Graduate Courses in Systems Engineering
SE 5402 Architecture of IoT

What’s Exciting About this Course? Applying the knowledge of systems engineering principles, processes, and methods to design embedded and networked systems. Understanding the constraints, requirements, architectures of hardware and software in cyber-physical systems.

Course Description. 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. The platform-based design (PBD) flow will be used as the common thread through the course. Examples are driven by cyber-physical systems.

Course Outcomes

- Develop several hardware, software, and network architectures for a given embedded system.
- Evaluate the cost, power, and performance tradeoffs associated with each architecture.

Topics: Foundations of microarchitectures, x86 assembly language, cost and power constraints, FPGAs and ASICs, programmable logic controllers, foundations of real-time operating systems, worst case execution time (WCET), ISO stack for networking, network protocols like TCP/IP, UDP, ATM, protocols for embedded systems like ZigBee, ZWave, CAN, TTP, distributed computing protocols like Chord and Pastry.

Course Objectives and Links to Overall Program Goals

Students can design, develop, and integrate embedded and networked systems into complex cyberphysical systems. With the emergence of the Internet of Things, this course prepares engineers to design systems that satisfy stakeholder needs, while taking into account the complexity of new interfaces and interactions.