

1. Course number and name

**ECE 439: Control Systems Laboratory**

2. Credits and contact hours

2 Credits and 4 contact hours

3. Instructor's or course coordinator's name:

Faculty Coordinator: Bernard Friedland

4. Text material

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

5. Specific course information

a. Laboratory work in the design and synthesis of control systems, closely coordinated with the control systems elective ECE432

b. prerequisites or co-requisites

Prerequisites: ECE 431

Required for Controls Track students.

6. Specific goals for the course

a. Specific outcomes of instruction

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.

b. explicitly indicate which of the student outcomes listed in Criterion 3 or any other outcomes are addressed by the course (see below).

Outcomes	Satisfies Criterion 3 item
1. Hardware familiarization	1
2. Control System implementation	1,6
3. Programming embedded microprocessor	1,6
4. Presentation	2,3

7. 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.