ECE 2160 – Electronics 2E

Winter 2015

Course Objectives
To understand the principles, circuit models and applications of amplifiers, real and ideal op amps, diodes and transistors, and to design simple circuits using these components.

Course Content
The following topics will be covered:

- Review of Circuit Theory
- Signals and Amplifiers
- Circuit Models of Amplifiers
- Frequency Response of Amplifier Blocks
- Ideal Op Amps and Applications
- Non-ideal behaviour in Op Amps
- Diode: Real and Ideal behaviours
- Diode: Circuits and Applications
- Bipolar Junction Transistors (BJT)
- BJT Equivalent circuit Models and Amplifiers
- Multistage Amplifiers

CAD Tools

- National Instruments™ Multisim™
- Texas Instruments TINA-T1 V9 (optional)

Textbook


Requirements/Regulations

- Attendance at lectures and laboratories is essential for successful completion of this course. Students must satisfy each evaluation component in the course to receive a final grade.
- It is the responsibility of each student to contact the instructor in a timely manner if he or she is uncertain about his or her standing in the course and about his or her potential for receiving a failing grade. Students should also familiarize themselves with the University’s General Academic Regulations, as well as Section 3 of the Faculty of Engineering Academic Regulations dealing with incomplete term work, deferred examinations, attendance and withdrawal.
- No programmable devices or systems (such as calculators, PDAs, iPods, iPads, cell phones, wireless communication or data storage devices) are allowed in examinations unless approved by the course instructor.
Learning Outcomes

1. Ideal Op Amps (inverting/non-inverting configurations, summers, voltage/current amplifiers, precision rectifiers, integrators/differentiators)
2. Non-ideal Op Amps (input voltage offset, input bias currents, slew rate, output voltage/current saturation)
3. Diodes (physics of pn-junction, models, rectifiers, voltage regulators)
4. BJTs (physical operation, models, I-V terminal characteristics, biasing schemes, common-emitter, common-base, collector amplifiers, two stage amplifiers)

Expected Competency Levels

<table>
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<th>Outcome</th>
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Evaluation

Students must receive a minimum of 50% on the final examination in order to be eligible to receive a passing grade. Students who are unable to write the mid-term exam for medical (or other acceptable) reasons will have their final examination weighted to include the mid-term weighting. Students must complete all the laboratories in order to be eligible to receive a passing grade.

<table>
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<th>Component</th>
<th>Value (%)</th>
<th>Method of Feedback</th>
<th>Learning Outcomes Evaluated</th>
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* Method of Feedback: F - Formative (written comments and/or oral discussion), S - summative (numerical grade)

Academic Integrity

Students are expected to conduct themselves in accordance with the highest ethical standards of the Profession of Engineering and evince academic integrity in all their pursuits and activities at the university. As such, in accordance with the General Academic Regulations on Academic Integrity, students are reminded that plagiarism or any other form of cheating in examinations, term tests, assignments, projects, or laboratory reports is subject to serious academic penalty (e.g. suspension or expulsion from the faculty or university). A student found guilty of