SYST 619 / ECE 672 / IT 850 Introduction to Architecture Based Systems Engineering. (3:3:0). Spring 06
Lifecycles in systems engineering and the role of systems integration and architecting in these. Conceptual frameworks for systems architecting. Structure, function, and purpose of systems architecting and integration. Risk management and systems architecting and integration. User requirements and functional specifications in systems architecting. Prerequisites: SYST 510 or 520 or permission of instructor.

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 system families, 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.

References:

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

Sage, A. P., ***Systems Management for Information Technology and Software Engineering***, John Wiley and Sons, New York, 1995.

Sage, A. P., ***Systems Engineering***, John Wiley and Sons, 1992.

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

Instructor: Andrew P. Sage, Office: STII, Room 311, Phone: 703-993-1506, Fax: 703-993-1521 Email: asage@gmu.edu, Office Hours by Appointment.

Course Call Numbers SYST 619 001 (10520), Also at BAE Systems as sect 617, IT 850 001 (16835), ECE 672 (16834) Spring 2006 Thursday from 4:30 PM to 7:10 PM in Room IN 131 (Innovation Hall).

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 systems architecting and integration, including a written report, and weekly assignments.

SYST 617, ECE 672, IT 850 - Detailed Syllabus and outline, by dates (subject to change) – Spring 2006

1. An Overview of Architecture Based Systems Engineering, Introduction to WebCT – 26 January 2006
2. Architectural Frameworks and Architecture Development Processes I – 2 February 2006
3. Architectural Frameworks and Architecture Development Processes II, 9 February 2006
4. Architectural Issues in Engineering System Families (System of Systems), 16 February 2006
5. System Family Integration and Architecture Frameworks I, 23 February
6. System Family Integration and Architecture Frameworks II, 2 March
7. DOD Series 5000 and JCS 3170, DODAF, JTA , MODAF– the three views, 9 March
8. No Class 16 March – Mid Term Break
9. COTS and Cost Estimation in Systems Architecting and Integration I, 23 March, Mid Term due 23 March
10. COTS and Cost Estimation in Systems Architecting and Integration II, 30 March
11. Architecting and Integration in a System of Systems, 6 April
12. Case Studies in Architecting and Systems Integration, 13 April
13. Architecture and Integration in Capability Based Planning, 20 April
14. Path Dependence, Network and Complex Adaptive System Architecting and Integration I, 27 April
15. Network and Complex Adaptive System Architecting and Integration II, term paper report due, 4 May
16. Final exams due 11 May.

APS. 10 February 2006