Engineering Capstone Design I  
EGR 460

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Office: STEM 207E  
Office Hours: MW 9:30 – 10:30 AM / M 1:00 - 2:00 PM / MTR 2:00 – 3:00 PM /  
Department: Department of Physics and Astronomy  
Class meeting time and place: Lecture – TR 12:30 – 1:20 PM / STEM 202

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. 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>
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</thead>
<tbody>
<tr>
<td>1</td>
<td>Aug 26</td>
<td>Introduction to Design</td>
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<tr>
<td>2</td>
<td>Sep 2</td>
<td>Design Team Dynamics</td>
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<tr>
<td>3</td>
<td>Sep 9</td>
<td>Product Design Specifications (PDS)</td>
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<tr>
<td>4</td>
<td>Sep 16</td>
<td>Clarifying Objectives &amp; Functions</td>
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<td>5</td>
<td>Sep 23</td>
<td>Concept Generation</td>
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<td>6</td>
<td>Sep 30</td>
<td>Concept Selection</td>
</tr>
<tr>
<td>7</td>
<td>Oct 7</td>
<td>Engineering Communication</td>
</tr>
<tr>
<td>8</td>
<td>Oct 14</td>
<td>Model Design</td>
</tr>
<tr>
<td>9</td>
<td>Oct 21</td>
<td>Model Fabrication</td>
</tr>
<tr>
<td>10</td>
<td>Oct 28</td>
<td>Model Fabrication</td>
</tr>
<tr>
<td>11</td>
<td>Nov 4</td>
<td>Model Presentation</td>
</tr>
<tr>
<td>12</td>
<td>Nov 11</td>
<td>Model Presentation</td>
</tr>
<tr>
<td>13</td>
<td>Nov 18</td>
<td>Review Changes</td>
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<tr>
<td>14</td>
<td>Nov 25</td>
<td>Thanksgiving Holiday</td>
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<tr>
<td>15</td>
<td>Dec 2</td>
<td>Conceptual Design Review</td>
</tr>
<tr>
<td>17</td>
<td>Dec 9</td>
<td>Complete Conceptual Design</td>
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Work Submission:  
Student grading for submitted work will be judged by if the work is neat, complete, and organized. Quantity of submissions for 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 of 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. Presentations are tentatively scheduled during the 4:00 – 4:50 pm time slot on Thursdays reserved for seminar (dates to
be reviewed in class. Each presentation will require all members of the team to speak. Organization of the presentation will be at the discretion of the students. Practice presentations may 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 professional 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.

**Grading Policy:**

<table>
<thead>
<tr>
<th></th>
<th>Percentage</th>
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<tbody>
<tr>
<td>Conceptual Design Draft</td>
<td>10%</td>
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<tr>
<td>Conceptual Design Presentation</td>
<td>10%</td>
</tr>
<tr>
<td>Conceptual Design Final Draft</td>
<td>20%</td>
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<tr>
<td>Course Exercises and Discussions</td>
<td>20%</td>
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<tr>
<td>Business Meetings</td>
<td>10%</td>
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<tr>
<td>Notebook, Peer Review</td>
<td>30%</td>
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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>
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<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>
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<tr>
<td>More than 24 hours less than 48</td>
<td>50</td>
</tr>
<tr>
<td>More than 48 hours</td>
<td>100</td>
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</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 taken at the beginning of each class. If you have 3 unexcused absences, then your final grade will be reduced by one letter grade. If you have 4 unexcused absences, you will receive an “F”
in the course. To receive an excused absence a written and signed notice is required within three class
days of the absence. If you miss class without approval of your instructor, you will receive a grade of
zero on the missed assignment. Authorized absences must be approved by your instructor in advance of
the absence unless you have an emergency or illness. Make-up work must be completed outside of normal
class hours and within one week following an excused absence. It is your responsibility to see your
instructor and make arrangements for make-up work.

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 2 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](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.