SYST 622 / ECE 675 System Integration and Architecture Evaluation (3.0:3) Syllabus Spring 2006
Recommended Co-requisite: SYST 621 or ECE 674 or permission of instructor. *Description:* Covers the system integration problem, the role of architectures in systems integration, integration in a system of systems and a federation of systems. Evaluation of architectures, measures performance and effectiveness. Assessment of system capabilities. Analysis of alternatives. This course is part of the degree track, concentration, and certificate in architecture based systems integration. There is much interest today in the engineering of systems that are comprised of other component systems, and where each of the component systems serves organizational and human purposes. These systems families are often categorized as systems-of-systems, or federations of systems. The design of architectures is a major ingredient in the design of systems families and provides the conceptual basis for achieving system integration. Towards this end, the Department of Defense has issued new regulations for acquisition of systems. These require an architecture-based approach and focus on how a proposed system will be integrated with other existing or planned systems. 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. Both defense and industrial applications are considered. This is the capstone course in the sequence. It addresses the system integration problem using architectures as the basis and then addresses the evaluation of architectures in terms of the capabilities they provide.

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Course Call numbers: SYST 622 001 10521; ECE 675 001 12303, Spring 2006: Tuesday 4:30 – 7:10 pm in Innovation Hall Room 132

COURSE OUTLINE (subject to change)

1/24/2006	Overview, System of Systems and system Families, Introduction to WebCT
1/31/2006	System of Systems Interoperability (Guest Lecture: Lee Wagenhals)
2/7/2006	Capability Based System of Systems Planning, Networked Systems of Systems
2/14/2006	Enterprise Architecture Body of Knowledge I
2/21/2006	Enterprise Architecture Body of Knowledge II
2/28/2006	Maturity Models, and Integration and Architecting Development Models
3/7/2006	Systems of Systems Integration: The Lead Systems Integrator (and Architect)
3/21/2006	Issues in Architecture Evaluation; Mid Term exam due
3/28/2006	System Effectiveness Analysis
4/4/2006	Structural Methods, Relating Structure to Capability
4/11/2006	State Space Methods
4/18/2006	Organizational Architecture Design
4/25/2006	Adaptive Architecture Design
5/2/2006	Evaluation of Architectures; Term Paper Report Due
5/9/2006	Final Exam

Course notes will be made available for downloading through WebCT. The first seven lectures of the course will be given by Dr. Sage; the remaining ones by Dr. Levis. Contemporary literature is available and is either on the Internet or will be made available on WebCT. These references concerning systems integration and related issues in architecting for systems integration and evaluation will be of much use, and experience will be gained in the Internet as a research tool during the course. *Homework:* The first part of the course will have a term paper assignment, including a written report and oral presentation. The second part will have weekly homework assignments

Reference: Sage, A. P. and Rouse, W. B. (Eds.), ***Handbook of Systems Engineering and Management***, John Wiley and Sons, New York, 1999.

Grading: 50% - examinations; 15% - term paper; 35% - homework assignments. One take home mid-term exam and an in-class final exam will be given. There will be a term paper assignment, including a written report.
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