SYST 619 / ECE 672 Introduction to Architecture Based Systems Engineering. (3:3:0) Spring 2011
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, interoperability concerns, the Lead Systems Integrator. 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, 2009, 2nd Edition. (suggested)
> Sage, A. P., ***Systems Management for Information Technology and Software Engineering***, John Wiley and Sons, New York, 1995. (suggested)
> Sage, A. P., ***Systems Engineering***, John Wiley and Sons, 1992. (suggested)

A plethora of contemporary literature, available on the Internet concerning systems integration and related issues in architecting for systems integration. This 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 Blackboard will be operational and also put to much use.

Instructor: Andrew P. Sage, Office: School of Engineering, Room 2240, Phone: 703-993-1506, Fax: 703-993-1521 ,Email: asage@gmu.edu, Office Hours by Appointment.

Course Call Numbers SYST 619 001 11917, ECE 672 001 11924 Spring 2011 Thursday from 4:30 PM to 7:10 PM in Room IN 131.

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 619, ECE 672 Detailed Syllabus and outline, by dates (subject to change)
 1. An Overview of Architecture Based Systems Engineering, Introduction to Blackboard - 27 January 2011
 2. Architectural Frameworks and Architecture Development Processes I – 3 February 2011
 3. Architectural Frameworks and Architecture Development Processes II - 10 February 2011
 4. Architectural Issues in Engineering System Families (System of Systems), 17 February 2011
 5. System Family Integration and Architecture Frameworks, 24 February 2011
 6. DOD Series 5000 and JCS 3170, DODAF, JTA , MODAF– the three views, 3 March 2011
 7. COTS and Cost Estimation in Systems Architecting and Integration I 10 March 2011
 8. No Class 17 March 2011– Mid Term Break
 9. COTS and Cost Estimation in Systems Architecting and Integration II, Mid Term due 24 March 2011
10. Architecting and Integration in a System of Systems, 31 March 2011
11. Case Studies in Architecting and Systems Integration, 7 April 2011
12. Architecture and Integration in Capability Based Planning, 14 April 2011
13. Path Dependence, Network and Complex Adaptive System Architecting and Integration, 21 April 2011
14. Introduction to service Oriented Architectures, 28 April 2010
15. Introduction to service Oriented Architectures II, 5 May 2010, Term Papers due 5 May 2011
16. Final exams due to Blackboard Thursday 12 May 2011
APS 5 November 2010