

System design and integration methods are studied and practiced, including structured analysis and object-oriented based techniques. Life cycle of systems is addressed, including definition and analysis of life cycle requirements. Software tools are introduced and used for the systems engineering cycle. Identification of preliminary architectures. Students are expected to develop a system design for a system using both the structured analysis and object-oriented techniques presented in class.

Instructor: Andrew P. Sage, School of Engineering, Room 2240, 703-993-1506, [asage@gmu.edu](mailto:asage@gmu.edu), Office Hours by Appt.

Course Call numbers: SYST 520 001 11602

Spring 2012: Tuesday 4:30 – 7:10 pm Room 124 Science and Technology I

### COURSE OUTLINE (subject to change)

24 Jan 12	Overview of Systems Engineering; Approaches to Design, Blackboard ; B1
31 Jan 12	Systems Engineering Design Process; Structured Analysis; CORE; B2
7 Feb 12	Use cases, Process modeling: IDEF0, DFD: F11, B3 & B12.3
14 Feb 12	Data Modeling and Rule Modeling – Model Based SE – notes, F2
21 Feb 12	Requirements and Design Definition; B6
28 Feb 12	Functional Architecture; B7
6 Mar 12	Physical Architecture and Design; B8 and B9
13 Mar 12	Behavioral Models and Executable Models of Design; B12
20 Mar 12	Interface Design and System Integration and Quantification; B10 & B11
27 Mar 12	Mid Term Exams Due
27 Mar 12	Alternative Structural and Architectural Representations; B12. F15
3 Apr 12	The Systems Modeling Language: (SysML) Basic Concepts; F1 through F 4
10 Apr 12	The Systems Modeling Language: (SysML) Diagrams; F5 through F15
17 Apr 12	The Systems Modeling Language (SysML) Modeling Examples F16, F17
24 Apr 12	Integrating SysML into Development and Organizational Environments, F18, F19
1 May 12	Integrating SysML into Development and Organizational Environments, F18, F19
15 May 12	Final Take Home Exams Due (No Class)

### Textbooks for Course (required):

(1) Dennis M. Buede, *The Engineering Design of Systems*, Wiley, 2009, NY (2<sup>nd</sup> Edition)..

(2) Sanford Friedenthal, Alan Moore, and Rick Steiner, *A Practical Guide to SysML: The Systems Modeling Language*, Morgan Kaufman OMG Press (Elsevier) Second Edition 2012.

In the Course Outline, Bx denotes chapter x in Buede; Fx denotes chapter x in Friedenthal

A plethora of contemporary literature available on the Internet concerning systems design, integration, and architecting and will be of much use. Experience will be gained in the Internet as a research tool during the course. A course web site on Blackboard Learning Systems (BLS) will be operational and put to much use. We will gain experience in using the CORE software package for design and architecting. Other software will be briefly discussed including Enterprise Architecture. Detailed class notes (Overheads) will be provided. Student Evaluation Criteria: Homework 40%; Midterm 30%; Final 30%, APS 8 November 2011.