

**Meeting time:** Mon/Wed 3:30-4:45pm

**Prerequisites:** ECE 160, ECE 213, ECE 315 - (or equivalents)

**Suggested background (at least one of):** Embedded systems programming; solid modeling and rapid prototyping; feedback control; advanced Python programming; PCB design and layout

### **Come design, build, and deploy a swarm of robots.**

In this fast-paced upper division course, we will work collaboratively to develop a swarm of small-scale robots from the ground up. Working largely in groups, you will design, prototype, and build robotic subsystems (e.g., power management, computation and communication, mobility, perception) which can be integrated into a single flexible platform. Using state-of-the-art robot simulation and coordination frameworks (Gazebo, ROS2), we will build several of these platforms and deploy them as a “swarm.”

You can expect a combination of traditional lectures to provide background on relevant topics and techniques, studio-based sessions with instructor-facilitated small group work, and student-run skill-sharing workshops and subsystem design reviews. Grading will be based largely on project group peer evaluations, in-class presentations, and a final technical report.

This course provides hands-on experience engineering end-to-end systems, with an emphasis on key skills for industry jobs: mechatronics, embedded systems, programming, advanced digital manufacturing, wireless communication, and more. You will also develop important “soft skills” for working as part of a modern engineering team, including project management, technical content delivery, and pedagogical methods.

**Note:** Capable upper-level undergraduates welcome with instructor approval. This course can be substituted for an undergraduate TE or counted towards a future MS degree with departmental approval.

