Engineering Capstone Design I  
ENGR 4260 and ENGR 4060

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Office Hours: [https://calendly.com/ochoa-hector-a/office-hours](https://calendly.com/ochoa-hector-a/office-hours) (4 hours in advance)
Department: Department of Physics, Engineering and Astronomy
Class meeting time and place: TR 12:30 pm – 1:45 pm STEM 202 / Zoom

Course Description:
This course is the first of two parts of a capstone design project that is taken up to the point of prototype construction, testing and hardware specification. The specific skills and knowledge needed by practicing engineers in the product realization process are emphasized and developed. The focus for the first capstone course will be on conceptual design. Prerequisite: 12 hours of engineering or physics.

Text and Materials (Recommended, Not Required):

Course Calendar:

<table>
<thead>
<tr>
<th>Week</th>
<th>Date</th>
<th>Topics</th>
<th>Lecture</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Aug 23</td>
<td>Engineering Design</td>
<td>Face-to-Face</td>
</tr>
<tr>
<td>2</td>
<td>Aug 30</td>
<td>Engineering Design</td>
<td>Face-to-Face</td>
</tr>
<tr>
<td>3</td>
<td>Sep 6</td>
<td>Evaluate and Select Concept</td>
<td>Face-to-Face</td>
</tr>
<tr>
<td>4</td>
<td>Sep 13</td>
<td>Career Development</td>
<td>Remote</td>
</tr>
<tr>
<td>5</td>
<td>Sep 20</td>
<td>Business Meeting</td>
<td>Face-to-Face</td>
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<tr>
<td>6</td>
<td>Sep 27</td>
<td>Team Dynamics and Gathering Information</td>
<td>Remote</td>
</tr>
<tr>
<td>7</td>
<td>Oct 4</td>
<td>Bill of Materials (BOM)</td>
<td>Face-to-Face</td>
</tr>
<tr>
<td>8</td>
<td>Oct 11</td>
<td>Ethics</td>
<td>Face-to-Face</td>
</tr>
<tr>
<td>9</td>
<td>Oct 18</td>
<td>Business Meeting</td>
<td>Remote</td>
</tr>
<tr>
<td>10</td>
<td>Oct 25</td>
<td>Ethics</td>
<td>Remote</td>
</tr>
<tr>
<td>11</td>
<td>Nov 1</td>
<td>Prototyping</td>
<td>Face-to-Face</td>
</tr>
<tr>
<td>12</td>
<td>Nov 8</td>
<td>Embodiment of design</td>
<td>Face-to-Face</td>
</tr>
<tr>
<td>13</td>
<td>Nov 15</td>
<td>Business Meeting</td>
<td>Remote</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>Conceptual Design Review (Presentation)</td>
<td>Face-to-Face</td>
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<tr>
<td>16</td>
<td>Dec 6</td>
<td>Completed Conceptual Design (Report)</td>
<td></td>
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</tbody>
</table>

Lecture Delivery Format
At this age, it is very common for companies to have engineers working together worldwide. For that reason, you must practice how to interact with other engineers in a remote environment. Therefore, I decided to allocate a couple of lectures in which we will be meeting remotely using Zoom. Furthermore, you will have a couple of business meetings that will be delivered remotely using zoom.

Work Submission:
Student grading for submitted work will be judged by if the work is neat, complete, and organized. The quantity of the submitted work will also be used to grade relative to other students in the group. Therefore, it is required that any information a student generates for the project (tables, graphs, PowerPoint slides, etc.) should be accompanied by the initials of the student. If multiple students work on a single task, then list them as well. For instance, if one student is responsible for taking meeting minutes,
then record that student’s initials in a “recorded by:” label on the minutes page. Further details on required work in the notebook as well as project reports will be given in class.

**Presentations:**
Grading for presentations will be based partially on written comments by invited faculty. Each presentation will require all members of the team to speak. The organization of the presentation will be at the discretion of the students. Practice presentations will be required by the instructor prior to the scheduled time for the talk.

**Peer Evaluations:**
A portion of the grade will be based on peer review as outlined above. Peer reviews will be anonymous to the rest of the team. This metric is included to encourage all team members to contribute to the project. Severe instances of student non-participation will be dealt with on a case-by-case basis.

**Business Meeting:**
At least once a month, each team will meet with the professor and other professionals to discuss progress related to the project. The team will be judged based on their ability to answer questions with facts and proper documentation. The teams should be treating this as a meeting with their boss and the customer. The meeting time will not exceed 10 minutes. Make sure that the team is on time and ready.

**Completion of the Conceptual Design**
The teams will generate a document in which they will establish the outcomes for the conceptual design. This document will be presented and evaluated during the first business meeting. A second review and evaluation will be made during the third business meeting. This document will be used during the assessment of the completion of the conceptual design.

**Grading Policy:**

<table>
<thead>
<tr>
<th>Grading Category</th>
<th>Percentage</th>
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<tbody>
<tr>
<td>Completion of the Conceptual Design</td>
<td>30%</td>
</tr>
<tr>
<td>Conceptual Design Draft</td>
<td>10%</td>
</tr>
<tr>
<td>Conceptual Design Presentation</td>
<td>10%</td>
</tr>
<tr>
<td>Conceptual Design Report</td>
<td>10%</td>
</tr>
<tr>
<td>Business Meetings</td>
<td>10%</td>
</tr>
<tr>
<td>Course Exercises, Discussions, Notebook</td>
<td>10%</td>
</tr>
<tr>
<td>Peer-Review Evaluations</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>
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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>
Submission 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 “TeamName_DocumentName.pdf.” For example: Team_HOA_Conceptual_Design.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.

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. Demonstrate knowledge of engineering standards. (SO-7)
2. Develop solutions to a problem with a given set of realistic constraints. (SO-2)
3. Conduct tests on engineering prototype to show proof-of-concept for final product realization. (SO-6)
4. Illustrate how conceptual design can be utilized in present-day industries. (SO-4)
5. Demonstrate how solution to engineering problem can impact society under realistic constraints for wide-spread application. (SO-4)
6. Show understanding of ethical responsibilities of an engineer. (SO-4)
7. Collaborate with engineers from other disciplines to develop solutions to complex engineering problems. (SO-5)
8. Present technical information to others. (SO-3)
9. Evaluate conceptual design with the use of modern computer aided engineering software. (SO-1)
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

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. This is a problem oriented class and lab with homework problems. The lecture and lab combine for 100 minutes of contact time each week and the work outside of classes each week for the combined courses averages much more than 200 minutes 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.

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/](http://www.sfasu.edu/disabilityservices/).

**Student Code of Conduct: Policy 10.4**
Classroom behavior should not interfere with the instructor’s ability to conduct the class or the ability of other students to learn from the instructional program. Unacceptable or disruptive behavior will not be tolerated. Students who disrupt the learning environment may be asked to leave class and may be subject to judicial, academic or other penalties. This policy applies to all instructional forums, including electronic, classroom, labs, discussion groups, field trips, etc. The instructor shall have full discretion over what behavior is appropriate/inappropriate in the classroom. Students who do not attend class regularly or who perform poorly on class projects/exams may be referred to the iCare: Early Alert Program at SFA. Information regarding the iCare program is found at [https://www.sfasu.edu/judicial/earlyalert.asp](https://www.sfasu.edu/judicial/earlyalert.asp) or call the office at 936-468-2703.

**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.

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*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