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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

# AGILE SYSTEMS & ENTERPRISES

LEADING TO A MASTER'S DEGREE IN

## SYSTEMS ENGINEERING

An offering of the SDOE Program at  
Stevens Institute of Technology

More and more, systems today must show new agile capabilities for effective response in the face of continual change. Enterprise thrives only while it mirrors the environment it serves. Products lead only while they fit new demands better than others. Process serves only while it delivers new performance as needed. Integration works only while it meets new expectations.

Real-time responsiveness characterizes systems at the forefront of competition, enterprise, strategy, warfare, governance, innovation, engineering, information, integration, and virtually anything designed today for purpose. These and other systems are the focus of case studies, exercises, and course projects configured in response to participant needs and interests.

Agile systems dance with the environments they serve and live in; leading sometimes, following other times, but always dancing. Agile systems don't skip a beat when the music changes, when the tempo changes, when the dance-of-the-day changes, when the venue changes. And they are the partner of choice – they dance with élan, they are the source of energy and synergy.

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

**STEVENS**  
Institute of Technology

SDOE 775

Systems "Thinking" Integrating Paradox, Perspectives, and People

Agile systems and enterprises are the product of thinking that envisions systems holistically – in harmony with their environments, in existence across time, in service to a purpose, and in useful tension with the changing forces of reality. This module provides a fundamental underpinning for organized thought, drawing the practitioner toward insightful vision and strategy; building a solid conceptual foundation for defining, conceiving, and realizing agile systems and enterprises of all kinds.

SDOE 780

Engineering of Agile Systems and Enterprises: Fundamentals of Analysis, Synthesis, and Performance

Agile systems and enterprises are created and enabled by architectures, principles, and operational practices that facilitate responsive configuration and reconfiguration in the continual face of changing needs. This module introduces tools for analyzing and establishing response requirements and performance metrics; and engineering principles for synthesizing architecture and operational practices.

SDOE 785

Architecting the Extended Enterprise: Human-Activity Systems of Systems

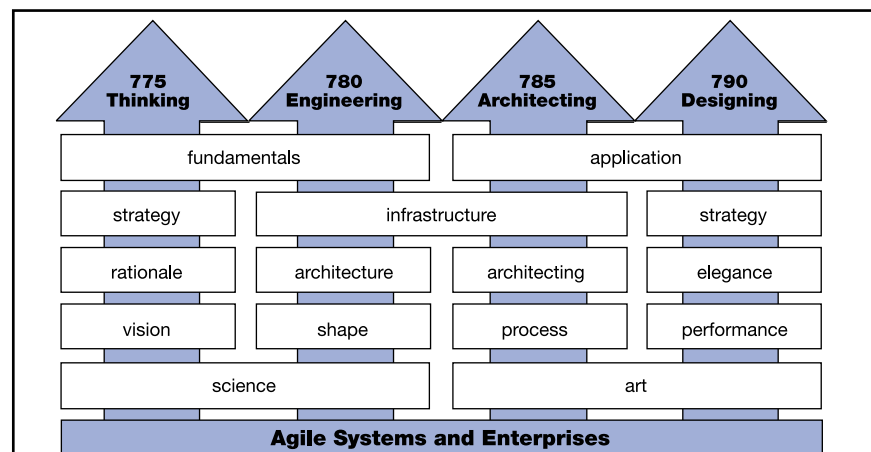
Agility enables the extended enterprise, where purpose is achieved when multiple independent units respond effectively to common opportunity and common threat. This module explores the process and purpose of architecting the extended enterprises, from pick-up teams to alliance networks, from business process to corporate strategy, from local issues to global concerns.

SDOE 790

Design of Agile Systems and Enterprises: Design Quality and Self Organizing Systems

Esthetic quality in systems and enterprises makes the difference between enforced compliance and embraced experience; and determines the positive or negative vectors of self organization and emergence. This module explores the value and nature of esthetic design quality, principles and architectures for harnessing self organized extended enterprise, agility as risk management and reality confrontation, and similar issues at the edge of agile system and enterprise knowledge.

This certificate in Agile Systems and Enterprises integrates four complementary courses. One common theme throughout defines enterprise as a human activity system. Another defines agile systems as those responding effectively to unpredicted situations, at all times, within mission. These common themes facilitate a study of agility across a seemingly wide variety of interesting system types, with the lines of difference blurred as each informs the other. The frontier of systems engineering today seeks new levels of system capability and behavior, and expects to find those benefits in higher forms of systems that elude traditional control and creation concepts.



Intended Audience

*This graduate certificate is relevant to engineers, managers, and decision makers in commercial, healthcare, financial and insurance, and defense domains working with systems that must thrive in a dynamic unpredictable environment - especially if they are system of systems or enterprise systems. The graduate certificate and the constituent courses first build a theoretical and philosophical basis for understanding and formulating the interactive and interdependent problem and solution spaces, and then suggest pragmatic and executable approaches to realize the enterprise potential.*

The Graduate Certificate in Agile Systems & Enterprises 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 Agile Systems & Enterprises Graduate Certificate (4 courses, 12 credits)

SDOE 775 Systems Thinking

SDOE 785 Architecting the Extended Enterprise

SDOE 780 Engineering of Agile Systems and Enterprises

SDOE 790 Design of Agile Systems and Enterprises

Required Courses to complete core course requirements for a Master's Degree in Systems Engineering.

The above 4-course sequence satisfies two of the four core course requirements for a Master's Degree in Systems Engineering. In addition, candidates must take SDOE 625: System Operational Effectiveness and Life Cycle Analysis and SDOE 650: System Architecture and Design to complete the core course requirements.

Elective Courses

Applicable Elective Courses (up to 5 elective courses can be selected by the candidate)

SDOE 680: Designing and Managing the Development System

SDOE 612: Project Management of Complex Systems

SDOE 665: Integrated Supply Chain Management

SDOE 640: System Supportability and Logistics

SDOE 611: Modeling and Simulation

SDOE 645: Design for System Reliability, Maintainability, & Supportability

SDOE 670: Forecasting and Demand Modeling Systems

*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.