Department of Systems Engineering

Objectives

Systems engineering is an interdisciplinary field of systems engineering, focusing on the design, modeling, interconnection, and management of large complex systems. In addition to the methods of traditional engineering, systems engineering relies on skills and expertise in areas such as optimization, simulation, economics and finance, risk management, and decision making under uncertainty. These skills come together to address the challenges of designing and managing complex interconnected systems, ranging from an automobile or an airplane to communication systems, financial markets, the power grid, and many more.

The Department of Systems Engineering at UT Dallas focuses research and curriculum in the fundamentals of systems engineering and management, with applications in interdisciplinary areas of interest to industry, such as energy systems, financial engineering systems, software systems, healthcare systems, cybersecurity systems, control and mechatronic systems, and others. In so doing, the Department of Systems Engineering offers an MS degree in Systems Engineering and Management (MS-SEM), a joint program with the UT Dallas Naveen Jindal School of Management. The program brings together faculty and disciplines from the engineering and management schools into a single program that has traditional and executive education formats.

Research

While many diverse areas of research and curriculum are represented by the core faculty and affiliated faculty in the Department of Systems Engineering, we identify with a few basic, core areas of concentration which combine graduate level research and curriculum:

- Control Systems and Mechatronic Systems
- Computational Cancer Biology
- Energy Systems
- Compressed Sensing

Other curriculum-centric concentration areas in our Systems Engineering and Management (MS-SEM) program are possible research focus areas. In keeping with the established tradition of research at UT Dallas, the Systems Engineering Department, through its research efforts and its MS-SEM degree program, encourages students to interact with researchers in other programs in the Erik Jonsson School of Engineering and Computer Science and the Naveen Jindal School of Management, including computer science, electrical engineering, mechanical engineering, bioengineering, computer engineering, operations management, finance, marketing, innovation and entrepreneurship, and business management.
Department Faculty

**Professors:** Mark W. Spong, Lakshman Tamil, Mathukumalli Vidyasagar, W. Eric Wong, Steve Yurkovich  
**Associate Professor:** Lawrence Chung  
**Assistant Professor:** Robert D. Gregg  
**Senior Lecturers:** Nhut Nguyen, Janell Straach  
**Affiliated Faculty:** Matthew Durchholz, Bhanu Kapoor, Alixandre Minden

The Systems Engineering and Management MS-SEM is a joint program offered by the Erik Jonsson School of Engineering and Computer Science and the Naveen Jindal School of Management. Features are:

- Two program formats
  1. Executive Master's - with classes offered on weekends only for those in the workforce  
  2. Traditional Master's - with classes offered on weekdays  
- Flexible choice of core courses in both engineering and management disciplines.  
- Elective courses for concentrations in various industry sectors.  
- Qualifying students may enter the program in the spring, summer or fall semester.  
- Program may be completed in 18 to 24 months with typical course load.  
- Opportunity for pursuing combined MS-SEM and MBA in a Dual Degree Program.

More information is available under the MS-SEM link.

Apart from the MS-SEM program, the Department of Systems Engineering offers several courses that may be included in a MS-SEM concentration or taken by students in other disciplines:

- **SYSE 6321** Systems Integration  
- **SYSE 6322** Digital Control of Automotive Powertrain Systems  
- **SYSE 6323** (EECS 6323, MECH 6323) Robust Control Systems  
- **SYSE 6324** (BMEN 6388, EECS 6336, MECH 6313) Nonlinear Systems

Certificate Program

The volume and sophistication of cybersecurity threats point to a critical demand for research and education in the general area of cybersecurity, which is highly interdisciplinary by nature. Elements from computer science, systems engineering, and information technology management form the basis for systems-related technologies to secure typical vulnerabilities. In addressing this growing critical demand, the Certificate in Cybersecurity Systems (CCSS) offered at UT Dallas provides a joint program between the Erik Jonsson School of Engineering and Computer Science and Naveen Jindal School of Management (internal audit and information technology management), with a natural home in the Department of Systems Engineering (SYSE).
Graduate Certificate in Cybersecurity Systems (CCSS)
12 semester credit hours

Faculty

Faculty and lecturers for the courses in this certificate program are drawn from the Department of Computer Science and the Department of Systems Engineering in the Erik Jonsson School of Engineering and Computer Science, and from the Naveen Jindal School of Management.

Overview

The CCSS requires 12 semester credit hours, and may be combined with other courses and/or certificates toward an MS degree, such as Computer Science, Information Technology and Management, or Systems Engineering and Management, provided that the student has gained admission into that particular program. To earn the certificate, students in the program must take four courses with an overall GPA of 3.0.

Required Course for all tracks: MIS 6311 Cybersecurity Fundamentals (3 semester credit hours)

Track #1: Computer Science (CS) Emphasis (9 semester credit hours)

Choose three courses from the following:
- CS 6324 Information Security
- CS 6349 Network Security
- CS 6348 Data and Applications Security

Or a course from a list of existing cybersecurity systems in Computer Science courses (offered periodically, and must be approved)

Track #2: Internal Audit, Information Management (IA/IM) Emphasis (9 semester credit hours)

- MIS 6330 Information Technology Security
- ACCT 6336 Information Technology Audit and Risk Management

Choose one course from the following:
- ACCT 6380 Internal Audit
- MIS 6363 Cloud Computing

Track #3: Systems Engineering and Management Emphasis (9
semester credit hours)

- **MIS 6330** Information Technology Security
- **SYSM 6301** Systems Engineering, Architecture and Design (Required)

Choose one course from the following:

- **CS 6324** Information Security
- **MIS 6330** Information Technology Security

Choose one additional course from the following:

- **CS 6348** Data and Applications Security (CS track)
- **CS 6349** Network Security (CS track)
- **MIS 6363** Cloud Computing (CS track)
- **ACCT 6336** Information Technology Audit and Risk Management (IA/IM track)
- **ACCT 6380** Internal Audit (IA/IM track)