

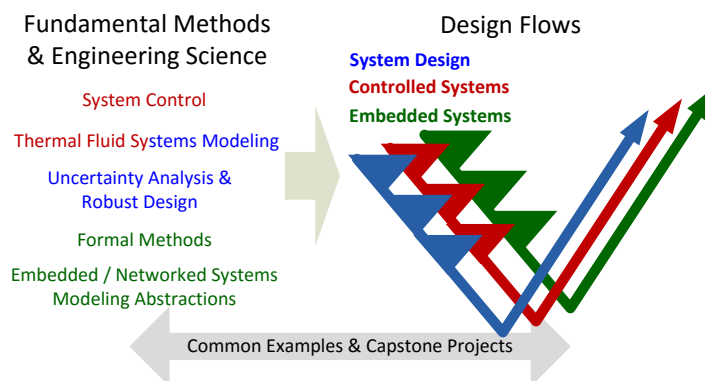


Graduate Certificate in Advanced Systems Engineering

Embedded Systems 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 Embedded Systems Certificate program will build competency in advanced systems engineering related to embedded software intensive systems within a larger integrated system (e.g., a computational system that implements part of control architecture in a networked thermal fluid system such as a building climate management system). The two foundational courses will develop student's skills in embedded systems modeling and analysis as well as formal methods as used in verification and validation. The third design flows course will take students from the requirements analysis of an embedded system through architectural selection (hardware/software), platform-based embedded system design to finally close with verification and validation of the system. 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 Embedded Systems Certificate program is comprised of the following four courses:

SE 5301: Embedded/Networked Systems Modeling Abstractions

<http://utc-iase.uconn.edu/education/course-descriptions/se-5301/>

This course is designed to provide students with a thorough understanding of the abstractions and principles required to model embedded and networked systems. Topics include cyber-physical systems, platform-based design, heterogeneous design, hardware-software co-design, real-time operating systems. Examples are driven by control systems, thermal fluid systems, and electro-mechanical systems.

SE 5302: Formal Methods

<http://utc-iase.uconn.edu/education/course-descriptions/se-5302/>

This course is designed to provide students with an introduction to formal methods as a framework for the specification, design, and verification of software-intensive embedded systems. Topics include automata theory, model checking, theorem proving, and system specification. Examples are driven by thermal fluid systems and electro-mechanical systems.

SE 5303: Design Flows for Embedded / Networked Systems

<http://utc-iase.uconn.edu/education/course-descriptions/se-5303/>

This course is designed to provide students with a thorough understanding of the design, verification, and validation of embedded/network systems and software-intensive systems. The student will develop skills in specifying requirements for embedded software systems, model based architecture and design, and verification and validation of embedded systems. Special emphasis will be placed on distributed embedded systems and real-time systems. Examples are driven by thermal fluid and electro-mechanical systems.

SE 5395: Capstone Projects for Embedded Systems

This project course is designed to provide students with a thorough understanding of all embedded system modeling, design, and verification 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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