SYST 520 –System Design and Integration (3:3:0) Spring 2006

System design and integration methods are studied, including both structured analysis and object oriented approaches: life cycle of systems, and generation and analysis of life cycle requirements; architectural representations, including development of functional, physical, and operational architectures for allocation and derivation of component-level requirements for the purpose of specification production; examination of interfaces and development of interface architectures. The last part of the course discusses object orientation in systems engineering design and architecting and utilizes the Unified Modeling Language (UML) and such extensions as the Systems Modeling Language (SysML). Software tools are introduced and used to support systems design, including architecture and integration efforts.

Required Texts:

Buede, D. M., *The Engineering Design of Systems*, John Wiley and Sons, Inc. 2000.
Fowler, M., *UML Distilled: A Brief Guide to the Standard Object Modeling Language*, 3rd Edition, Addison Wesley, 2004.

References:

Rumbaugh, J., Jacobson, I., and Booch, G., *Unified Modeling Language Reference Manual*, 2nd Ed., Addison Wesley, 2005.
Blaha, M., and Rumbaugh, J., *Object Oriented Modeling and Design with UML*, 2nd Ed., Prentice Hall, 2005.
Eriksson, H. E. and Penker, M., Lyons, B., and Fado, D., *UML 2 Toolkit*, John Wiley, 2004.
Sage, A. P. and Rouse, W. B. (Eds.), *Handbook of Systems Engineering and Management*, John Wiley, New York, 1999.
Sage, A. P., *Systems Management for Information Technology and Software Engineering*, John Wiley, New York, 1995.
Sage, A. P., *Systems Engineering*, John Wiley, 1992.

A plethora of contemporary literature available on the Internet concerning systems design and integration and related issues in architecting 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 WebCT 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.

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SYST 520-001, Course Call Number 10277. Spring 2006, Wednesday from 4:30 PM to 7:10 PM in IN (Innovation Hall) 206.

Grades: 50% - examinations; 20% - term paper; 30% - home assignments. Two take home exams will be given, one approximately at the middle of the semester and one at the end of the semester. There will be a term paper assignment on systems design and architecting, including a written report, and weekly homework assignments.

SYST 520 - Detailed Syllabus and outline, by dates (subject to change) – Spring 2006.

1. An overview of systems engineering (Buede, Ch. 1), Introduction to WebCT – 25 January.
2. Systems engineering design process (Buede, Ch. 2) and software tool CORE – 1 February.
3. Modeling and process modeling (Buede, Ch. 3) – 8 February.
4. System requirements and identification of design definition (Buede, Ch. 6) – 15 February.
5. Functional architecture definition (Buede, Ch. 7) – 22 February.
6. Physical architecture definition and operational architecture (Buede, Ch. 8 and Ch. 9) – 1 March.
7. Interface design and system integration and qualification (Buede, Ch. 10, 11) – 8 March.
8. No class on 15 March – Spring Recess.
9. Alternative structural and architectural representations (Buede Ch. 12). Mid-term exams due – 22 March.
10. Object oriented modeling and Unified Modeling Language (Fowler) – 29 March.
11. Object oriented modeling and Unified Modeling Language (Fowler) – 5 April.
12. Object oriented modeling and Unified Modeling Language (Fowler) – 12 April.
13. Object oriented modeling and Unified Modeling Language (Fowler) – 19 March.
14. Object oriented modeling and Systems Modeling Language (SysML Partners) – 26 March
15. Term Paper Presentations and Term Papers Due – 3 May.
16. Final Exams Due – 10 May.

APS: 1 December 2005.