Course Information

Meeting day and time: M-F, 11:40 am – 1:50 pm
Room: Physical Science 222A
Final Exam: Monday, July 10, 1:00 pm – 3:45 pm
Course designation: EE 2353 - 004
CRN: 33530

What is this course about? EE 2353 would be considered the “continuation” to EE 2351. This course focuses more on voltage and current signals, and circuits being the systems that operate and modify signals. We will see a variety of tools to analyze and control signals with systems in both time-domain and frequency-domain, such as convolution, Laplace, and Fourier Transforms. Finally, we will use those tools to create a variety of systems that will let us modify signals, like filtering, amplitude and frequency modulation, and feedback.

What can I expect? It is assumed that students in this class have some practice with circuit theory and pre-calculus/calculus. The students are expected to take an active role by completing readings and home assignments before class, coming to class ready to participate with peers and with the professor, and reviewing routinely for assignments and exams. In this course, we have evidence that every student can achieve if they are motivated to be an active learner!

Instructor Information

Jesus J. Gutierrez, Ph.D.
Assistant Professor of Instruction
Office: ENGR A-338
Office Hours: M-R 9:00 am – 11:00 am
E-mail: jjgutierrez4@utep.edu

Course Materials

- Textbook (Zero-Cost PDF):
  Signals & Systems: Theory and Applications
  Fawwaz T. Ulaby and Andrew E. Yagle
  Michigan Publishing, 2018, 670 pages
  Free PDF Website: http://ss2.eecs.umich.edu/

- Textbook (Optional):
  Linear Systems and Signals, 3rd Edition
  B.P. Lathi and R.A. Green
  Oxford University Press, 2018
• **What should you bring to class everyday:**
  - Pen/pencil and paper/notebook for taking notes.
  - TI-85 scientific calculator or equivalent (no TI-Nspire allowed in exams)
  - Laptop with access to the internet.
  - Access to MATLAB

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.

You can install MATLAB on your laptop or computer following the MATLAB link: [https://www.mathworks.com/academia/tah-portal/university-of-texas-at-el-paso-40735445.html](https://www.mathworks.com/academia/tah-portal/university-of-texas-at-el-paso-40735445.html)
You will be required to create a Mathworks account to download both the software and the license using your UTEP username and password.

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](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.

**Prerequisites**

By Course (with grade of “C” or better):
- EE 2351 – Circuits II
- MATH 1312 – Calculus II
- MATH 2326 – Differential Equations

**Course Outline**

Topics covered in this course include:

1. Classification of signals and systems, transformations for periodic signals in time.
2. Linear Time-Invariant systems, impulse and step response, memory and stability.
3. Applications of the Laplace transform, including s-domain circuit analysis, op-amp circuits, system synthesis, basic control theory.
5. Applications of the Fourier Transform, 2D image filtering, active filters, filter design, Butterworth filters, resonator filter, modulation.

**Contribution to Professional Component**

EE 2351 is a sophomore level core course that builds on topics covered primarily in freshman and sophomore lower division 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 analysis and design of systems.
- An ability to apply engineering design to produce solutions that meet specified needs:
  Students use their newly acquired skills to design systems that meet specified constraints.
- An ability to acquire and apply new knowledge as needed, using appropriate learning strategies:
  Students learn to use MATLAB to design and analyze signals and systems.

Rules and Policies

How is your grade determined?
Student achievement will be assessed using a combination of in-class work, homework, quizzes, and exams. All student grades are protected by the Privacy Act of 1974.

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

1. In-Class Assignments ...............20%  
   90% – 100% → A
2. Weekly Exams (3).....................45%  
   80% – 89% → B
3. Final Exam ............................25%  
   70% – 79% → C
4. Class Participation....................10%  
   60% – 69% → D
   0% – 59% → F

How can I succeed in the course? This course may be difficult to you, especially if you received A’s and B’s in previous courses for memorizing material. But this course is not about memorizing equations or theory. It’s about applying equations and deriving them. You may be wondering; how do I achieve this? The answer in my experience is… practice, practice, practice! If you practice enough, you will be able to recognize patterns and become familiarized with the process needed to derive equations, which will give you a deeper understanding about systems and their usefulness and presence in our everyday lives.

Not all students do as well as they think they will when they walk into class on the first day. Why is this? My experience tells me that:
1) Some students do not have the active learning and studying skills that they should already have at college level (it takes one or two exams to recognize this). We can fix this together.
2) Some students do not put the effort that is necessary (even though they think they are). You can fix this if you are honest with yourself.

For some students, there may be a “gray area” between two letter grades, so two people getting the same weighted average grade could get different letter grades. If you are in one of these gray areas, whether you get a higher grade depends on two factors: (a) class participation and (b) whether your performance has been improving or declining over time.

What are In-Class Assignments?
On each class, with some exceptions, there will be an assignment covering the material for the day. The assignments will account for 20% of the final grade. The time allotted for the
assignment will be around 15 minutes. The assignments may be done individually or in groups. The two lowest graded in-class assignments will be dropped.

**What are the Rules for the Exams?**

- You will only have a calculator, pen or pencil, eraser, and one cheat sheet with formulas or problems with your name and UTEP ID on both sides of the paper.
- 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.
- If you get 90% average or better for the midterms, you are exempt from the final exam.
- The tentative schedule for the exams is shown in the chart below, subject to change:

<table>
<thead>
<tr>
<th>Date</th>
<th>Exam #</th>
</tr>
</thead>
<tbody>
<tr>
<td>Friday, June 16th</td>
<td>Exam #1</td>
</tr>
<tr>
<td>Friday, June 23rd</td>
<td>Exam #2</td>
</tr>
<tr>
<td>Friday, June 30th</td>
<td>Exam #3</td>
</tr>
<tr>
<td>Monday, July 10th, 1:00 pm – 3:45 pm</td>
<td>Final Exam</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: medical excuse, jury duty, death in the family or automobile accident, and
2. prior consent is obtained from the professor 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 the day before the exam, describing the reasons for missing, appropriate documentation, and petition for a make-up exam. **A missed exam will carry zero grade if conditions are not met.**

**How do I Participate in the Course?**

As an active learner, you will appreciate the value of discussions and participation in class assignments. 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 is doing class work, helping fellow classmates by explaining during group exercises, and answer questions asked by the professor in a thoughtful manner.

How can you participate in class if you’re shy? Although I do my best to ensure a safe space for learning for everyone to participate, there may be some students that are quiet learners. If you are a quiet learner, you can participate with honest and serious participation through student response systems, collaborating your small group during assignments, engage with me (the professor) during office hours or by e-mail, or even helping fellow students by explaining concepts inside and outside of class. There are many other ways you can participate even if you don’t want to participate in front of the whole class.
How successful students have done well in this course? They always read the textbook and pay attention to what they are reading and reflect on what they are unsure about. They complete their homework on time with plenty of time to make mistakes and ask questions. They value taking notes and doing assignments as valuable tools to learn. They attend each class and come prepared. They are **brave and vulnerable**, meaning that they are willing to make mistakes, take the chance of drawing a circuit or a solution wrong, and attempt to answer the question by themselves before checking in with a peer. They review on their own every question to see if they could **teach** it to someone else. **Successful students don’t just get the right answer and move on, they are able to explain how they arrive at that answer.**
## Course Calendar

This is a tentative schedule of the course topics, and assignments, subject to change.

<table>
<thead>
<tr>
<th>Day</th>
<th>Dates</th>
<th>Topics</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Monday, June 12</td>
<td>0. Complex Numbers, 1a. Classifications of Signals</td>
</tr>
<tr>
<td>2</td>
<td>Tuesday, June 13</td>
<td>1b. Energy and Power Signals, 1c. Step and Impulse, 1d. Complex Exponentials</td>
</tr>
<tr>
<td>3</td>
<td>Wednesday, June 14</td>
<td>1e. Signal Transformations in Time, 1f. Classification of Systems, 1g. Linear, Time-Invariant Systems.</td>
</tr>
<tr>
<td>4</td>
<td>Thursday, June 15</td>
<td>2a. Introduction to Laplace, 2b. Inverse Laplace</td>
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<tr>
<td>5</td>
<td>Friday, June 16</td>
<td>Exam #1, 2b. Inverse Laplace</td>
</tr>
<tr>
<td>6</td>
<td>Monday, June 19</td>
<td><strong>No classes</strong></td>
</tr>
<tr>
<td>7</td>
<td>Tuesday, June 20</td>
<td>2c. Laplace in Circuit Analysis, 2d. Transfer Function and Impulse Response</td>
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<tr>
<td>9</td>
<td>Thursday, June 22</td>
<td>2g. Basic Control Theory</td>
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<td>10</td>
<td>Friday, June 23</td>
<td>Exam #2, 3a. Intro to Fourier Series</td>
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<tr>
<td>11</td>
<td>Monday, June 26</td>
<td>3a. Intro to Fourier Series</td>
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<tr>
<td>12</td>
<td>Tuesday, June 27</td>
<td>3b. Fourier Series Coefficients</td>
</tr>
<tr>
<td>13</td>
<td>Wednesday, June 28</td>
<td>3c. Circuit Analysis with Fourier Series</td>
</tr>
<tr>
<td>14</td>
<td>Thursday, June 29</td>
<td>4a. Intro to Fourier Transform</td>
</tr>
<tr>
<td>15</td>
<td>Friday, June 30</td>
<td>Exam #3, 4a. Intro to Fourier Transform</td>
</tr>
<tr>
<td>16</td>
<td>Monday, July 3</td>
<td>4b. Properties of Fourier Transform</td>
</tr>
<tr>
<td>17</td>
<td>Tuesday, July 4</td>
<td><strong>No classes</strong></td>
</tr>
<tr>
<td>18</td>
<td>Wednesday, July 5</td>
<td>4c. Cascaded Filters, 4d. Filter Design by Poles and Zeros</td>
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<tr>
<td>19</td>
<td>Thursday, July 6</td>
<td>4e. Amplitude Modulation</td>
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<tr>
<td>20</td>
<td>Friday, July 7</td>
<td>4f. Sampling Theorem</td>
</tr>
<tr>
<td>21</td>
<td>Monday, July 10</td>
<td>Final Exam</td>
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**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.

Any student who commits an act of scholastic dishonesty is subject to discipline. Scholastic dishonesty includes but is not limited to cheating, plagiarism, collusion, the submission for credit of any work or materials that are attributable in 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.

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 also 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 University is committed to providing services, equipment, and accommodations to individuals with documented disabilities to provide them with equal opportunities to participate in programs, services, and activities in compliance with Sections 503 and 504 of the Rehabilitation Act of 1973, as amended, and the Americans with Disabilities Act (ADA) of 1990, and the Americans with Disabilities Act Amendments Act (ADAAA) of 2008. If you have a disability and need classroom accommodations, please contact The Center for Accommodations and Support Services (CASS) at 747-5148, or by email to cass@utep.edu, or visit their office located in UTEP Union East, Room 106. For additional information, please visit the CASS website at [www.sa.utep.edu/cass](http://www.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.
University Resources

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/marcs

- **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

- **YWCA Early Learning Academy**: Conveniently located on campus to serve the, YWCA’s Early Learning Academy is the best childcare solution for UTEP students, faculty, and staff. https://www.utep.edu/student-affairs/early-learning-academy/

- **Military Student Success Center**: Assists personnel in any branch of service to reach their educational goals. www.utep.edu/student-affairs/mssc/

- **Center for Accommodations and Support Services (CASS)**: Assists students with ADA-related accommodations, for coursework, housing, and internships. www.utep.edu/student-affairs/cass

- **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