

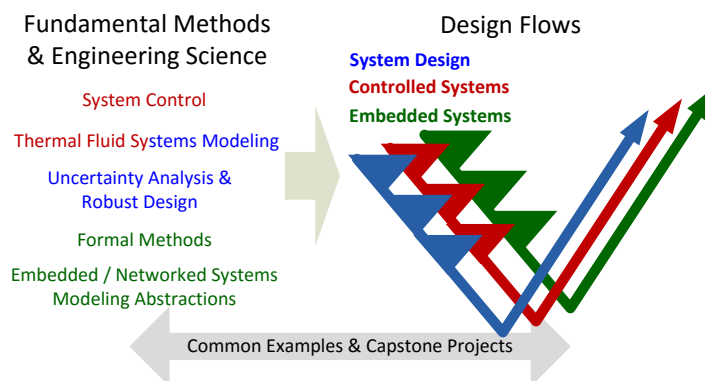


Graduate Certificate in Advanced Systems Engineering

Systems Design Track

Motivated by the digital revolution and the need to produce high quality products in a globally competitive economy, we aim to train engineers in urgently needed areas of advanced systems engineering. Advanced Systems Engineering brings together model based engineering and interdisciplinary themes into a requirements and architecture centric environment where new levels of systems understanding can be achieved.

The Institute curriculum decomposes the system development process into three overlapping design flows, 1) System Design, 2) Controlled Systems, and 3) Embedded Systems.



The curriculum includes three certificate tracks that are organized around each of these design flows. Each certificate program will begin with two courses in Fundamental Methods and Engineering Science followed by a Design Flow course.

The 4-course or 12-credit System Design Certificate program will build competency in advanced systems engineering related to system modeling, uncertainty analysis and robust design, and standard design work flows of physical systems. Courses are sequenced to allow students to establish a solid understanding of the pillars for requirements analysis, architecture selection, model-based development methods and tools, and design flows. These are first applied to a course on physical systems modeling and followed by a course on uncertainty analysis and robust design of physical systems. The third course is designed to provide students with the platform-based design flows for robust design of physical systems. The final capstone project design course will provide an opportunity for the student to implement and reinforce the learning from the courses to a real-world problem.

Application Requirements

Advanced Engineering Certificate students are admitted to the graduate school. The following documents must be submitted to the graduate school:

- Application – [Online](#)
- Transcripts – Uploaded and sent directly to graduate school
- Resume – Uploaded and sent directly to graduate school
- Residence Affidavit – Uploaded and sent directly to graduate school
- One Letter of Recommendation (e.g. Supervisor)



Course Descriptions

The Systems Design Certificate program is comprised of the following four courses:

SE 5101: Foundations of Physical Systems Modeling

<http://utc-iase.uconn.edu/education/course-descriptions/se-5101/>

This course is designed to provide students with the foundations of physical systems modeling and computational methods for performance analysis. Students will develop skills in fundamental physical and mathematical representations as well as architecture and design of fluid dynamics, thermodynamics, electro-mechanics, and propulsion systems. Emphasis is placed on the modeling of such systems in the equation oriented programming environment of the Modelica language, and the utilization of these models within the Functional Mockup Interface for co-simulation and Model Exchange. Relevant examples from industry are used to demonstrate the theoretical and modeling aspects of physical system modeling.

SE 5102: Uncertainty Analysis, Robust Design and Optimization

<http://utc-iase.uconn.edu/education/course-descriptions/se-5102/>

This course is designed to provide students with a thorough understanding of platform-based and model-driven methods for uncertainty analysis and robust design of physical systems. Topics include modeling of uncertainties, sensitivity analysis, robust design analysis methodologies (DFSS, IDOV), and critical parameter management (CPM).

SE 5103: Design Flows for Robust Design

<http://utc-iase.uconn.edu/education/course-descriptions/se-5103/>

This course is designed to provide students with the platform-based design flows for robust design of physical systems. The student will develop skills in requirements analysis of physical systems, architectural selection, model-based system design, and verification and validation at various model abstraction levels. Special emphasis will be placed on development processes spanning system design and the requirements validation analyses (Sizing & Performance, Robustness, Dynamics & control, and Safety).

SE 5195: Capstone Projects for Systems Design

This project course is designed to provide students with a thorough understanding of physical systems modeling and design through a comprehensive capstone project. These projects will be practical and relevant to industry needs.

Course Information

All courses are comprised of 14 sessions. Each session is 3 hours long and typically meets once a week. All courses are also available to remote students for online study (synchronous and asynchronous options).

Contacts

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