ECE3043 Course Syllabus

ECE3043

Measurements, Circuits and Microelectronics Laboratory (1-0-3-2)

CMPE Degree
This course is Elective 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
Robinson Jr,Robert Allen

Prerequisites
ECE 3040* [min C] and ECE 2031/20X2 [min C] * Prerequisites indicated with an asterisk may be taken concurrently with ECE3043

Corequisites
None

Catalog Description
Theory and experiments related to the design, analysis, construction, and measurement of elementary passive and active analog circuits using both discrete and integrated devices.

Textbook(s)
Leach, Brewer, & Robinson, *Experiments in Electrical and Analog Electronic Circuits*, Kendall Hunt, 2012. ISBN 0757596517, ISBN 9780757596513 (required)

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

1. Evaluate the performance of basic electrical and analog electronic circuits by using test and measurement instrumentation including dc power supplies, function generators, oscilloscopes, digital multimeters, and RCL meters.
2. Design basic electrical and analog electronic circuits such as amplifiers, filters, rectifiers, and oscillators to meet given specifications.
3. Validate designs and problem solutions by using mathematical and circuit simulation software.
4. Analyze and construct basic circuits and relate expected behavior to experimental measurements.

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. (P) 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. (M) 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. (LN) 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. (M) An ability to acquire and apply new knowledge as needed, using appropriate learning strategies.

Topical Outline

1. Instrumentation: Oscilloscope, Function generator, DC power
2. First-order RC and RL circuits: Transient response (step fu
3. Second-order RLC circuits: Resonance, Step-function respons
4. IC op-amp amplifiers: Noninverting, Inverting, T feedback,
5. IC op-amp differential and instrumentation amplifiers: Diff
6. First-order IC op-amp active filters: Low-pass, High-pass,
7. Second-order IC op-amp active filters: Low-pass, High-pass,
8. IC op amp oscillators: Wien Bridge, Phase shift oscillator,
9. Diodes: Terminal characteristics, Applications for passive
10. Common-emitter amplifier: Biasing, Small-signal behavior, L
11. Common-source MOSFET amplifier: Biasing, Small-signal behav
12. Discrete BJT differential amplifier: Biasing, Differential