Modeling Constraints with Parametrics	7
11	1&2	Modeling Cross-Cutting Relationships with Allocations	13

Typical Section Structure

- Homework Review
- Introduction
  - Motivation for a particular diagram
- Language Concepts
  - Diagram Elements (textbook)
- Tool Usage
  - Using Enterprise Architect to Model a particular diagram type
- Modeling Example (In-Class Project)
  - Parking Garage Gate
- Homework Assignment

Homework

- Homework will include assigned readings from the course text, as well as hands-on development of MBSE artifacts using Sparx EA
- Two Systems to Model
  - Alarm Clock Radio
  - Coke Machine
- Why?
  - Familiarity
  - Relatively Simple Systems
  - Compare and Contrast
  - Practice
- Groups
  - Form Group Homework teams of 3-5 students/team

Grading

- Course is Pass/Fail
- No Tests
- Grades are based solely on Homework and Class Participation

Course Philosophy

- Modeling - there is no 'one' right answer
- Need to practice to learn
- Essential vs Complete Information
  - Focus of course is on what's essential
  - Lots of information in the book is not covered
    - Not enough time
    - Too much detail for an Intro course
- Goal - Time Savings
  - Discerning the basics of SysML
  - Learning the basics of using the EA Tool

Notes

- Remote students may want to print out slides prior to each class
  - In case there are connectivity issues
- Course SharePoint site:
  - Need OUTER account
  - Course lecture slides will be posted
  - https://partners.jhuapl.edu/Projects/SEP2009MBSE/default.aspx
- If you miss class:
  - Classes will be recorded in MeetingPlace
  - Lecture Slides will be available on SharePoint site

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- **Course Material Peer Review**
  - All course material was presented at INCOSE OOSEM Working Group meetings for review and comment
  - INCOSE OOSEM Working Group consists of subject-matter experts with numerous years of experience in Systems and Software Engineering, MBSE, UML, and SysML
    - Including textbook co-author (Sandy Friedenthal)
  - Course material was reviewed incrementally by the Working Group
    - Course Outline
    - Section Development
    - Contributions to post-course improvements

Introductions

- Name and Department
- Brief Background
  - Technical focus area
  - UML Experience
  - SysML Experience
  - Enterprise Architect Experience