SYST 619 / ECE 672 / IT 850Introduction to Architecture Based Systems Engineering. (3:3:0).
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

Course Call Numbers SYST 619 001 (Fairfax- 70128) (NSWC-Unknown) , ECE 672 001 72492, IT 850 001 72493, Fall 2005 Tuesday from 4:30 PM to 7:10 PM in Room IN 131 (Innovation Hall).

Grades: 50% - examinations; 20% - term paper and presentation; 30% - home assignments. Two take home exams will be given. There will be a term paper assignment, including a written report and oral presentation, and weekly assignments. Presentation: Each student will give a seven (7) minute formal oral presentation and prepare a term paper in the general area of systems architecting and integration.

SYST 617, ECE 672, IT 850 - Detailed Syllabus and outline, by dates (subject to change) – Fall 2005

1. An Overview of Architecture Based Systems Engineering, Introduction to WebCT – 30 August
2. Architectural Frameworks and Architecture Development Processes, 6 September
3. Architectural Issues in Engineering System Families (System of Systems), 13 September
4. System Family Integration and Architecture Frameworks I, 20 September
5. System Family Integration and Architecture Frameworks II, 27 September
6. System Family Integration and Architecture Frameworks III, 4 October
7. No Class 11 October – Columbus Day Class Shift
8. DOD Series 5000 and JCS 3170, DODAF, JTA , MODAF– the three views, 18 October
9. The Architecture Development and Evaluation Process, 25 October, Mid Term exams due 25 October
10. COTS and Cost Estimation in Systems Architecting and Integration, 1 November
11. Architecting and Integration in a System of Systems, 8 November
12. Case Studies in Architecting and Systems Integration, 15 November
13. Architecture and Integration in Capability Based Planning, 22 November
14. Path dependence, Network and Complex Adaptive System Architecting and Integration, 29 November
15. Term paper presentations, term paper report due, 6 December
16. Final exams due 13 December.

APS. 28 June 2005