Linear Circuit Analysis II
ENGR 3370

Name: Hector A. Ochoa
Email: ochoah@sfasu.edu
Phone: 936-468-2896
Office: STEM 207E
Office Hours: [link](https://calendly.com/ochoa-hector-a/office-hours) (4 hours in advance)
Department: Department of Physics, Engineering and Astronomy
Class meeting time and place: Lecture MWF 10:00 – 10:50 am / STEM 108;

Course Description:
Transient circuit analysis; circuit analysis and design using the Laplace transform; convolution in time domain and frequency domain; transfer functions; frequency response and Bode plots; passive and active filter design; Fourier Transform; two-port circuits; balanced three-phase AC circuits. Prerequisite: ENGR/PHYS 2305 and MATH 3330.

Text and Materials:

Course Calendar:

<table>
<thead>
<tr>
<th>Week</th>
<th>Date</th>
<th>Topics</th>
<th>Chapter</th>
<th>Reading</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Aug 23</td>
<td>First and Second Order Circuits</td>
<td>7, 8, 9,10</td>
<td>Review Materials</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Sinusoids and Phasors</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>Sinusoidal Steady-State Analysis</td>
<td></td>
<td></td>
</tr>
<tr>
<td>2</td>
<td>Aug 30</td>
<td>AC Power Analysis</td>
<td>11</td>
<td>11.2, 11.3, 11.4</td>
</tr>
<tr>
<td>3</td>
<td>Sep 6</td>
<td>AC Power Analysis</td>
<td>11</td>
<td>11.5, 11.6, 11.7, 11.8</td>
</tr>
<tr>
<td>4</td>
<td>Sep 13</td>
<td>Three-Phase Circuits</td>
<td>12</td>
<td>12.2, 12.3, 12.4, 12.5, 12.6, 12.7, 12.8</td>
</tr>
<tr>
<td>5</td>
<td>Sep 20</td>
<td>Three-Phase Circuits</td>
<td>12</td>
<td>12.2, 12.3, 12.4, 12.5, 12.6, 12.7, 12.8</td>
</tr>
<tr>
<td>6</td>
<td>Sep 27</td>
<td>Magnetically Coupled Circuits</td>
<td>13</td>
<td>13.2, 13.3, 13.4, 13.5, 13.6, 13.7</td>
</tr>
<tr>
<td>7</td>
<td>Oct 4</td>
<td>Exam 1 (Chapter 11,12)</td>
<td>13</td>
<td>13.2, 13.3, 13.4, 13.5, 13.6, 13.7</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Magnetically Coupled Circuits</td>
<td></td>
<td></td>
</tr>
<tr>
<td>9</td>
<td>Oct 18</td>
<td>Laplace Transform</td>
<td>15</td>
<td>15.2, 15.3, 15.4, 15.5, 15.6</td>
</tr>
<tr>
<td>10</td>
<td>Oct 25</td>
<td>Applications of Laplace Transform</td>
<td>16</td>
<td>16.2, 16.3, 16.4, 16.5, 16.6</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Exam 2 (Chapter 13, 14, 15)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>11</td>
<td>Nov 1</td>
<td>Fourier Series</td>
<td>17</td>
<td>17.1, 17.2</td>
</tr>
<tr>
<td>12</td>
<td>Nov 8</td>
<td>Fourier Series</td>
<td>17</td>
<td>17.3, 17.4, 17.5, 17.6</td>
</tr>
<tr>
<td>13</td>
<td>Nov 15</td>
<td>The Fourier Transform</td>
<td>18</td>
<td>18.2, 18.3, 18.4, 18.5, 18.6</td>
</tr>
<tr>
<td>14</td>
<td>Nov 22</td>
<td>Thanksgiving</td>
<td></td>
<td></td>
</tr>
<tr>
<td>15</td>
<td>Nov 29</td>
<td>The Fourier Transform</td>
<td>18</td>
<td></td>
</tr>
<tr>
<td>16</td>
<td>Dec 6</td>
<td>Final (All Chapters)</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
Assignments:  
There will be assignments almost every week. These assignments are due one week after they have been posted. Assignments will be submitted using D2L Dropbox. Keep in mind that the HW should be clean and organized, for more details about HW submission refer to “Homework Guidelines” in this document. Once you finish the HW scan the work, and upload it to D2L.

Quizzes:  
Quizzes will be posted on D2L. The idea is to reinforce knowledge from lecture, and reading assignments.

Projects:  
There will be multiple projects assigned during the semester. You can think of projects as an assignment with some extra complexity. Most of the projects will require you to use MATLAB and/or Multisim to solve and analyze circuits. The projects will be submitted using D2L, and every project will have its own specific instructions on what will need to be submitted.

Exams:
There will be a total of two regular exams during the semester, and one comprehensive final exam. The exams will be based on the homework, and the materials covered during the lecture. These exams will be proctored during the F2F sessions. I will let you know with enough time when the exam will be administered. If you have any problems attending the exam, please contact me as soon as possible.

Grading Policy:

<table>
<thead>
<tr>
<th>Component</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>Homework</td>
<td>10%</td>
</tr>
<tr>
<td>Projects</td>
<td>20%</td>
</tr>
<tr>
<td>Attendance</td>
<td>5%</td>
</tr>
<tr>
<td>Quizzes</td>
<td>15%</td>
</tr>
<tr>
<td>Exams</td>
<td>30%</td>
</tr>
<tr>
<td>Final Exam</td>
<td>20%</td>
</tr>
</tbody>
</table>

Late Policy
Any assignment should be returned in time. In the case that the assignment is returned late it will be affected by the following policy:

<table>
<thead>
<tr>
<th>Time Late</th>
<th>Deduction</th>
</tr>
</thead>
<tbody>
<tr>
<td>Less than 2 hours</td>
<td>5</td>
</tr>
<tr>
<td>More than 2 hours less than 12</td>
<td>10</td>
</tr>
<tr>
<td>More than 12 hours less than 24</td>
<td>20</td>
</tr>
<tr>
<td>More than 24 hours less than 48</td>
<td>50</td>
</tr>
<tr>
<td>More than 48 hours</td>
<td>100</td>
</tr>
</tbody>
</table>

Homework Guidelines
As engineers, you should learn how to be organized, you will need to present reports and results to your superiors and these needs to be professional. For that reason, you will need to start learning how to be organized. The homework should be returned complying with the following format:

1. Use clean paper that will scan properly
2. Name should be on the top left corner
3. Pages should be numbered on the top right corner using the following format “3/10”
4. Problems should be organized and in order
5. Problem number should be clear and readable
6. Only one document should be submitted in PDF format
7. Use the following file naming format “LastnameFirstNameInitial_AssignmentNumber.pdf.” For example: OchoaH_Assignment_7.pdf

Failing to comply with any of these will result in a **10 points** deduction.

**Attendance Policy:**
Attendance will be based on the Video Quizzes, and Attendance to Lecture/Laboratory Sessions. After watching the lecture videos, you will need to answer a video quiz related to the concepts covered in the lecture video. I will take attendance during the lecture/laboratory sessions, this is to ensure that you are keeping up with the material, and practicing the concepts covered in the lecture videos. If you arrive late to any of the sessions is your responsibility to ensure that your attendance was recorded. If you have problems to attending the Zoom meetings, please contact me as soon as possible.

**Credit Hour Justification**
Meets 3 hrs/wk for 15 weeks, and also meets for a 2-hour final examination. This is a problem-oriented class with homework problems. The lecture total 2.5 hours of contact time each week and the work outside of classes each week averages much more than 5 hours in working homework problems, preparing and answering online quizzes, reading the book to understand the theories used in lecture and in homework problems and exams, working on projects, writing formal project reports, and studying for exams which include major exams and possibly short lecture quizzes.

**Asynchronous Content**
This course is following the flipped classroom methodology. This requires the students to cover the theory and concepts outside the classroom. Every week, the students will have to read and watch videos related to course material that will be covered the following week. It is crucial that you keep up with materials to get the best results from the face-to-face lecture time.

**Lecture Remote Delivery**
In case of quarantine or if you cannot attend the lecture for some important reason, please let me know so I can stream the class using zoom. This same method will be used in case I am not able to get on campus. The zoom link will be posted in D2L.

**Student Learning Outcomes**
By the end of the course, a successful student will be able to:

1. Solve first and second order circuits. (SO-1)
2. Apply phasors to AC circuits. (SO-1)
3. Solve circuits using sinusoidal steady state analysis. (SO-1)
4. Use complex power to analyze AC power systems. (SO-1)
5. Identify the different types of three phase circuits. (SO-1)
6. Solve three phase circuits. (SO-1)
7. Solve transformer circuits. (SO-1)
8. Draw bode plots. (SO-1)
9. Identify the different types of filters. (SO-1)
10. Calculate the frequency response of filters. (SO-1)
11. Use the Laplace transform to solve AC circuits. (SO-1)
12. Apply the Fourier transform to solve AC circuits. (SO-1)
13. Use MATLAB and Multisim to analyze AC circuits. (SO-6)
14. Use MATLAB and Multisim to design AC Circuits. (SO-2)
15. Identify how the theory covered in this class directly relates to real life problems. (SO-7)

**Program Learning Outcomes**
Graduates of the program will:

1. an ability to identify, formulate, and solve complex engineering problems by applying principles of engineering, science, and mathematics
2. an ability to apply engineering design to produce solutions that meet specified needs with consideration of public health, safety, and welfare, as well as global, cultural, social, environmental, and economic factors
3. an ability to communicate effectively with a range of audiences
4. an ability to recognize ethical and professional responsibilities in engineering situations and make informed judgements, which must consider the impact of engineering solutions in global, economic, environmental, and social contexts
5. an ability to function effectively on a team whose members together provide leadership, create a collaborative and inclusive environment, establish goals, plan tasks, and meet objectives
6. an ability to develop and conduct appropriate experimentation, analyze and interpret data, and use engineering judgment to draw conclusions
7. an ability to acquire and apply new knowledge as needed, using appropriate learning strategies

Credit Hour Justification
Meets 3 hrs/wk for 15 weeks, and also meets for a 2-hour final examination. This is a problem-oriented class with homework problems. The lecture total 2.5 hours of contact time each week and the work outside of classes each week averages much more than 5 hours in working homework problems, preparing and answering online quizzes, reading the book to understand the theories used in lecture and in homework problems and exams, working on projects, writing formal project reports, and studying for exams which include major exams and possibly short lecture quizzes.

General Education Core Curriculum Objectives/Outcomes (EEO)
There are no specific general education core curriculum objectives in this course. This course is not a general education core curriculum course.

Academic Integrity (A-9.1)
Academic integrity is a responsibility of all university faculty and students. Faculty members promote academic integrity in multiple ways including instruction on the components of academic honesty, as well as abiding by university policy on penalties for cheating and plagiarism.

Definition of Academic Dishonesty
Academic dishonesty includes both cheating and plagiarism. Cheating includes but is not limited to (1) using or attempting to use unauthorized materials to aid in achieving a better grade on a component of a class; (2) the falsification or invention of any information, including citations, on an assigned exercise; and/or (3) helping or attempting to help another in an act of cheating or plagiarism. Plagiarism is presenting the words or ideas of another person as if they were your own. Examples of plagiarism are (1) submitting an assignment as if it were one's own work when, in fact, it is at least partly the work of another; (2) submitting a work that has been purchased or otherwise obtained from an Internet source or another source; and (3) incorporating the words or ideas of an author into one's paper without giving the author due credit.

Please read the complete policy at http://www.sfasu.edu/policies/academic_integrity.asp

Withheld Grades Semester Grades Policy (A-54)
Ordinarily, at the discretion of the instructor of record and with the approval of the academic chair/director, a grade of WH will be assigned only if the student cannot complete the course work because of unavoidable circumstances. Students must complete the work within one calendar year from the end of the semester in which they receive a WH, or the grade automatically becomes an F. If students
register for the same course in future terms the WH will automatically become an F and will be counted as a repeated course for the purpose of computing the grade point average.

Students with Disabilities

To obtain disability related accommodations, alternate formats and/or auxiliary aids, students with disabilities must contact the Office of Disability Services (ODS), Human Services Building, and Room 325, 468-3004 / 468-1004 (TDD) as early as possible in the semester. Once verified, ODS will notify the course instructor and outline the accommodation and/or auxiliary aids to be provided. Failure to request services in a timely manner may delay your accommodations. For additional information, go to http://www.sfasu.edu/disabilityservices/.

Mental Health Statement for Syllabus:

SFASU values students’ mental health and the role it plays in academic and overall student success. SFA provides a variety of resources to support students’ mental health and wellness. Many of these resources are free, and all of them are confidential.

On-campus Resources:
SFASU Counseling Services
www.sfasu.edu/counselingservices
3rd Floor Rusk Building
936-468-2401

SFASU Human Services Counseling Clinic
www.sfasu.edu/humanservices/139.asp
Human Services Room 202
936-468-1041

Crisis Resources:
Burke 24-hour crisis line 1(800) 392-8343
Suicide Prevention Lifeline 1(800) 273-TALK (8255)
Crisis Text Line: Text HELLO to 741-741