Course Syllabus

Course Information

Introduction to ECSE		ECSE 1010	Section 01
RPI Fall 2018	4 credits		
Studio	MR	12:00PM-1:50PM	JEC 4104/4107

Course Website: hthttps://www.ecse.rpi.edu/courses/S19/ECSE-1010/

Prerequisites or Other Requirements: None

Instructor

Professor Jeffrey Braunstein
Office Location: JEC 6020 braunj4@rpi.edu
Office Hours: M/R 10:00AM-12:00PM (518) 276-8708

Teaching Assistant(s)

Name	Office	Office Hours	Email Address
TBD	JEC 4201	TBD	@rpi.edu
TBD	JEC 4201	TBD	@rpi.edu

Course Description

The overall goal of this course is to help EE and CSE students build a broad analysis skill set so that through experimentation, simulation and the application of science, mathematics and engineering fundamentals, they can develop useful systems models that enable engineered solutions addressing a broad array of societal needs.

Course Text(s)

None

Supplemental Reference

See https://www.ecse.rpi.edu/courses/S19/ECSE-1010/

Course Goals / Objectives

Develop basic experimental techniques and SPICE-based simulation techniques for circuits and electronics
Introduce the purpose of the core courses in EE and CSE and prepare for the first major assignments in each course.
Develop basic competency in the use of MATLAB or similar tools for data display, analysis and simulation of basic analog and digital circuits.
Develop a broad functional understanding of basic analog and digital circuits.

Explore approaches to making simple modifications of existing electronic projects to expand their application to specific purposes.

Course Content

Instruments and Protoboards
Analog Discovery
Ideal vs Real Circuit Models
Energy Storage Elements
Charging Capacitors and PWM
Capacitive and Inductive Circuits: Filters and Energy Revisited
Diodes
The Exponential Function
Phase
Phasors
MATLAB
MATLAB and Data
Transistors
Amps and Transformers
Building a Transformer
Digital Electronics
Software Control of Hardware
MATLAB Control of Hardware
Projects

Student Learning Outcomes

1. Experimental Methodology: Students will be able to build and make reliable time-dependent measurements of simple analog and digital circuits, exporting data to display and analysis tools (e.g. Excel, MATLAB), and demonstrate understanding of results by describing key data features and comparing with simulation and analysis. Extract useful information from component datasheets.
2. Simulation Methodology: Students will be able to create circuit simulations using a commercial SPICE program and produce reliable voltage and current plots (functions of both time and frequency), exporting simulated data to display and analysis tools and demonstrate understanding of results by describing key data features and comparing with experiment and analysis.
3. Mathematics and Analytic Methodology: Students will be able to apply pre-college circuit knowledge to real circuits, analyze simple circuits based on voltage dividers and inverting/non-inverting op-amps, apply phasor analysis to simple combinations of R, L and C components and apply all analysis skills to demonstrate understanding of experimental and simulated data for simple circuits. Apply the basic matrix arithmetic used in circuit analysis, circuit simulation and in the display and analysis of data using tools like Excel and MATLAB.

4. Design Methodology: Students will be able to modify existing circuit designs for specific applications and fully characterize the operation of the circuit using experimental, simulation and analytic methods.

Course Assessment Measures

Assessment	Due Date	Learning Outcome #s
Exam	3 Per Term	1, 2, 3, 4
Project	2 Per Term	1, 2, 3, 4
Quiz	Daily Except for Exam Days	1, 2, 3
Problem Sets	1 for Each Exp	1, 2, 3
Experiment	Daily except Exam and Project Days	1, 2, 3, 4

Grading Criteria

Quizzes 45%
Experiments 25%
Problem Sets 15%
Attendance 5%
Project 5%
Participation 5%

Attendance Policy

Attendance is required and part of the course grade because students are expected to work together in class.

Academic Integrity

Student-teacher relationships are built on trust. For example, students must trust that teachers have made appropriate decisions about the structure and content of the courses they teach, and teachers must trust that the assignments that students turn in are their own. Acts that violate this trust undermine the educational process. The Rensselaer Handbook of Student Rights and Responsibilities and The Graduate Student Supplement define various forms of Academic Dishonesty and you should make yourself familiar with these. In this class, all assignments that are turned in for a grade must represent the student's own work. In cases where help was received, or teamwork was allowed, a notation on the assignment should indicate your collaboration. Submission of any assignment that is in violation of this policy will result in a penalty of no credit for the assignment. If you have any question concerning this policy before submitting an assignment, please ask for clarification.