Stephen F. Austin State University
ABET Syllabus:
ENGR 1310 – Geometric Modeling for Mechanical Design (Selected Elective)

Course Description:
Students will utilize computer-aided engineering (CAE) to understand concepts in geometric modeling and engineering graphics with applications to mechanical design. Topics will include fundamentals of design; modeling visualization and preparation of engineering drawings including multiview 3-D representations: orthographic projection and isometric perspective; solid modeling; dimensioning and tolerancing; modern prototyping and manufacturing techniques.

Prerequisites: None
Co-Requisites: None

Credits: 3 Hours (Lecture: 3 Hours)

Instructor: Christopher J. Aul

W. E. Howard & J. C. Musto
McGraw-Hill Education
ISBN: 978-1259820175

Supplemental Materials: None

Topics Covered:
Fundamentals of design; modeling visualization and preparation of engineering drawings including multiview 3-D representations: orthographic projection and isometric perspective; solid modeling; dimensioning and tolerancing; modern prototyping and manufacturing techniques.

Course Learning Outcomes
By the end of the course, a successful student will be able to:
1. Apply skills in software designed for computer-aided design (CAD) and computer-aided engineering (CAE) to (SO-6):
   a. Create a 2D representation of a 3D model
   b. Detail a CAD drawing with appropriate dimensions and tolerances
   c. Create a 3D model with a standard set of 2D representations (a sketch)
   d. Combine multiple objects into an assembly
   e. Simulate mechanical motion of an assembly to illustrate design intent
2. Analyze an existing engineering design to (SO-6):
   a. Identify design intent of each component in a complex assembly
   b. Measure components to recreate engineering design in a CAE environment
   c. Determine materials used in existing design and estimate physical properties
   d. Find potential for design improvements in existing design
3. Improve, change, or add new function to the design intent of an existing design to (SO-2):
   a. Create a new CAD model to illustrate improvement/change
   b. Test new CAD model for effectiveness
   c. Outline new CAD model and its performance in a technical report
4. Present technical information on CAD/CAE design to others (SO-3)
5. Show how engineering design can impact society, environment, and economy (SO-4)
Student Outcomes
Graduates of the program will show:

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 judgments, which must consider the impact of engineering solutions in global, economic, environmental, and societal 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.
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Text and Materials:
Introduction to Solid Modeling Using Solidworks, W. E. Howard & J. C. Musto, McGraw-Hill Education

I will be assigning homework directly from the text so it is important that you obtain a copy of this edition or similar. You do not have to obtain any online materials.

Grading Policy:

<table>
<thead>
<tr>
<th>Component</th>
<th>Percentage</th>
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</thead>
<tbody>
<tr>
<td>Initial Design Exam</td>
<td>20%</td>
</tr>
<tr>
<td>Detailed Design Exam</td>
<td>20%</td>
</tr>
<tr>
<td>New Model Design Exam</td>
<td>20%</td>
</tr>
<tr>
<td>In-class Assignments</td>
<td>10%</td>
</tr>
<tr>
<td>Homework Assignments</td>
<td>15%</td>
</tr>
<tr>
<td>Final Presentation</td>
<td>15%</td>
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</tbody>
</table>

Letter grades are based on the following ranges:

- A  90.0 – 100%
- B  80.0 - 89.9%
- C  70.0 - 79.9%
- D  60.0 - 69.9%
- F  < 60.0%

Exams:
The three exams in this course will be “take home” and consist of detailed instructions from the professor. The tentative due dates for these exams are shown in the course outline. A grading rubric will be provided and the exams should be constructed in a report-style format. Due to the nature of take-home exams there will be no make-up exams given. Late exams will be accepted with a penalty of 20% for each day the exam is late (i.e. if the exam is turned in two days late the maximum possible score the student could attain is 60 points out of 100). This penalty is increased to 50% for the New Model Design Exam due during the final exam time for this course (see calendar).
Course Calendar:
*(Calendar is tentative and dates/times are subject to change)*

<table>
<thead>
<tr>
<th>Week</th>
<th>Class Dates</th>
<th>Topic</th>
<th>Chapter</th>
<th>Important Dates</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>8/29/23</td>
<td>Intro to Design using Solidworks (SW)</td>
<td>1</td>
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<tr>
<td>2</td>
<td>9/5/23</td>
<td>Design Basics, Measuring Instruments, CAE Techniques</td>
<td>1</td>
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<tr>
<td>3</td>
<td>9/12/23</td>
<td>Additional CAE Techniques in SW</td>
<td>3</td>
<td>9/11 - Design Selection Due</td>
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<tr>
<td>4</td>
<td>9/19/23</td>
<td>Advanced Modeling in SW, Technical Report Writing</td>
<td>4</td>
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<tr>
<td>5</td>
<td>9/26/23</td>
<td>Parametric Modeling in SW</td>
<td>5</td>
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<tr>
<td>6</td>
<td>10/3/23</td>
<td>Assembly Models, Mating in SW, Exploded Views</td>
<td>6</td>
<td>10/6 - Initial Design Exam Due</td>
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<tr>
<td>7</td>
<td>10/10/23</td>
<td>Advanced Assembly Options, Interference and Collision</td>
<td>7</td>
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<tr>
<td>8</td>
<td>10/17/23</td>
<td>Engineering Drawings, Dimensioning &amp; Tolerancing</td>
<td>2</td>
<td></td>
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<tr>
<td>9</td>
<td>10/24/23</td>
<td>Assembly Drawings, BOM</td>
<td>8</td>
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<tr>
<td>10</td>
<td>10/31/23</td>
<td>Mechanisms in SW, Motion Simulation</td>
<td>11</td>
<td>11/3 - Detailed Design Exam Due</td>
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<tr>
<td>11</td>
<td>11/7/23</td>
<td>Molds and Sheet Metal Design, Prototyping Methods</td>
<td>12</td>
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<tr>
<td>12</td>
<td>11/14/23</td>
<td>Stress Analysis</td>
<td>13</td>
<td></td>
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<tr>
<td>13</td>
<td>11/21/23</td>
<td>Thanksgiving Break</td>
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<tr>
<td>14</td>
<td>11/28/23</td>
<td>Technical Presentation Guidelines</td>
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<td></td>
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<tr>
<td>15</td>
<td>12/5/23</td>
<td>Final Design Presentations</td>
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<td></td>
<td></td>
<td>New Model Design Exam Due by 3pm on 12/12</td>
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In general, you will be required to spend at least 2 hours of time outside of class for every hour spent in class. Considering this class meets for 3 hours a week it is important to spend at least 6 hours working with course material outside of class. It is encouraged that you spend more time than this to properly attain course subject matter. A required 150 minutes of asynchronous material will be given to the students throughout the class.

**In-Class Assignments:**
The course will largely be software based using SolidWorks. I will assign work to be completed within the class time using this software. I will also give in-class quizzes to be completed within the time of the class. The quizzes will be over material covered and may be closed-note and closed-book. See the Attendance Policy for rules on missing work due to absence. The grading for in-class assignments and quizzes will be averaged for 10% of your final grade. Details for in-class assignments and quizzes will be reviewed in class.

**Final Presentation:**
Your “Final Exam” of sorts will be an in-class presentation of your design at the end of the semester. Details for what is required in the final presentation will be given in class. Tentatively the presentation will be on the order of 10 minutes and will include a PowerPoint presentation with images explaining your final design. It is the goal of the presentation to assess technical communication skills. Pertinent training for technical presentations will be given in class.

**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. Being late to class will be recorded as a “late” for the student. Two recordings of “late” will be counted as a single absence.

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.
Email Communication
All official course communication will be made using your SFA email account. You must use your SFA email account for all communications. You can look up your SFA email account or setup email forwarding using this link:
http://www.sfasu.edu/mysfa/o365/forwarding-email/

It is important to practice good email communications in college courses. Use “ENGR 1310” in the subject of your email messages. Use complete sentences and capitalization when appropriate. The body of your email messages should begin with your instructor's name and end with your name.

Academic Integrity (4.1)
The Code of Student Conduct and Academic Integrity outlines the prohibited conduct by any student enrolled in a course at SFA. It is the responsibility of all members of all faculty, staff, and students to adhere to and uphold this policy.

Articles IV, VI, and VII of the new Code of Student Conduct and Academic Integrity outline the violations and procedures concerning academic conduct, including cheating, plagiarism, collusion, and misrepresentation. Cheating includes, but is not limited to: (1) Copying from the test paper (or other assignment) of another student, (2) Possession and/or use during a test of materials that are not authorized by the person giving the test, (3) Using, obtaining, or attempting to obtain by any means the whole or any part of a non-administered test, test key, homework solution, or computer program, or using a test that has been administered in prior classes or semesters without permission of the Faculty member, (4) Substituting for another person, or permitting another person to substitute for one’s self, to take a test, (5) Falsifying research data, laboratory reports, and/or other records or academic work offered for credit, (6) Using any sort of unauthorized resources or technology in completion of educational activities.

Plagiarism is the appropriation of material that is attributable in whole or in part to another source or the use of one’s own previous work in another context without citing that it was used previously, without any indication of the original source, including words, ideas, illustrations, structure, computer code, and other expression or media, and presenting that material as one’s own academic work being offered for credit or in conjunction with a program course or degree requirements.

Collusion is the unauthorized collaboration with another person in preparing academic assignments offered for credit or collaboration with another person to commit a violation of any provision of the rules on academic dishonesty, including disclosing and/or distributing the contents of an exam.

Misrepresentation is providing false grades or résumés; providing false or misleading information in an effort to receive a postponement or an extension on a test, quiz, or other assignment for the purpose of obtaining an academic or financial benefit for oneself or another individual or to injure another student academically or financially.

Withheld Grades Semester Grades Policy (5.5)
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 coursework 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 to compute the grade point average. For additional information, go to https://www.sfasu.edu/policies/course-grades-5.5.pdf.

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 promptly may delay your accommodations. For additional information, go to http://www.sfasu.edu/disabilityservices/.
Student Wellness and Well-Being
SFA values students’ overall well-being, mental health and the role it plays in academic and overall student success. Students may experience stressors that can impact both their academic experience and their personal well-being. These may include academic pressure and challenges associated with relationships, emotional well-being, alcohol and other drugs, identities, finances, etc.

If you are experiencing concerns, seeking help, 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:
The Dean of Students Office (Rusk Building, 3rd floor lobby)
www.sfasu.edu/deanofstudents
936.468.7249
dos@sfasu.edu

SFA Human Services Counseling Clinic Human Services, Room 202
www.sfasu.edu/humanservices/139.asp
936.468.1041

The Health and Wellness Hub “The Hub”
Location: corner of E. College and Raguet St.

To support the health and well-being of every Lumberjack, the Health and Wellness Hub offers comprehensive services that treat the whole person – mind, body and spirit. Services include:
- Health Services
- Counseling Services
- Student Outreach and Support
- Food Pantry
- Wellness Coaching
- Alcohol and Other Drug Education
www.sfasu.edu/thehub
936.468.4008
thehub@sfasu.edu

Crisis Resources:
- Burke 24-hour crisis line: 1.800.392.8343
- National Suicide Crisis Prevention: 9-8-8
- Suicide Prevention Lifeline: 1.800.273.TALK (8255)
- johCrisis Text Line: Text HELLO to 741-741