

THIS MODULAR COURSE CAN BE TAKEN FOR GRADUATE CREDIT TOWARDS A MASTER'S IN SYSTEMS ENGINEERING OR AS PART OF A PROFESSIONAL DEVELOPMENT PROGRAM.

MODULE DESCRIPTION AND OBJECTIVES

This module presents the fundamentals of system architecting, including practical heuristics for developing good architectures. It extends the systems engineering process introduced in SYS/SDOE 625 Fundamentals of Systems Engineering, through functional analysis, decomposition and requirements flow-down. The implications of open systems architectures and the use of commercial technologies and standards (COTS) are explicitly addressed, as are the linkages between the early architectural decisions, driven by customer requirements and the concept of operations, and system operational and support costs. Prerequisite: SYS/SDOE 625.

MODULE ORGANIZATION

The course combines lectures and readings to develop an understanding of the concepts and principles. A team project allows students to integrate their knowledge and apply it in a team environment. The course is designed to facilitate the sharing of experiences among the professionals who participate in the program.

MODULE AUDIENCE

This module completes the explication of the systems engineering process begun in SYS/SDOE 625. It is intended for systems engineers and architects and, together with its prerequisite, provides a sound basis for effective system design and an essential context for more detailed advanced courses in systems engineering tools and techniques.

COURSEWARE

Participants receive a binder containing course notes and additional readings specifically organized for this course, along with a textbook on systems engineering and architecting, and utilize the academic version of a systems engineering tool.

MODULE DIRECTOR

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MODULE REGISTRATION & INFORMATION

Please register early. Space is limited!
For additional information:

Contact **Katherine Connors**, Katherine.Connors@stevens.edu,
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from our website at www.stevens.edu/SDOEenroll and fax it to
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DAY 1	
SESSION 1	Course Overview; Introduction to System Architecture; Strategic Role of Architectures – The architecture metaphor; technology, business, and organizational trends that are increasing system complexity and the importance of architecture to system integrators.
SESSION 2	Review of SE Fundamentals – Review of the systems engineering process from customer needs to system requirements; benefits of a disciplined systems engineering process; introduction of the hands-on case study that students will model during the class.
DAY 2	
SESSION 3	Developing the Functional Architecture – Overview of the architecture process and developing a logical architecture; scenario tracing.
SESSION 4	Functional Architecture Tradeoffs – Extending the decomposition process; architectural considerations and tradeoffs.
DAY 3	
SESSION 5	Developing the Physical Architecture; Interface Architectures – The distinction between functional and physical architectures; developing a physical architecture that implements a logical design; the role and importance of interfaces; specifying an interface architecture.
SESSION 6	Completing the System Model; Functional Modeling – Integrating functional and physical views into a comprehensive system model, linking requirements to models and the flow-down of requirements to every level of the system design; building and using executable functional models.
DAY 4	
SESSION 7	Architecture Assessment; Object Oriented Methods; Architecture Frameworks – Characteristics of a good architecture, architectural metrics, examples of system architectures and trade-offs; Object Oriented design and its relation to functional decomposition; the Zachman, DoDAF and other frameworks for describing system architectures.
SESSION 8	System Integration and Testing; Completion of the Hands-On Case Study – The qualification process and its relationship to requirements development; preparation of PDR presentations for the in-class projects.
DAY 5	
SESSION 9	Preliminary Design Review (PDR) – Presentations by each project team of a modified PDR for their in-class case study.
SESSION 10	Course Evaluation and Wrap-up