Syllabus - Fall 2010
SYST 622 / ECE 675 / IT 850 / .SYST 850 System Integration and Architecture Evaluation (3.0:3)
Prerequisite SYST 619 / ECE 672,: SYST 621 / ECE 674 or permission of instructor.

Course Description: System integration issues, including integration in a system of systems and Federation of Systems. The Lead Systems Integrator (LSI) concept. Role of architectures in systems integration, including system architectures and Service Oriented Architectures (SOA). Evaluation of architectures, measures of performance and effectiveness. Assessment of system capabilities, and 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 of systems integration problem using architectures as the basis for this and then addresses the evaluation of architectures in terms of capabilities provided.

Instructors: Prof. Andrew P. Sage, Office - Engineering Bldg, Room 2240, Phone: 703-993-1506, Fax: 703-993-1521. Email: asage@gmu.edu.
Prof. Alexander H. Levis, Office – Engineering Bldg, Room 3245, Phone: 703 993 1619. Email: alevis@gmu.edu.

Course Call numbers: SYST 622 002 75134; SYST 622 (NSWC) TBA: Tuesday 4:30:00 – 7:10 pm in IN 131
COURSE OUTLINE (Subject to Change
08/31/2010   1. Overview, System of Systems and System Families, Introduction to BLS CE6
09/07/2010   2. System of Systems Interoperability
09/14/2010   3. Capability Based System of Systems Planning, Networked Systems of Systems
09/21/2010   4. Enterprise Architecture Body of Knowledge I
09/28/2010   5. Enterprise Architecture Body of Knowledge II
10/05/2010   6. Maturity Models, and Integration and Architecting Development Models
10/12/2010   No Class Scheduled
10/19/2010   7. Systems of Systems Integration: The Lead Systems Integrator (and Architect)
10/26/2010   8. Issues in Architecture Evaluation; Mid Term Exam Due on BLS-CE6
11/02/2010   9. System Effectiveness Analysis
11/09/2010   10. Structural Methods, Relating Structure to Capability
11/16/2010   11. State Space Methods
11/23/2010   12. Measures for Architecture Evaluation
11/30/2010   13. Adaptive Organizational Architecture Design
12/07/2010   14. Evaluation of SOA architectures Term Paper Report Due on BLS-CE6
12/14/2010   Final Exam in Class
The first seven lectures of the course will be given by Dr. Sage; the remaining seven by Dr. Levis. Lecture overheads and references will be made available on BLS CE6. Experience will be gained in the Internet as a research tool: The first part of the course will have a term paper assignment, including a written report. Reference: Sage, A. P. and Rouse, W. B. (Eds.), *Handbook of Systems Engineering and Management*, John Wiley and Sons, New York, Second Edition, 2010. 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.