San Jose State University  
Mechanical Engineering Department  

ME 20/Tech20  
Design & Graphics  
Fall 2013  

Faculty: Prof. Ken Youssefi,  
(Course Coordinator)  
Email: kyoussefi@aol.com  
Office: E-137  
Office hours: MW 12-1,  W 9:30-10:30  

Final Exam: Wed., Dec 11, 8:30-9:30 (design project presentation), Room E-407  

Lab. and Teaching Assistants: Gabriel Avila (gavila4@gmail.com), Maryam Khosrowshahi (maryam.khosrowshahi@gmail.com), Thien Van (thienvan@berkeley.edu), Vijetha Naveen (vijethanaveen@gmail.com)  

Course Website: www.engr.sjsu.edu/youssefi , course syllabus, lecture notes, project description, lab. assignments, homework solutions are posted  

Class time:  
Lecture  
Monday  9:00 – 9:50  (section 1, 46896) , E-189,  Youssefi  
Labs.  
Monday  1:30 – 4:15  (section 2, 46897),  E-407,  Instructor: Thien  
Tuesday  9:00 – 11:45  (section 3, 46898),  E-407,  Instructor: Maryam  
Wed.  1:30 – 4:15  (section 4, 46899),  E-407,  Instructor: Gabriel  
Thursday  1:30 – 4:15  (section 5, 46900),  E-407,  Instructor: Vijetha  

Course Description  
Introduction to graphical communication tools used by engineers. Orthographic projections, section and axillary views and dimensioning standards. Development of visualization and technical sketching skills in conjunction with orthographic and pictorial projections. Tolerance analysis for fabrication. Focus on solid modeling using computer-aided-design (CAD) software. Individual design project focusing on the design phases (concurrent engineering design).  

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: E10  

Custom edition for Mechanical Engineering Dept. (soft cover)  

Recommended Text: AutoCAD tutorial (2008), Creo 2.0 tutorial  
You may download a free copy of AutoCAD 2013/14 from Autodesk.com, and a copy of Creo 2.0 from PTC.com site  

Design Project: refer to the separate handout  

Homework: homework problems will be assigned a week before the due date. Homework is due after the lecture. Late homework, will not be accepted.  

Attendance: attendance in all lectures and labs are mandatory, absence will affect your grade.  

Laboratory assignments: Lab work will include 2D drawing (orthographic projections) and 3D drawing of an object using Creo 2.0. Lab work assigned has to be finished during the lab period, unless specified otherwise by the lab. instructors. No late assignments will be accepted. Lab period will also be used for the design project.
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.

Grading: Lab. Assignments & Homework 20%, Exams (three)  60% , Project 20%  
Final course grade is determined using a normal distribution curve. The average is given a grade Of C+. Grade distribution:  
Grade A  average plus one standard deviation and higher  
Grade B  average plus ½ standard deviation  
Grade C-  average minus ½ standard deviation  
Grade F  average minus one standard deviation and lower

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. 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 introduced students to the principal of orthographic projections.
- To introduce students to technical drawings; shop, assembly, and exploded.
- To introduce students to proper dimensioning and tolerancing.
- To introduce students to computer-aided design tools, 2D and 3D (solid 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 the standard two dimensional views (top, front and profile) of an object.
- Draw section and auxiliary views
- Properly dimension standard views for fabrication.
- Apply the proper tolerances to parts.
- Draw complicated two dimensional views of an object using AutoCAD.
- Draw three dimensional objects using Creo (solid modeling).
- Understand the engineering design process and the implementation of different design phases.
### COURSE SCHEDULE

<table>
<thead>
<tr>
<th>Week/Date (Mon.)</th>
<th>Subject</th>
<th>Reading Assign. (Ch., 6th ed.)</th>
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| 1 8/19           | Lect. - No lecture  
Lab. - No lab. | |
| 2 8/26           | Lect. - Introduction and course organization  
Orthographic projection and standard 2D views  
Lab. - AutoCAD; Intro to the CAD lab. and Tutorial 1 (lab. work #1) | (1, 5) |
| 3 9/2            | Lect. - **Holiday – Labor Day**  
Lab. - AutoCAD; Tutorial 2 (lab. work #2) | |
| 4 9/9            | Lect. - Orthographic projection continue  
Auxiliary views; classifications and applications  
Section views; full, half and broken, conventions  
Lab. - AutoCAD; Lab. work #3 (multiviews) | (1, 2, 7) |
| 5 9/16           | Lect. - Dimensioning and Tolerancing; rules and standards  
Lab. - AutoCAD; Lab. work #4 (dimensioning and tolerancing) | HW 1 due during lect. |
| 6 9/23           | Lect. - Pictorials; Isometric, oblique and perspective  
Lab. - Exam 1, all sections, 2½ -hr AutoCAD exam, (in the lab.) | HW 2 due during lect. |
| 7 9/30           | Lect. - Freehand sketching techniques, spatial visualization  
Lab. - Creo 2.0; Lab. work #5 (sketching, extrusion) | HW 3 due during lect. |
| 8 10/7           | Lect. - Introduction to 3D drawings; wireframe, surface and solid modeling, primitive solids, Boolean Operation  
Lab. - Creo 2.0, Lab. work #6 (3D modeling, 2D shop drawings and revolve) | (3, lecture notes) |
| 9 10/14          | Lect. - **Exam 2 (one hour) – Section 1, Monday 10/14, during the lecture period**  
Lab. - Creo 2.0; Lab. work #7, solid modeling, sweeps and blends | (1) |
| 10 10/21         | Lect. - Engineering Design Process; Concurrent engineering  
Lab. - Creo 2.0; Lab. work #8 (solid modeling) | (lecture notes) |
| 11 10/28         | Lect. - Solids modeling; Assembly drawing, various mates, Top-down and bottom-up design approach  
Lab. - Creo 2.0; Solid modeling; assembly and exploded views, Lab. work #9 (assembly) | (lecture notes) |
| 12 11/4          | Lect. - Formal engineering drawing and practices, shop drawings, assembly and exploded views, design project poster discussion  
Lab. - Creo 2.0; Lab. work # 10 (design problem, table) | (11) |
| 13 11/11         | Lect. - **Holiday – Veteran’s Day**  
Lab. - Creo 2.0; Design project documentation | |
| 14 11/18         | Lect. - Structural and welding drawings  
Lab. - Creo 2.0; Design project documentation | (lecture notes) |
| 15 11/25         | Lect. - Manufacturing processes  
Lab. - Creo 2.0; Design project documentation | (lecture notes) |
| 11/28-29         | **Holiday (Th, F) - Thanksgiving** | |
| 16 12/2          | Lect. - Design project poster discussion and exam review  
Lab. - Exam 3 (Creo) all lab. Sections; Monday (12/2), Tuesday (12/3), Wednesday (12/4), Thursday (12/5), 2½ hour exam during the lab. period. | |
| 17 12/9          | Lect. - No lecture or lab., last day of the semester | |

**Design project poster Due Date**

**Wed., Dec. 11, 8:30-9:30, E-407 (lab.)**

*No late poster will be accepted.*

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