Syllabus

ECE 3120 Microelectronics II

Course Number and Title: ECE 3120, Microelectronics II
Credits: 4
Website: [http://faculty.weber.edu/snaik/ECE3120.htm](http://faculty.weber.edu/snaik/ECE3120.htm)
Instructor: Suketu Naik
  - Office: WSU Campus, ET 133B
  - Phone: (801) 626 6895
  - Email: suketunaik@weber.edu (please put ECE3120 in the subject line)
Office Hours: See the link below for current schedule
  [http://faculty.weber.edu/snaik/Schedule.htm](http://faculty.weber.edu/snaik/Schedule.htm)

Class Time and Location:
Day Class: M, W 9:00-10:15am, ET 133C in Ogden Campus
Night Class: T, R 5:00-8:00pm, ET 133C in Ogden Campus

Lab Time and Location:
Day Class: W 1:30-4:30pm, ET 133C in Ogden Campus
Night Class: R or as declared in class

Text: Microelectronic Circuits 6th edition, Sedra and Smith

Description: Intermediate topics related to microelectronics including differential and multistage amplifiers, frequency response, feedback systems, power amplifiers, filters, and signal generation. Lecture and lab combination. Laboratory activities to include the design, construction, computer simulation, and analysis of filters and advanced circuits.

Prerequisite: ECE 3110 (Micro I)

Student Learning Outcomes: The students will demonstrate:

1. The knowledge of discrete and integrated circuits utilizing semiconductor devices including BJTs and MOSFETs.
2. The knowledge of semiconductor circuit design and modeling.
3. The ability to design, build, and analyze multi-stage amplifiers utilizing concepts such as biasing, high frequency response, feedback, and output stages.

Student Assessment:

1. Homework assignments: 5%
2. Laboratory assignments: 20%
3. 1st Midterm examination: 25%
4. 2nd Midterm examination: 25%
5. Final Exam: 25%
Course Assessment: The following course assessment criteria will be used:

1. Student review (each semester course is taught)
2. ECE Department Chair and faculty review
3. ECE Advisory Committee review

Grades:

Grades will be assigned as follows based on the weighted average of exams, labs, and homework as shown above. Grading scale may be normalized to the highest grade in the class per the instructor’s discretion.

Please note that C or better is required to obtain BSEE/BSCE degree. If you fail to meet this requirement, you will have to retake the class.

<table>
<thead>
<tr>
<th>Grade</th>
<th>Minimum</th>
<th>Maximum</th>
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<tbody>
<tr>
<td>A</td>
<td>&gt; 93%</td>
<td>C+</td>
</tr>
<tr>
<td>A-</td>
<td>90-93%</td>
<td>C</td>
</tr>
<tr>
<td>B+</td>
<td>87-90%</td>
<td>C-</td>
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<tr>
<td>B</td>
<td>83-87%</td>
<td>D</td>
</tr>
<tr>
<td>B-</td>
<td>80-83%</td>
<td>F</td>
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Topic Outline:

1. Ch 7: Current Mirrors and Biasing
2. Ch 9: Frequency Response
3. Ch 8: Active-Loaded Differential Pair
4. Ch 10: Feedback
5. Ch 11: Output Stages
6. (Tentative) Ch 12: Operational Amplifier Circuits

Schedule:

Please refer to the class website for the tentative list of class schedule, homework problems, and the labs: [http://faculty.weber.edu/snaik/ECE3120_sched_hw.htm](http://faculty.weber.edu/snaik/ECE3120_sched_hw.htm)

Homework:

Homework assignments and due dates will be posted on the schedule website (see the above link). Homework reports must be submitted online using the upload link. Homework must be clear and well organized. Please see the homework format below.
Late homework policy: 50% credit after the due date and before the relevant test. All past assignments are due on or before the test (pertaining to those assignments). No credit will be given after the test.

Homework Grading: Points per homework problem will be determined by the instructor. Full credit will be given for all the work and the correct answer. Homework that does not conform to the format (see the format below) will be penalized. Please see the late homework policy on the previous page.

Laboratory Experiments:

Laboratory experiments will be performed periodically throughout the semester at the discretion of the instructor. You must make all requested calculations and measurements specified and record for a laboratory report. You must write a neat and well-organized report in the format provided below and submit it using the upload link. You will be graded on the organization of your lab report. Your experimental circuits should also be very neat and organized. You will be graded on this aspect of lab work. All work can be recorded in an electronic lab-book or paper lab-book. For your information, lab book guidelines are also provided.

Course Fees: The purpose of the course fee for ECE 3120 is to purchase or maintain equipment, parts and software licenses for this course.

Services for Students with Disabilities: Any student requiring accommodations or services due to a disability must contact Services for Students with Disabilities (SSD) in Room 181 of the Student Services Center. SSD can also arrange to provide course materials (including the syllabus) in alternative formats if necessary.

Cheating and plagiarism: Just don’t…
## Homework Format

<table>
<thead>
<tr>
<th>Month / Day / Year</th>
<th>Course Number</th>
<th>Name (Last, First)</th>
<th>1/2</th>
</tr>
</thead>
<tbody>
<tr>
<td>Staple</td>
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<td></td>
<td></td>
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<tr>
<td>1.1 a</td>
<td></td>
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<td></td>
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<tr>
<td>Complete Problem Definition: Including figures, graphs, schematics, etc. May be copied directly from the assignment. Leave some space between definition and solution. Show Problem Solution. SHOW ALL WORK</td>
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<tr>
<td>1.1 b</td>
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<tr>
<td>Separate problems with a double line.</td>
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<tr>
<td>1.2</td>
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<tr>
<td>Repeat the above format for all remaining problems:</td>
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</tbody>
</table>

### NOTES:

1. Use only one side of engineering paper [E-2].
2. Staple multiple pages.
3. Number all pages (page # / of #).
4. You can work more than one problem per page if space is available.
5. Use PENCIL and eraser.
6. PRINT, no script. All printing must be neat and horizontal.
7. Each problem definition should have all pertinent information required to understand the problem without referring to the textbook.
8. Organize your solution so that it can be easily followed.
Lab Report Format

Lab 2: Frequency Response

Cleopatra Egyptian and Harry Houdini

Jan 16, 2015

Answer the questions in red (e.g. L1, L2, etc) from the lab handout and include them in appropriate sections (OMIT the labels L1, L2) in your report. You will be graded on the neatness and organization of the report.

1 Introduction

Write a brief introduction that summarizes the activities performed in the lab, and explains how they relate to concepts covered in the lectures. You should also include the circuit(s) and label them as Fig. 1: title, etc.

2 Calculations

Provide the details of your calculations. Take a picture of your hand-written notes/lab book, etc and paste it here if necessary. Include the detailed calculations. Clearly label and box answers.

3 Simulations

Provide your Simulation results in this section. You must include simulation plots. Plots from simulations should be captured as image files and included as figures (see Fig. 1 as an example). Ensure that an appropriate title is included below the figure.

![Fig. 1: Frequency Response of the CE Amplifier](image-url)
4 Experiment

Provide your Measured results in this section. Measured results should be provided in tables or individually with units specified and with appropriate labeling. Explain discrepancies.

5 Summary

Write a concise summary that describes what you have learned by performing this lab. You can also mention problems encountered, etc.

6 Appendix (optional)

You may include other handwritten notes, pictures of your breadboard, etc. here. This section should also be clearly labeled.
Lab Book Guidelines

1. It is best to keep an electronic lab book. You are free to use a paper lab book.

2. Keeping a proper lab book is essential to establish ownership of intellectual property (which is the primary output of all engineering). Try to follow these guidelines outside of this class as a good practice to maintain lab books.

3. Start each lab at the top of a new page. For each lab, write your name, lab number, and the title at the top of the page. See the format below.

4. Use the first page in your lab book as Table of Contents (TOC). Google to see the best way to include TOC. Each time you start a new lab, add an entry with its title, date and page number. See example below:

   **EE 3120 Lab book**
   
   C. Xavier
   
   Table of Contents
   
<table>
<thead>
<tr>
<th>Lab #</th>
<th>Title</th>
<th>Date</th>
<th>Page</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>High Freq Amp</td>
<td>1/21/2014</td>
<td>3</td>
</tr>
<tr>
<td>2</td>
<td>Diff pair: MOSFET</td>
<td>1/28/2014</td>
<td>10</td>
</tr>
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<td>…</td>
<td>…</td>
<td>…</td>
<td>…</td>
</tr>
</tbody>
</table>

5. Copy and paste your well-organized lab reports.

6. Number all pages!

7. Try to sign or initial and date each page if possible. If a page contains work from different dates, it should be separated with horizontal lines and each section (from different dates) should be signed or initialed and dated.

8. **Use your lab book!** Make it your work book. Do not write on separate papers or sheets or sticky notes. Try not to transfer notes from scratch paper into the lab book.