

**Hellen and John C. Hartmann Department of Electrical and Computer Engineering
New Jersey Institute of Technology**

ECE 439: Control Systems Laboratory; 2 Credits and 4 contact hours

Course Coordinator: Bernard Friedland

Course Text Material: Lab manual is on-line at <http://coefs2.njit.edu/>

Specific course information: Laboratory work in the design and synthesis of control systems, closely coordinated with the control systems elective ECE432

Prerequisites or co-requisites: ECE 431
Required for Controls Track students.

Course Learning Outcomes:

1. Student will recognize functionality and structure of hardware components used in closed-loop control systems.
2. Student will be able to design, implement in hardware, and test a closed-loop feedback control system.
3. Student will be able to program an embedded microprocessor for use in a real-time feedback control system
4. Student will be able to make a technical presentation on the design of control system experiments, acquired data, and their analysis.

Relevant ABET Criterion 3 Student Outcomes:

1. an ability to identify, formulate, and solve complex engineering problems by applying principles of engineering, science, and mathematics (CLO 1-4);
2. an ability to apply engineering design to produce solutions that meet specified needs with consideration of public health, safety, and welfare, as well as global, cultural, social, environmental, and economic factors (CLO 1-4);
3. an ability to communicate effectively with a range of audiences (CLO 4);
5. an ability to function effectively on a team whose members together provide leadership, create a collaborative and inclusive environment, establish goals, plan tasks, and meet objectives (CLO 1-4);
6. an ability to develop and conduct appropriate experimentation, analyze and interpret data, and use engineering judgment to draw conclusions (CLO 1-4)

Brief list of topics to be covered

1. Familiarization with hardware to be used.
2. Introduction to programming of imbedded computer (Arduino)
3. Testing operation of sensors.
4. P, PI, PID control of linear motion of rover
5. Programming for autonomous trajectory following
6. Testing of autonomous trajectory following.

The Honor Code

Students should be familiar with NJIT Honor Code. This code will be rigorously upheld, any violations will be brought to the immediate attention of the administration.