ECE 6561 – Computing for Control Systems

Topical Outline

Introductory Topics in Controls
- Principles of Feedback Control
- Standard Control Architectures

Implementation Issues
- Stability and Effect of Time Delays
- Common I/O models
- Sensor Processing

Advanced Control Concepts
- Hybrid Systems

Introductory Topics in Software Engineering
- Software Reuse
- Object-Oriented Controls
- Component-Based Design

Real-Time Computing for Controls
- Threads and Processes
- Scheduling
- Intertask Communication Methods
- Real-Time Operating Systems

Distributed Computing for Controls
- Network Communication Protocols Suitable for Controls
- Interprocess Communication Models
- Networked Control Systems

Case Studies
- Application of these techniques to process control, robotics, and uninhabited autonomous vehicles.

Projects will be given that include some of the following topics: implementing a multi-threaded control system using a real-time operating system, running control code distributed over a network, designing control of mobile robots using a distributed computing architecture.