ECE2045 Course Syllabus

ECE2045

Practical Skills and Design (0-0-3-1)

CMPE Degree
This course is Required for the CMPE degree.

EE Degree
This course is Required for the EE degree.

Lab Hours
3 supervised lab hours and 0 unsupervised lab hours

Course Coordinator
Kenney,James Stevenson

Prerequisites
ECE2040 or ECE2031 or ECE2035 or ECE2036 (with concurrency)

Corequisites
None

Catalog Description
This course teaches practical skills, such as soldering and prototyping, and introduces students to ECE design.

Textbook(s)
No Textbook Specified.

Course Outcomes
Upon successful completion of this course, students should be able to:

1. Analyze small RLC circuits by hand
2. Use network techniques, like node analysis and loop analysis, to write equations for large linear circuits
3. Apply Thevenin and Norton theorems to analyze and design for maximum power transfer
4. Apply the concept of linearity and the associated technique of superposition to circuits and networks
5. Analyze circuits containing ideal operational amplifiers
6. Measure time constants for first-order circuits
7. Explain the concept of steady state
8. Apply phasor analysis to AC circuits in sinusoidal steady state
9. Analyze the frequency response of circuits containing inductors and capacitors
10. Construct simple Bode plots for first- and second-order circuits
11. Measure frequency responses of circuits.

Student Outcomes
In the parentheses for each Student Outcome:
"P" for primary indicates the outcome is a major focus of the entire course.
“M” for moderate indicates the outcome is the focus of at least one component of the course,

but not majority of course material.
"LN" for "little to none" indicates that the course does not contribute significantly to this outcome.

1. (LN) An ability to identify, formulate, and solve complex engineering problems by applying principles of engineering, science, and mathematics
2. (LN) 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
3. (LN) An ability to communicate effectively with a range of audiences
4. (LN) 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
5. (P) 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
6. (P) An ability to develop and conduct appropriate experimentation, analyze and interpret data, and use engineering judgment to draw conclusions
7. (P) An ability to acquire and apply new knowledge as needed, using appropriate learning strategies.

Topical Outline

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Basic Safety Lab (such as the EHS safety course)
Introduction to Engineering Design (design process, sizing and orde
Microcontroller Hardware Integration (sensor conditioning, working
Soldering (through-hole connections, etc.)
Advanced Soldering (PCB surface mount, etc.)
Wiring Introduction (connectors etc)
PCB CAD and milling
Basic Tools (screwdrivers types, hammers, wrenches etc.)
Power Tools (bandsaws, power drills, grinder belts, circular saws,
3D CAD (3D printing, CNC milling)
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