ME 19                          Design & Graphics                      Spring 2014

Course Coordinator: Prof. Ken Youssefi,  Email: kyoussefi@aol.com
Office: E-137, office hrs.: MW 10-11
Lab. Instructor: Isaac Tineo, isaac.tineo@sjsu.edu
Class room: E- 407
Class time: Lecture / Lab. - Wednesday  9:00 - 11:45
Class code: 22276
Course web site: www.engr.sjsu.edu/youssefi

Final Exam: Design Project deliverables are due by Monday May 13, 5:00 pm. Leave the project reports in Youssefi’s mailbox in room 310 (ME office). No late project will be accepted.

Course Description
Introduction to graphical communication tools. Design and graphical solutions to two and three-dimensional design problems. Development of visualization and technical sketching skills in conjunction with pictorial projections. Individual design project. Focus on computer-aided drawing and design.

1 unit course, three hours lecture/lab.

“Success in this course is based on the expectation that students will spend, for each unit of credit, a minimum of forty-five hours over the length of the course (normally 3 hours per unit per week with 1 of the hours used for lecture) for instruction or preparation/studying or course related activities including but not limited to  internships, labs, clinical practical. Other course structures will have equivalent workload expectations as described in the syllabus.”

Prerequisites: none

Recommended Text: AutoCAD tutorial, and SolidWorks tutorial
Visit Autodesk.com to download a free copy of 2014 version of AutoCAD

Design Project: refer to the separate handout

Homework: homework problems will be assigned a week before the due date. Homework is due at the beginning of the lab. period. Late homework, will not be accepted.

Attendance: attendance in all labs are strongly recommended, absence will effect your grade.

Laboratory assignments: Lab work will include 2D drawing and 3D drawing of an object using AutoCAD and SolidWorks. Lab work must be turn in a week after they are assigned, most lab assignments can be finished during the lab. period. No late assignments will be accepted. Lab period will also be used for design project.

Grading: Lab. Assignments 30%, 2 Exams (25% each), Design Project 20%

Grade distribution: Grade A 90 - 100
Grade B  80 - 89
Grade C  70 - 79
Grade C- 60 – 69
Grade F  59 and below
Department Policy on Computer Lab Use: Use of the department and college computer labs is a privilege that can be lost by abuse. The following are grounds for loss of lab privileges:

- Unauthorized copying of software, either from the computer, or using the computer.
- Installation of any software, media, or files that are not specifically required to do your class activities. You may not install messenger, music, gaming, or any other software program on computers in the lab.
- Abuse of computers or hacking or modifying the operating system, user interface, or desktop in any way.

Loss of your computer lab privileges would mean that it will be up to you to arrange to meet your lab requirements outside of the campus computer labs.

Academic Integrity: Your own commitment to learning, as evidenced by your enrollment at San José State University, and the University’s Academic Integrity Policy requires you to be honest in all your academic course work. Faculty members are required to report all infractions to the Office of Judicial Affairs. All students should review the Academic Integrity Policy on cheating and plagiarism, copy of the policy can be found on the website at [http://www2.sjsu.edu/senate/s04-12.pdf](http://www2.sjsu.edu/senate/s04-12.pdf). The guidelines on collaboration for this class, and the consequence of cheating and plagiarism will be discussed in the class.

Campus policy in compliance with the Americans with Disabilities Act: If you need course adaptations or accommodations because of a disability, or if you need special arrangements in case the building must be evacuated, please make an appointment with me as soon as possible, or see me during office hours. Presidential Directive 97-03 requires that students with disabilities requesting accommodations must register with DRC to establish a record of their disability.

Course Goals

The course goals are:

- To help students visualize three dimensional objects.
- To introduce students to technical freehand sketching (pictorials).
- To introduce students to computer-aided design tools, 2D and 3D (parametric modeling).
- To introduce the students to engineering design process through a design project and lab work.

Student Learning Objectives

The students should be able to:

- Freehand sketch a 3D view of an object (isometric, oblique and perspective).
- Draw complicated two dimensional views of an object using AutoCAD.
- Create three dimensional objects using SolidWorks (solid modeling package).
- Understand the engineering design process and the implementation of different design phases.
# COURSE SCHEDULE

<table>
<thead>
<tr>
<th>Week/Date (Wed.)</th>
<th>Subject</th>
</tr>
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<tbody>
<tr>
<td><strong>1 1/29</strong></td>
<td>Lect.  - Introduction, course organization and project discussion.  Lab. - Introduction to AutoCAD, Tutorial 1 (lab. work #1)</td>
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<tr>
<td><strong>2 2/5</strong></td>
<td>Lect.  - Introduction to engineering design process  Lab. - Project design discussion, AutoCAD; Tutorial 2 (lab. work #2)</td>
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<tr>
<td><strong>3 2/12</strong></td>
<td>Lect.  - Introduction to Pictorials; isometric, oblique and perspective views  Lab. - AutoCAD; Lab. work #3 (design problems)</td>
</tr>
<tr>
<td><strong>4 2/19</strong></td>
<td>Lect.  - Pictorials; Freehand sketching techniques  Lab. - AutoCAD; Lab. work #4 (residential house floor plan design)</td>
</tr>
<tr>
<td><strong>5 2/26</strong></td>
<td>Lect.  - Project Design Bug list discussion, selecting one idea from the list  Lab. - AutoCAD; Lab. work #5 (electrical schematic layout)</td>
</tr>
<tr>
<td><strong>6 3/5</strong></td>
<td>Lect.  - Orthographic projections, standard two dimensional views of an object (front, top, and right side views)  Lab. - Project design discussion, finishing previous work</td>
</tr>
<tr>
<td><strong>7 3/12</strong></td>
<td>Lect.  - Dimensioning standards and conventions  Lab. - AutoCAD; Lab. work #6 (mechanical component drawing, shop drawing)</td>
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<tr>
<td><strong>8 3/19</strong></td>
<td>Lab. - Exam 1, 2 ½ hour exam on AutoCAD skills (2D drawings)</td>
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<tr>
<td><strong>9 3/24 – 3/28</strong></td>
<td><strong>Spring Recess</strong></td>
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<tr>
<td><strong>10 4/2</strong></td>
<td>Lect.  - Introduction to parametric modeling using 3D CAD software, sketching  Lab. - SolidWorks; Lab. work #7 (Sketch, Extrude)</td>
</tr>
<tr>
<td><strong>11 4/9</strong></td>
<td>Lect.  - Solids modeling; Sweep and Loft  Lab. - SolidWorks; Lab. work #8, Revolve, Sweep and Loft</td>
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<tr>
<td><strong>12 4/16</strong></td>
<td>Lect.  - Assembly and exploded views, top-down and bottom-up design approach  Lab. - SolidWorks; Lab work #9, Assembly and Exploded views</td>
</tr>
<tr>
<td><strong>13 4/23</strong></td>
<td>Lect.  - No lecture, work on design project  Lab. - SolidWorks; work on the design project</td>
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<tr>
<td><strong>14 4/30</strong></td>
<td>Lect.  - No lecture, work on design project (design project documentation)  Lab. - SolidWorks; work on the design project</td>
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<tr>
<td><strong>15 5/7</strong></td>
<td>Lab. - Exam 2, 2 ½ hour exam on SolidWorks skills (3D modeling).</td>
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<tr>
<td><strong>16 5/13</strong></td>
<td>Tuesday - Last day of the semester</td>
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Design Project deliverables are due by Tuesday May 13, 5:00 pm. Leave the project reports (no posters) in Youssefi’s mailbox in room 310 (ME office). No late project will be accepted.
Design students can be motivated to learn many of the theoretical and abstract concepts of engineering
science and analysis by embedding those concepts in practical, real world, design problems. This careful
melding of design and analysis can help design students strengthen their synthesis skills and appreciate
the practical value of much of their analysis-oriented courses.

The design project for this course is intended to familiarize you with some of the fundamental design
phases involved. For this design project you are required to:

1. Identify design problems (recognition of a need).
2. Explore alternative solutions (conceptual design).
3. Present your most promising solution.

Milestones have been set in order to keep you on schedule which will help you complete the project in a
timely fashion.

Design Project Schedule

Product list due date – Week 4 (2/19), turn in the list to the lab. instructor.
You are asked to come up with 5 ideas for either new products or modification of an existing product.
Think of things that “bug” you, that you wish someone would come up with a solution for or those
existing products that you think could be better designed. The list should only include ideas that can be
built physically. Ideas like solving the traffic problem is not suitable for this course. Turn in the list to
the lab. instructor for review and feedback.

Product sketch due (the problem) – Week 7 (3/12), turn in the sketch to the lab. instructor.
After discussion with the lab and/or lecture instructor, choose your most interesting idea and graphically
communicate your idea by sketching (3D freehand) the problem, use color and cartooning.

Solution sketch (the solution) – Week 11, (4/9), turn in the sketch to the lab. instructor.
After brainstorming possible solutions, choose the most promising one (with the help of the instructor)
and make a sketch (3D freehand) of the solution. Make sure you include as much detail as you have
thought of. Use color and cartooning. Your sketch should be self explanatory.

Design documentation – Weeks 13 and 14
Three lab periods are set aside for you to work on documenting your solution using solid modeling
capabilities of Inventor. Work on your design during the lab. periods.

The following items should be included in your final report.

1) Cover page with a description of your idea, 1-2 pages.
2) Three dimensional freehand sketch of the problem (on one page)
3) Three dimensional freehand sketch of the solution (on one page)
4) 3D assembly and exploded views of the product in color (SolidWorks)
5) 2D (orthographic) views of the product with overall dimensions (SolidWorks), on one page

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