Basic Electronics
ENGR 4175

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Department: Department of Physics, Engineering and Astronomy
Class meeting time and place: Lecture – None

Course Description:
A basic introduction to Electronics Circuits. The topics covered in this course are amplifier circuits, semiconductors, diodes, MOSFETs, BJTs, and Transistors amplifiers.

Text and Materials:

Course Calendar:

<table>
<thead>
<tr>
<th>Week</th>
<th>Date</th>
<th>Topics</th>
<th>Chapter</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Aug 23</td>
<td>Signals and Amplifiers</td>
<td>1</td>
</tr>
<tr>
<td>2</td>
<td>Aug 30</td>
<td>Signals and Amplifiers</td>
<td>1</td>
</tr>
<tr>
<td>3</td>
<td>Sep  6</td>
<td>Operational Amplifiers</td>
<td>2</td>
</tr>
<tr>
<td>4</td>
<td>Sep 13</td>
<td>Operational Amplifiers</td>
<td>2</td>
</tr>
<tr>
<td>5</td>
<td>Sep 20</td>
<td>Semiconductors</td>
<td>3</td>
</tr>
<tr>
<td>6</td>
<td>Sep 27</td>
<td>Semiconductors</td>
<td>3</td>
</tr>
<tr>
<td>7</td>
<td>Oct 4</td>
<td>Diodes</td>
<td>4</td>
</tr>
<tr>
<td>8</td>
<td>Oct 11</td>
<td>Diodes Exam 3 (Chapter 1, 2, 3)</td>
<td>4</td>
</tr>
<tr>
<td>9</td>
<td>Oct 18</td>
<td>MOS-Field-Effect-Transistors</td>
<td>5</td>
</tr>
<tr>
<td>10</td>
<td>Oct 25</td>
<td>MOS-Field-Effect-Transistors</td>
<td>5</td>
</tr>
<tr>
<td>11</td>
<td>Nov 1</td>
<td>Bipolar Junction Transistors</td>
<td>6</td>
</tr>
<tr>
<td>12</td>
<td>Nov 8</td>
<td>Bipolar Junction Transistors</td>
<td>6</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Exam 2 (Chapters 4, 5)</td>
<td></td>
</tr>
<tr>
<td>13</td>
<td>Nov 15</td>
<td>Transistor Amplifiers</td>
<td>7</td>
</tr>
<tr>
<td>14</td>
<td>Nov 22</td>
<td>Thanksgiving.</td>
<td></td>
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<tr>
<td>15</td>
<td>Nov 29</td>
<td>Transistor Amplifiers</td>
<td>7</td>
</tr>
<tr>
<td>16</td>
<td>Dec 6</td>
<td>Final Exam (All Chapters)</td>
<td></td>
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</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.

Assignment Quizzes:
Assignment quizzes will be posted on D2L. These are designed to gauge the level of understanding of the concepts covered at that point in time. These quizzes are typically released after the homework has been submitted.
Exams:
During the semester, we will be having two regular exams. These will be based on the concepts covered in the lecture and homework. I will let you know in advance when it is time to have an exam.

Final Exam
The final exam will be given during finals’ week. This exam is comprehensive, but a significant percentage of the exam will be based on the concepts covered in chapters: 6, and 7. Once we get close to the end of the semester, I will discuss with all of you the details regarding the final exam.

Grading Policy:

<p>| | |</p>
<table>
<thead>
<tr>
<th></th>
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<tbody>
<tr>
<td>Homework</td>
<td>15%</td>
</tr>
<tr>
<td>Attendance</td>
<td>5%</td>
</tr>
<tr>
<td>Quizzes</td>
<td>15%</td>
</tr>
<tr>
<td>Exams</td>
<td>40%</td>
</tr>
<tr>
<td>Final Exam</td>
<td>25%</td>
</tr>
</tbody>
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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>
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<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 Sessions. After watching the lecture videos, you will need to answer a video quiz related to the concepts covered in the lecture video. This ensures that you keep up with the material and practice the concepts covered in the lecture videos. Furthermore, your response to discussion forums will also be considered part of your participation.
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.

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.

Program Learning Outcomes (PLO)
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

Student Learning Outcomes (SLO)
By the end of the course, a successful student will be able to:
1. Identify the different amplifier circuit models.
2. Identify the different operational amplifier circuits.
3. Analyze operational amplifier circuits.
4. Describe how semiconductors work.
5. Design Voltage Regulators and Rectifier circuits using diodes.
6. Describe the I-V Characteristics of MOSFETs.
7. Describe the I-V Characteristics of BJTs.
8. Design basic transistor amplifier circuits.
9. Simulate microelectronic circuits.
10. Fabricate amplifier circuits.

**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.

**Credit Hour Justification**
Meets 1-4 hrs/wk for 15 weeks. This class is often used to teach a lecture course that did not have sufficient enrollment. The majority of the time it is used for student research. When it is a lecture course the lecture is 1-4 hours of contact time each week and the work outside of classes each week averages much more than 2-8 hours in working homework problems, reading the book to understand the theories used in lecture and in homework problems and exams, and studying for exams which include major exams and possibly short lecture quizzes. Here is an example of when EGR 475 or 476 is used for student research. At the end of the semester the student will report on the design work required of the student for the following objectives: 1. Create solution to rotating polarizer mount required for experiments in the laboratory; 2. Detail electronic components necessary and design circuitry required to achieve activation of relative position of polarizer; 3. Design a housing to mount on existing hardware located within the laboratory setup; 4. Save detailed drawings and circuit diagram for submission; 5. Test final configuration of the design. Requirements are: 1. Describe method of construction for original parts and outline purchased parts; 2. Include design drawings and assembly views from SolidWorks; 3. Record results of final design. Research usually involves faculty and student meetings rather than formal lectures. The work outlined here would amount to a minimum of three hours per week for a one hour credit 475 or 476 and 12 hours per week for a four hour credit 475 or 476.

**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](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