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

FED 101-L56/L57: Fundamentals of Engineering Design for ECE Majors (2-1-2)

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Office hours: Wednesdays and Fridays, 10:00-11:20 or by appointment

Meeting times: Fridays 1:00-2:20, Kupfrian Hall 118
Fridays 2:30-3:50, LSEC 402 (L56), LSEC 401 (L57)

Text: *Laboratory Manual and Supplementary Notes: FED 101 – Freshman Engineering Design, Electrical and Computer Engineering Module*, by John D. Carpinelli, Mohammed Feknous, and Marek Sosnowski (available via the ECE Department Laboratory web page at http://ecelabs.njit.edu.)

There is also a required parts kit for this course. The IEEE store (Faculty 104) sells a parts kit and breadboard for FED 101/ECE 291. They also have spare parts for sale individually.

Description: Teams of students work on open-ended engineering projects. Sections are offered to represent an introduction to real-world engineering design problems in a specific engineering discipline. Topics covered include introduction to basic engineering design elements, processes, measurements, product and project design and development, with hands-on experiments in a specific major area. Students also learn to use engineering tools for computer-aided design and simulation. Technical writing and oral presentation along with project management skills are emphasized. Students are required to take an FED section corresponding to their declared major. Undecided students will be placed in FED sections which best correspond to their interests according to space availability.

Course Outcomes:

1) The student will be able to understand engineering in general and electrical and computer engineering in particular.
2) The student will be able to acquire basic handling capabilities of simple circuits containg resistors, diodes, and transistors.
3) The student will be able to analyze and design basic digital circuits, culminating in a more complex project.
4) The student will be able to research and present a contemporary technological topic in electrical or computer engineering.
5) The student will be able to work in teams enhancing skills in leadership and contribution to a team.

Student Outcomes:

1) an ability to identify, formulate, and solve complex engineering problems by applying principles of engineering, science, and mathematics (CLO 2, 3, 4)
2) an ability to apply engineering design to produce solutions that meet specific needs with consideration of public health, safety, and welfare, as well as global, cultural, social, environmental, and economic factors (CLO 3)
3) an ability to communicate effectively with a range of audiences (CLO 3,4)
4) an ability to recognize ethical and professional responsibilities in engineering situations and make informed judgments, which must consider the impact of engineering solutions in global, economic, environmental, and societal contexts (CLO 1, 3, 4, 5)
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 5)
6) an ability to develop and conduct appropriate experimentation, analyze and interpret data, and use engineering judgment to draw conclusions (CLO 2, 3)
7) an ability to acquire and apply new knowledge as needed, using appropriate learning strategies (CLO 3, 4)

Computer assisted design and course specific software: Multisim, Matlab

Course Schedule:

Week	Topic	Chapter	Experiment
1	Introduction	1	N/A
2	Electricity, Charge, Current, Resistance, Computer Simulation I	2.1-2.3	1
3	Series and Parallel Resistance, Variable Resistors, Kirchoff's Laws	2.4-2.8	2*
4	Transistors and Diodes , Quiz #1	3	4*
5	Computer Simulation	4	3*
6	*How Things Work*	5	
7	*How Things Work*	5	
8	Digital Logic	6	5*
9	More Complex Combinatorial Digital Logic, Quiz #2	6	6
10	Digital Sequential Logic	6	7
11	*Engineering Design Process.* Introduction to Project, Quiz #3	7	
12-14	Project presentations by student teams	7	

* One written report per team is required for these experiments.

Grading Policy:

3 quizzes@10%	30%
Laboratory reports and notebook*	35%
How Things Work**	10%
Project and final report**	25%

**individual effort will be considered in grading of these items. Team work is vital to success.

Attendance is strictly required – three absences may result in failing the course.

Honor Code: The NJIT Honor Code will be upheld, and any violations will be referred to the Dean of Students for disciplinary action.