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**The SDOE Program**

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The Fellows serve in an advisory capacity with regard to curriculum development, program design, doctoral committees, research and project ideas, and program assessment.

GRADUATE CERTIFICATE IN

# SYSTEMS & SUPPORTABILITY ENGINEERING

LEADING TO A MASTER'S DEGREE IN

## SYSTEMS ENGINEERING

An offering of the SDOE Program at  
Stevens Institute of Technology

With an increasing percentage (often 65% or more) of the system life cycle cost being allocated to operations and support, there is urgency about exploring "cause and effect" relationships between design decisions and their operational and support related impacts. System and product robustness and sustainability become key. The notion of "open" system architectures becomes an imperative with increasing use of commercial system elements and common platforms.

This four course cluster addresses innovative methods and practices to integrate system reliability, maintainability, and supportability considerations into the systems engineering process. On the other hand, methods to optimize necessary logistics resources and processes is critical and is also studied in this sequence of courses. Current business trends are discussed and assessed. The courses have a significant "how-to" orientation and case studies and group exercises are used to facilitate understanding of concepts discussed.

[www.stevens.edu/sdoe](http://www.stevens.edu/sdoe)



SDOE 625

System Operational Effectiveness and Life Cycle Analysis

This module presents the fundamental principles and processes for designing effective systems, including how to determine customer needs, how to distinguish between needs and solutions, and how to translate customer requirements into design specifications. The focus is on designing systems that not only provide the required capabilities, but that are reliable, supportable and maintainable throughout their life-cycle. The course concludes with a Systems Requirements Review (SRR) in which students present their class projects.

SDOE 650

System Architecture and Design

This module presents the fundamentals of system architecting, including practical heuristics for developing good architectures. It extends the systems engineering process introduced in SDOE 625 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: SDOE 625.

SDOE 640

System Supportability and Logistics

This module addresses the development and optimized allocation and location of the numerous elements of system logistics support to ensure that a system satisfies its business and operational readiness requirements and effectiveness. Particular focus is placed on the concept of integrated supply chain and demand management, and the optimization and allocation of a system's logistics resources to ensure maximum availability at the lowest investment in logistics resources. Participants will also be introduced to the latest thinking and technologies with regard to system training, documentation, inventory management, and transportation.

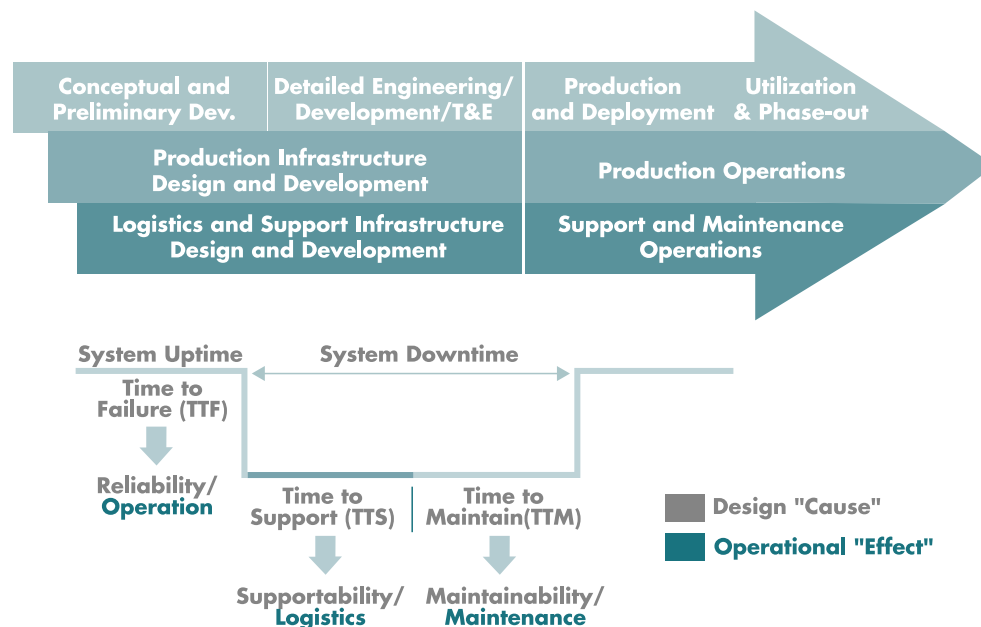
SDOE 645

Design for System Reliability, Maintainability, and Supportability

Module participants will be exposed to the latest trends and concepts in complex system design for reliability, maintainability, and supportability. Supportability issues pertaining to COTS-intensive systems through practices such as technology refreshment will also be specifically focused. All phases of the system design and development process (requirements definition through detailed design) will be addressed, including the opportunities available to influence the system for reliability, maintainability, and supportability. Software intensive systems will also be addressed in the instructional process.

Intended Audience

This course sequence would be of interest to reliability and maintainability engineers, ILS engineers and analysts, logistic support analysts, systems engineers, system analysts, logisticians, and cost engineers.



The Graduate Certificate in Systems and Supportability Engineering can be used as a stepping stone towards a Master's Degree in Systems Engineering. The Master's Degree in Systems Engineering requires 10 courses (equivalent to 30 credits). At least 3 credits, and up to 6 credits, must be applied towards a project or a thesis.

Required Courses

Required Courses for the Systems and Supportability Engineering Graduate Certificate (4 courses, 12 credits)

- SDOE 625: System Operational Effectiveness and Life Cycle Analysis
- SDOE 650: System Architecture and Design
- SDOE 645: Design for System Reliability, Maintainability, and Supportability
- SDOE 640: System Supportability and Logistics

Required Courses to complete "core course" requirements for a Master's Degree in Systems Engineering. Candidates need to complete **two** of the following four options:

- SDOE 605: System Integration **or** SDOE 606: Accelerated Systems Integration and Testing
- SDOE 655: Robust System Design **or** SDOE 660: Decision and Risk Analysis
- SDOE 611: Modeling and Simulation **or** SDOE 670: Forecasting and Demand Modeling Systems
- SDOE 612: Project Management of Complex Systems

Elective Courses

Applicable Elective Courses (up to 3 elective courses can be selected by the candidate)

- SDOE 775: Systems Thinking
- SDOE 665: Integrated Supply Chain Management
- MGT 702: Technology Management (Online Course)
- MGT 610: Strategic Project Management (Online Course)
- SDOE 780: Engineering of Agile Systems and Enterprises

The electives listed here are for illustrative purposes only. Additional electives from other engineering disciplines and management are also available to students. Please see the SDOE Program website for a listing at [www.stevens.edu/sdoe](http://www.stevens.edu/sdoe). Selection of electives must be approved and coordinated with the faculty advisor

Project or Thesis Courses

The candidate has the option of working on a project (3 to 6 credit hours) or a thesis (minimum of 6 credit hours) to complete the requirements for a Master's Degree in Systems Engineering. Project or Thesis work must be coordinated with a faculty advisor.

- SDOE 800: Special Topics in Systems Engineering** (3 to 6 credit hours for a Project), **or**
- SDOE 900: Thesis in Systems Engineering** (Minimum 6 credit hours for a Thesis)

All courses in the SDOE Program are taught in a modular format and many are also taught in an online format.

Modular Format

**Pre-Module Readings:** Candidates will receive module related readings in advance as preparation for the module week.

**Module Week:** Intense week-long lectures and group exercises

**Module Homework Assignment and Project (10 Weeks):** Candidates have 10 weeks to complete the Module Homework Assignment and Project. Faculty support is provided during these 10 weeks.

Online Format

Online courses are run in an asynchronous format. Candidates are often required to collaborate with each other and to complete weekly assignments. Online courses run on a traditional semester schedule spread over 15 weeks.