

# ECE 492-040 and ECE 592-063

## Introduction to Autonomous Systems

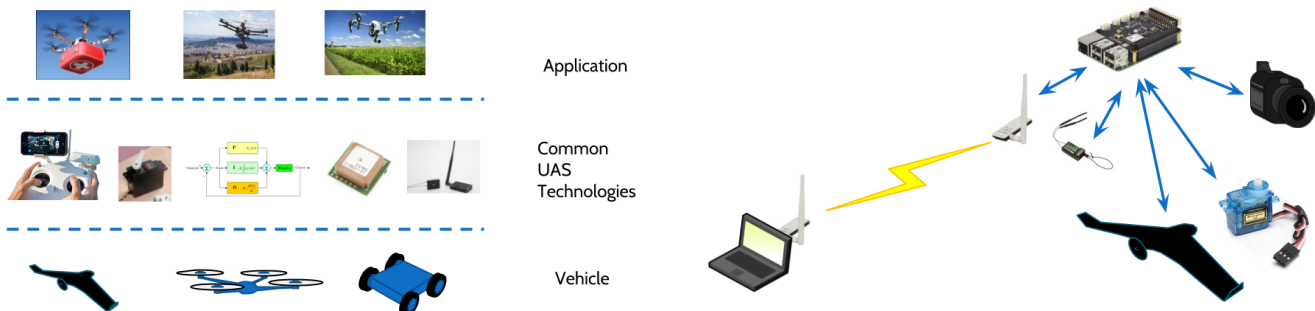
**Instructor:** Mihail L. Sichitiu, <mlsichit@ncsu.edu>

**Objective or Description:** The goal of the course is to teach the students how to design a small UAV system (aka “drone”). Starting from an application (e.g., “find a lost person”), design an UAV that is able to complete the mission specified in the application (e.g., scan the entire search area with a video camera, use image recognition to find the person and land next to the person with a rescue package). The lectures focus on the technologies necessary for designing such a system, including autopilots, programming applications for UAVs, computing wireless link budgets, as well as designing the vehicles themselves (multirotors, and fixed wing aircrafts). The projects involving teams puts the theory into practice.

**Prerequisites:** programming experience is required for at least a few of the team members. Ability to pilot a remote controlled small UAV (multirotor or fixed wing) is also very helpful. Knowing which way a screw is tightened is welcome, and soldering is often required. Not all skills need to be mastered by all students (one per team is enough).

**Textbook:** None.

**Topics:** Autopilots, programming UAV applications, propulsion (motors, engines, propellers, batteries), fixed wing and multirotor aircraft design, wireless link design



**Grading:** Homework: 10%, Project: 30%, Midterm exam: 30%, Final exam: 30%.

**Cross-listing in other departments:** None

**Include anything else that is unique to the course - this information will be posted on the ECE Current Graduate/Undergraduate Student Portals for all students to view**

The project in the course is a great opportunity to learn hands on how to build a drone, design a power scheme, program an embedded system, program a small linux computer (usually more powerful than a Raspberry Pi), etc. On the other hand, it is very demanding in terms of time you need to spend on the course, so make sure you take it in a light semester, so you have the time to put in the project, or else you'll fail your team, and likely the course.