ECE 231S Introductory Electronics
Course Outline

This course is an introduction to electronic circuits using operational amplifiers, diodes, and transistors. The course is the third of the three-course sequence, ECE110-ECE212-ECE231, designed to provide ECE students with a foundation for circuit analysis and electronics.

1. Instructors

<table>
<thead>
<tr>
<th>Section</th>
<th>Instructor</th>
<th>Office</th>
<th>Email</th>
</tr>
</thead>
<tbody>
<tr>
<td>LEC01</td>
<td>Antonio Liscidini</td>
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<tr>
<td></td>
<td>(course coordinator)</td>
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<td>LEC02</td>
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2. Text Book

The course covers the first seven chapters (Part I):
- Chapter 1: Basic circuit concepts (voltage amplifiers, frequency response, Bode plots)
- Chapter 2: Operational Amplifiers
- Chapter 3: Introduction to Semiconductor Physics
- Chapter 4: Diodes
- Chapter 5: Field-Effect Transistors (MOSFETs)
- Chapter 6: Bipolar Junction Transistors (BJTs)
- Chapter 7: Transistor Amplifiers

3. Marking Scheme

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<tbody>
<tr>
<td>Final Exam</td>
<td>45%</td>
</tr>
<tr>
<td>Quiz (two)</td>
<td>20%</td>
</tr>
<tr>
<td>Labs (six labs)</td>
<td>15%</td>
</tr>
<tr>
<td>(lab 1 1% Lab 2 2%, other Labs 3%)</td>
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<tr>
<td>Midterm Test</td>
<td>20%</td>
</tr>
<tr>
<td>Total</td>
<td>100%</td>
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Updated Jan. 3, 2018
4. Learning Objectives
- Basic theoretical concepts and techniques on Operational Amplifiers
- Theoretical and practical design of circuits based on DIODES
- Theoretical and practical design of circuits based on MOSFET and BJT
- Integrated circuit transistor amplifier design

5. Tutorials
Tutorials are two hours long and held weekly starting from the week of Jan.9th. The first hour is dedicated for review and important sample problems will be taken up on the board. During the second hour students will discuss and solve problems in small groups under the guidance of a TA. The problems discussed will be taken from previous tests or exams. In general, these past test problems will only be available in the tutorial and will not be posted online.

6. Midterm and Quizzes
There is one midterm exam (Thu. Mar. 1st) and two quizzes held during the regular tutorial, one during the second week of February and one third week of March.

7. Circuit Simulation
SPICE simulation is an integral part of electronic circuit verification. Students will use NI Multisim throughout the course. An activation code will be distributed in the lectures. The installation package is available at: www.ni.com/gate/gb/GB_ACADEMICEVALMULTISIM/US

Unfortunately Multisim is only available for the Windows environment, however Mac/Linux are encouraged to download the free VirtualBox package:
www.oracle.com/technetwork/server-storage/virtualbox/downloads/index.html#vbox

Alternatively, all students are free to use the cross-platform LTSpice simulator, however it is not officially supported by the course staff:
www.linear.com/designtools/software/

8. Labs
There are 5 laboratory experiments and one simulation lab. These labs give students experience with circuit simulation, and with the design and debugging of practical electronic circuits. Students work in teams of two.

Lab Sign-up and Simulation Training Session: Prior to the first lab experiment, students must attend a Lab Signup Session where students will sign-up in teams and have an introductory tutorial on using the circuit simulation software package, Multisim. The sign-up will occur during the first lab session.

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<tr>
<th>Section</th>
<th>Date</th>
<th>Time</th>
<th>Location</th>
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<tr>
<td>PRA01</td>
<td>2018/01/09</td>
<td>9am</td>
<td>GB341</td>
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<tr>
<td>PRA02</td>
<td>2018/01/16</td>
<td>9am</td>
<td>GB341</td>
</tr>
<tr>
<td>PRA03</td>
<td>2018/01/15</td>
<td>3pm</td>
<td>GB341</td>
</tr>
<tr>
<td>PRA04</td>
<td>2018/01/08</td>
<td>3pm</td>
<td>GB341</td>
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Updated Jan. 3, 2018
You can find a lab partner at the time of the lab information session.
Each student must keep a bound lab book to document their work in order to receive full marks.
Lab handouts will be posted on the course website and include a preparation component that must be completed prior to the lab session.

9. Course Website
The course website is accessible through the main UofT portal, portal.utoronto.ca
Under your "My Courses" tab, you should see the link:
All the official course announcements, handouts, and other information are posted on the blackboard site.

Discussion Board on Piazza:
We will use Piazza, for our discussion board. Our goal is to encourage active discussion amongst students: do not simply wait for an answer from your TA or instructor – please take part in answering questions. We will actively monitor the discussion and provide feedback.

10. Homework
Homework for each section is provided in the Course Syllabus (NOTE: Homework ‘exercises’ are found within each section in the chapter, whereas homework ‘problems’ are found at the end of the chapter.)
Questions relating to the homework should be posted on the discussion board or brought up during tutorials.

Have a Question?
In general, questions relating to the course material, labs, and homework should be posted on the discussion board so that everyone can benefit from the answer. Email correspondence should be limited to administrative issues such as handling a missed quiz or lab, etc. Emails should be sent to ta231@eecg.utoronto.ca, an email alias that includes both instructors and TAs who can respond to issues concerning the labs and tutorials.