Course Information

Meeting day and time: MW, 4:30 pm – 5:50 pm
Room: Liberal Arts (LART) 108
Final Exam: Monday, May 9th, 4:00 pm – 6:45 pm
Course designation: EE 3340 – 002
CRN: 26453
Credit hours: 3
Lecture hours: 3

Course Description: Analysis and design of linear integrated circuits stressing impedance levels, gains and frequency responses. Complex plane concepts. Active filter and oscillator design. Pulse response and stability analysis.

Instructor Information

Jesus J. Gutierrez, Ph.D.
Assistant Professor of Instruction
Office: ENGR A-338
Office Hours: MW – 1:00 pm – 5:00 pm or by appointment (virtual also available)
E-mail: jjgutierrez4@utep.edu
Office Phone #: 915-747-8937

Course Materials

- Textbook (Main):
  Microelectronic Circuits, 7th, or 8th Edition
  A. S. Sedra, K. C. Smith, T. C. Carusone, and V. Gaudet
  Oxford University Press, 2020, 1296 pages
  Companion Website: www.oup.com/he/sedra-smith8e

- Textbook (Optional):
  The Art of Electronics, 3rd Edition
  Paul Horowitz and Winfield Hill
  Cambridge University Press, 2015, 1220 pages
- Pen/pencil and paper/notebook for taking notes
- TI-84 scientific calculator or equivalent (no TI-89 or Nspire)
- Mobile Device (Laptop/Phone) with access to the internet and Blackboard
- Access to Multisim and/or LTSpice.

Course content will be delivered through Blackboard. Also, important class announcements will be delivered via Blackboard and/or e-mail. Please make sure your UTEP e-mail is working, and you have stable access to the internet.
If a student has no computer with access to the internet, from UTEP’s Technology Support Center has borrowing services for laptops and tablets:
https://www.utep.edu/technologysupport/TSCenter/TSC_EQ_LaptopsTablets.html
UTEP’s Technology Support center also helps for technological needs beyond your scope of troubleshooting, so make sure you contact them if you encounter technical difficulties.

Students should maintain a well-organized notebook that archives their syllabus, lecture notes, homework problems, and tests. Students are also encouraged to purchase a USB Drive or use a cloud service like Dropbox or OneDrive to save their digital work.

**Prerequisites**

By Course (with grade of “C” or better):
• EE 3338 – Electronics I

By Topic:
• Knowledge of passive and active circuit components.
• Understanding of basic principles and behavior of electronic devices (diodes, BJTs, MOSFETs).
• Knowledge and application of circuit analysis techniques.

**Course Outline**

Topics covered in this course include:
1. Transistor amplifiers, principles of operation, circuit models, and biasing.
2. Principles of integrated-circuit (IC) design and basic building blocks of ICs.
3. Analysis and design of differential and multistage amplifiers and loading effects.
5. Operational-Amplifier circuits, CMOS op-amp architecture and design.

**Course Outcomes**

By the end of the semester, the student will demonstrate the ability to:
• Understand and analyze the principles of signal amplification using transistors.
• Analyze and design the basic blocks of IC amplifiers.
• Understand the low- and high-frequency behavior of transistor amplifiers.
• Understand how IC building blocks work together to create an op-amp circuit.
• Understand how a sinusoidal oscillator circuit works and conditions for oscillation.

**Contribution to Professional Component**

EE 3338 is a junior level core course that builds on topics covered primarily in junior and sophomore required courses.

**Relationship to (ABET) Program Outcomes**

• An ability to identify, formulate, and solve complex engineering problems by applying principles of engineering, science, and mathematics:
  Students use mathematical and engineering concepts in the design and analysis of circuits.

• An ability to apply engineering design to produce solutions that meet specified needs:
  Students use their acquired skills to design electronic circuits that meet specified behaviors.

• Ability to communicate effectively with a range of audiences:
Students solve electronics problems in class and discuss electronics topics with their fellow classmates and the professor.

- An ability to acquire and apply new knowledge as needed, using appropriate learning strategies:
  Students learn to use software to design and analyze electronic circuits.

**Rules and Policies**

**Grading**

Student achievement in the course objectives will be assessed using a combination of homework, exams, class work, and class participation.

Student grades are protected by the Privacy Act of 1974.

Your course grade will be determined by your weighted performance in the following categories:

<table>
<thead>
<tr>
<th>Component</th>
<th>Weight (%)</th>
<th>Grade Range</th>
<th>Letter Grade</th>
</tr>
</thead>
<tbody>
<tr>
<td>Homework (6)</td>
<td>30%</td>
<td>90% - 100%</td>
<td>A</td>
</tr>
<tr>
<td>Class Participation</td>
<td>20%</td>
<td>80% - 89%</td>
<td>B</td>
</tr>
<tr>
<td>Midterm Exams (2)</td>
<td>30%</td>
<td>70% - 79%</td>
<td>C</td>
</tr>
<tr>
<td>Final Exam</td>
<td>20%</td>
<td>60% - 69%</td>
<td>D</td>
</tr>
</tbody>
</table>

**Total Grade**..................................................100%

0% – 59% → F

**Homework Policy**

- Homework is an integral part of the course. It is crucial that you promptly and effectively do all your homework, as it will be very useful for your learning and preparing for the exams.
- Homework will consist of six (6) assignments, each worth 5% of the final grade.
- Homework is graded on a 100-point scale. Unless otherwise instructed, solve problems by hand.
- Show all your work. You may only use a calculator or computer for basic arithmetic and to check your answers. Your solutions must be provided in the proper order and the final answer(s) must be clearly boxed and given proper units.
- Do not box intermediate results.
- Finish all calculations. For example, $3\pi, \sqrt{14}, \sin(0.2)$ are **not** final answers. These should be given as 9.4248, 3.7417, and 0.1987.
- Homework must be completed with a high level of professionalism and be formatted properly. Points will be deducted for sloppy work, incorrect formatting, or shows incomplete work.
- Your homework must be your own work. Students suspected of cheating or copying homework will be submitted to the Office of Student Conduct and Conflict Resolution and will remain part of your permanent record at UTEP.
- Homework is due at the beginning of the lecture on the assigned due date.
- **Format** – All homework assignments will be submitted as a single document stapled in the upper-left corner with no additional binding. The first page must be a cover sheet with the student’s name, date of the assignment, course information, and assignment number. No problems or work should appear on the cover sheet.

~ Missed Homework ~

If for some reason you cannot finish the homework on the due date, **unless** you have promptly advised the professor, you can complete it later. However, the grade will be reduced proportionately to the days passed after the due date (10% for each day passed).

**Exam Policy**

- There will be 2 midterm exams, each one accounting for 15% of the final grade.
The final exam will be held at the time and date shown on this syllabus under “Course Information” and is worth 20% of the final grade.

Duration of the exam will be the time allotted for the class, but no longer.

Full work must be shown for full credit. Work must be neat and well organized.

The final answer must be boxed and given proper units.

Students suspected of cheating will be submitted to the Office of Student Conduct and Conflict Resolution and will remain part of your permanent record at UTEP, and a zero grade for the test.

The tentative schedule for the exams and the covered topics is shown in the chart below. This may be subject to change:

<table>
<thead>
<tr>
<th>Date</th>
<th>Exam #</th>
</tr>
</thead>
<tbody>
<tr>
<td>Wednesday, March 9</td>
<td>Exam #1</td>
</tr>
<tr>
<td>Wednesday, April 27</td>
<td>Exam #2</td>
</tr>
<tr>
<td>Monday, May 9 4:00 pm – 6:45 pm</td>
<td>Final Exam</td>
</tr>
</tbody>
</table>

Some other important dates to keep in mind:

<table>
<thead>
<tr>
<th>Date</th>
<th>Motive</th>
</tr>
</thead>
<tbody>
<tr>
<td>Monday, March 14 - Friday, March 18</td>
<td>Spring Break (No Classes)</td>
</tr>
<tr>
<td>Friday, April 1</td>
<td>Drop/Withdrawal Deadline (no joke)</td>
</tr>
</tbody>
</table>

~ Missed Exams ~

A missed exam can be made-up IF AND ONLY IF:

1) the reason for missing the exam is beyond the student’s control, e.g. such as a medical excuse, jury duty, death in the family or automobile accident, or

2) prior consent is obtained from the instructor for missing the exam based on a non-frivolous reason, e.g. such as a job interview, conference, or out-of-town job related travel. In either case, the student must submit a written and signed statement describing the reasons for missing the exam, with appropriate documentation, and petition for a makeup exam. Medical excuses require a note from the doctor. A missed exam will carry zero grade if these conditions are not met.

Class Participation Policy

- 20% of your total grade is based on your participation in class. Participation will be comprised mainly of questions asked by the professor, small group discussions and in-class assignments, and participation through student response systems (iClicker, Mentimeter).

- Participating in class does not necessarily mean talking a lot or asking a lot of questions. Some of the most helpful things you can do to enrich participation in class is bringing new resources/information to the classroom, doing all class work, answer questions asked by the professor in a thoughtful manner, or ask a question or make a comment that shows interest in what another fellow classmate said.

- There are also multiple ways quieter learners can participate, like honest and serious participation through student response systems, participate in class assignments and discuss the in-class assignments with your fellow classmates.

- The grading rubric for class participation will be based on the frequency and quality of contributions to the class:
  - (18-20%): Attends class regularly and often contributes to class participation by raising thoughtful questions or asks for clarification if something is not clear, responds seriously and honestly to surveys and questions on iClicker or Mentimeter, builds on other students’
ideas or questions, and actively participates in class assignments by working in groups to solve problems or to explain/help a fellow classmate.

- (15-17%): Attends class regularly and *sometimes contributes* to class participation in the aforementioned ways.
- (11-14%): Attends class regularly but *rarely contributes* to class participation in the aforementioned ways.
- (<10%): Attends class regularly but *never contributes* to class participation in the aforementioned ways.

**Attendance Policy**

Students are required to attend class and show up to lectures on time. Attendance will be taken at the beginning of each lecture. The course instructor reserves the right to turn away late comers and to withdraw students from the course that are repeatedly absent. Students missing more than two lectures should seriously reflect on their commitment to this course, as missing classes is highly correlated with poor performance. Absent students are held responsible for information discussed and homework assigned during the missed lecture.

**Etiquette**

The following items are expected from students as part of being a student in the class:

- Ask questions if you are confused or a concept is not clear! Despite how “silly” or “dumb” you may think your question is, it is likely that other students have the same question. Confusion on even small details in course material can cause bigger problems and hold you back. If you are truly embarrassed by your question, send an anonymous e-mail to the course instructor. I promise I will respond!
- Respond honestly to polls and provide real-time feedback to instructor about the course. This will contribute greatly to the quality of the course and to your success in it.
- Visit the course instructor during office hours, or by appointment, if needed.
- Treat e-mail correspondence as a professional exchange of information.
- Limit the use of mobile devices like phones or laptops to only class work and participation.
- Purchase the textbook with the correct edition and read the assigned sections before class.
- Bring all your course materials (textbook, notebook, pens/pencils, calculator) to class.
- Show proper etiquette during class. Do not talk if not encouraged to do so, make excessive noise, or otherwise distract the class. You will be asked to leave, and it will affect your grade.

**Course Calendar**

This is a tentative schedule of the course topics, homework, and tests, and might change.

<table>
<thead>
<tr>
<th>W</th>
<th>Dates</th>
<th>Ch</th>
<th>Topic</th>
<th>HW</th>
<th>Exam</th>
<th>Notes</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Jan 17, 19</td>
<td>4-6</td>
<td>Electronics I Review</td>
<td></td>
<td></td>
<td>MLK Day/Jan. 17</td>
</tr>
<tr>
<td>2</td>
<td>Jan 24, 26</td>
<td>4-6</td>
<td>Electronics I Review</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>3</td>
<td>Jan 31, Feb 2</td>
<td>7</td>
<td>Transistor Amplifiers</td>
<td>HW #1, Feb 7</td>
<td></td>
<td></td>
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<tr>
<td>4</td>
<td>Feb 7, 9</td>
<td>7</td>
<td>Transistor Amplifiers</td>
<td></td>
<td>HW #2, Feb 21</td>
<td></td>
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<tr>
<td>5</td>
<td>Feb 14, 16</td>
<td>8</td>
<td>IC Building Blocks</td>
<td></td>
<td></td>
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<tr>
<td>6</td>
<td>Feb 21, 23</td>
<td>8</td>
<td>IC Building Blocks</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>7</td>
<td>Feb 28, Mar 2</td>
<td>8</td>
<td>IC Building Blocks</td>
<td></td>
<td></td>
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<tr>
<td>8</td>
<td>Mar 7, 9</td>
<td>9</td>
<td>Differential and Multistage Amps.</td>
<td>HW #3, Mar 7</td>
<td>Exam #1, Mar. 9</td>
<td></td>
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<tr>
<td>9</td>
<td>Mar 14, 16</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>Spring Break</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Date</td>
<td>No.</td>
<td>Topic</td>
<td>Assignments</td>
<td>Information</td>
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<tr>
<td>10</td>
<td>Mar 21, 23</td>
<td>9</td>
<td>Differential and Multistage Amps.</td>
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<tr>
<td>11</td>
<td>Mar 28, 30</td>
<td>10</td>
<td>Freq. Response of Transistors</td>
<td>HW #4, Mar 28</td>
<td>Drop/Withdrawal Deadline Apr. 1</td>
<td></td>
</tr>
<tr>
<td>12</td>
<td>Apr 4, 6</td>
<td>10</td>
<td>Freq. Response of Transistors</td>
<td></td>
<td></td>
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</tr>
<tr>
<td>13</td>
<td>Apr 11, 13</td>
<td>13</td>
<td>Op-Amp Circuits</td>
<td>HW #5, Apr 11</td>
<td></td>
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<tr>
<td>14</td>
<td>Apr 18, 20</td>
<td>13</td>
<td>Op-Amp Circuits</td>
<td></td>
<td></td>
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<tr>
<td>15</td>
<td>Apr 25, 27</td>
<td>15</td>
<td>Oscillators</td>
<td>HW #6, Apr 25</td>
<td>Exam #2, Apr. 27</td>
<td></td>
</tr>
<tr>
<td>16</td>
<td>May 2, 4</td>
<td>15</td>
<td>Oscillators</td>
<td></td>
<td>Dead Day, May 6</td>
<td></td>
</tr>
</tbody>
</table>

**Academic Dishonesty**

As an entity of The University of Texas at El Paso, the Department of Electrical and Computer Engineering is committed to the development of its students and to the promotion of personal integrity and self-responsibility. The assumption that a student’s work is a fair representation of the student’s ability to perform is the basis for departmental and institutional quality. All students within the Department are expected to observe appropriate standards of conduct. Acts of scholastic dishonesty such as cheating, plagiarism, collusion, the submission for credit of any work or materials that attributable in the whole or in part to another person, taking an examination for another person, any act designed to give unfair advantage to a student or the attempt to commit such acts will not be tolerated. Any case involving academic dishonesty will be referred to the Office of the Dean of Students. The Dean will assign a Student Judicial Affairs Coordinator who will investigate the charge and alert the student as to its disposition. Consequences of academic dishonesty may be as severe as dismissal from the University. See the Office of the Dean of Students’ homepage (Office of Student Life) at [http://studentaffairs.utep.edu/dos](http://studentaffairs.utep.edu/dos) for more information. You can refer to the IEEE website for information on our code of ethics: [http://www.ieee.org/about/corporate/governance/p7-8.html](http://www.ieee.org/about/corporate/governance/p7-8.html)

**American Disabilities Act**

The UTEP Center for Accommodations and Supports Service (CASS) was established for the purpose of providing appropriate and reasonable accommodations as mandated in Section 504 of the Rehabilitation Act of 1973 ([http://www.dol.gov/oasam/regs/statutes/sec504.htm](http://www.dol.gov/oasam/regs/statutes/sec504.htm)) and the Americans with Disabilities Act ([http://www.ada.gov/](http://www.ada.gov/)). If you have needs regarding learning disabilities, please help by reporting your special needs to the course instructor the first week of classes. For additional help, contact CASS: (915) 747-5148, e-mail: cass@utep.edu website: [http://sa.utep.edu/cass/](http://sa.utep.edu/cass/)

**Discrimination Statement**

I do not discriminate, nor will I allow discrimination, on the basis of race, color, national origin, sex, religion, age, disability, genetic information, veteran’s status, sexual orientation, or gender identity. Members of the UTEP community are protected from discrimination and harassment by the State and Federal Laws.

**COVID-19 Statement/Precautions**

Due to the ongoing global pandemic situation, please stay home if you (1) have been diagnosed with COVID-19, or (2) are experiencing COVID-like symptoms. If that is the case, let me know as soon as possible, and alternative instruction will be provided. The Student Health Center, located in the Union Building East, is equipped to provide COVID-19 testing.
The Centers for Disease Control and Prevention recommends that people in areas of substantial or high COVID-19 transmission wear face masks when indoors in groups of people. The best way that Miners can take care of Miners is to get the vaccine. The vaccine is widely available in the El Paso area. For more information about local rates, testing, and vaccinations, please visit www.epstrong.org

**University Resources**

UTEP provides a wide variety of student services and support:

**Technology Resources**
- **UTEP Technology Support**: Students experiencing technological issues or challenges (e-mail, Blackboard, software, etc.) can submit a ticket to the UTEP Helpdesk for assistance. www.utep.edu/technologysupport
- **UTEP Engineering Technology Center (ETC)**: Provides laptop and computer repair services for engineering students, as well as service requests for software. www.utep.edu/engineering/etc/

**Academic Resources**
- **UTEP Library**: Access to a wide range of resources including online, full-text access to thousands of journals and e-Books, plus reference services and librarian assistance for enrolled students. www.utep.edu/library/
- **Math Resource Center for Students (MaRCS)**: Ask a tutor for help (including remotely) and explore available math resources like formula sheets, tables, and videos. www.utep.edu/science/math/marc
- **Advancement Center for Engineering Students (ACES)**: Students serving other students. Hybrid tutors provide tutoring for a wide range of topics including engineering, math and science, and also manages room reservations. www.utep.edu/engineering/student-resources/student-resources-aces.html

**Individual/Well-Being Services**
- **Military Student Success Center**: Assists personnel in any branch of service to reach their educational goals. www.utep.edu/student-affairs/mssc/
- **Counseling and Psychological Services**: Provides a variety of counseling services including individual, couples, and group sessions, as well as career and disability assessments. www.utep.edu/student-affairs/counsel