

SYST 659 / SYST 750 Model Based Systems Engineering. (3:3:0). Spring 2011. Prerequisites: SYST 520 and corequisite SYST 619, or permission of instructor.

Model Based Systems Engineering (MBSE) is the formalized application of modeling to support the processes associated with a framework for the engineering of systems. This framework includes both the steps and the phases associated with systems planning and marketing; research, development, testing and evaluation; and system acquisition and production. The purpose of this course is to provide a description of some of the leading methodologies for MBSE and to illustrate their use in systems engineering and management. Use of MBSE to support a variety of systems engineering applications is described in the course. Studies in this area cover: formulation of the system integration problem, definition of architecture frameworks, use of structured analysis and object oriented methodologies for the design of architectures, modeling and simulation for evaluation of architectures and approaches to integration, and interoperability. Both defense and industrial applications are considered. Discussion of works presented in September 2010 at GMU-MBSE-2010 conclude the presentation.

Text:

Sage, A. P. and Rouse, W. B. (Eds.), *Handbook of Systems Engineering and Management*, Second Edition, John Wiley and Sons, New York, 2009.

We will use several chapters in this work, beginning with Chapter 0 to describe a systems engineering framework. Then we turn our attention to Chapter 32 which is specifically on model based systems engineering. Next, we examine systems modeling methodologies from many of the chapters in this work.

A plethora of contemporary literature available on the Internet concerning the subjects to be covered will be of much use, and experience will be gained in the Internet as a research tool during the course. A course web site on Blackboard will be operational and will be much used throughout the course.

Instructor: Andrew P. Sage, Office: Engineering Building, Room 2240, Phone: 703-993-1506, Fax: 703-993-1521
Email: asage@gmu.edu, Office Hours by Appointment.

Course Call Numbers SYST 659 15028 001, SYST 659 16647 DL1, SYST 750 17102 001, Tuesday from 4:30 PM to 7:10 PM in Room Stl-126.

Grades: 50% - examinations; 15% - term paper; 35% - home assignments. Two take home exams will be given. There will be a term paper assignment in the general area of the course, and periodic homework assignments. The content in the detailed weekly syllabus is based on Chapters from the text and also a recent conference at GMU.

SYST 659, SYST 750 – Model Based Systems Engineering Syllabus and Outline, (subject to change)

25 Jan 11	Framework for Systems Engineering and Management; Chapters 0 and 1
1 Feb 11	An Introduction to Model Based Systems Engineering Part 1 (Chapter 32)
8 Feb 11	An Introduction to Model Based Systems Engineering Part 2 (Chapter 32)
15 Feb 11	System Architecture Models and MBSE Part 1 (Chapter 12)
22 Feb 11	System Architecture Models and MBSE Part 2 (Chapter 12)
1 Mar 11	Modeling the Enterprise as a System (Chapter 10)
8 Mar 11	Requirement, Measurement, Human, and Design Model Issues (Chapters 4, 13, 15, 21)
22 Mar 11	Modeling and Analysis of Alternatives (Chapter 26)
29 Mar 11	Cost, Quality, Reliability, Availability, and Maintainability Models (Chapters 6, 7, 8)
29 Mar 11	Mid Term Exams Due
5 Apr 11	Modeling and Analysis of Alternatives and Decisions (Chapters 26, 27, 28)
12 Apr 11	Models for Human Systems Integration and Organizational Design (Chapters 31, 33)
19 Apr 11	Complex Adaptive System Models (Chapter 30)
26 Apr 11	Model Based Systems Engineering Summary and Principles and Efforts from MBSE-2010 (Part 1)
3 May 11	Model Based Systems Engineering Summary and Principles and Efforts from MBSE-2010 (Part 2)
10 May 11	Final Take Home Exams Due (No Class)