| **E 28** | **Basic Engineering Design Graphics** | **Fall 2014** |

Faculty: Prof. Ken Youssefi
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Office Hours: TuTh 9:00 – 10:45
Class website: http://bcourse.berkeley.edu (use CalNet ID and password to login)

Description:

Engineering sketching and drawing. Drawing conventions, computer graphics, and modeling. The fundamentals of orthographic projection with applications. Classical descriptive geometry, 3D drawing. Parametric and feature based solids modeling. Graphical analysis, and the documentation and presentation of engineering information. This course will introduce and emphasize the use of Computer-Aided-Design software as the major graphical analysis and design tool. A group design project is required. 3 units.

Lecture: TuTh 8:00 – 9:00,   120 Latimer

Laboratory:	section 101	Wed.	3:00 – 6:00	1171 Etcheverry Hall	GSI - Logan
	section 102:	Wed.	3:00 – 6:00	2107 Etcheverry Hall	GSI - Rebecca
	section 103	Th.	3:30 – 6:30	1171 Etcheverry Hall	GSI - Logan
	section 104	Th.	3:30 – 6:30	2107 Etcheverry Hall	GSI - Rebecca
	section 105	F	9:00 – 12:00	2107 Etcheverry Hall	GSI - Jake

Graduate Student Instructors (GSI): Rebecca Usoff, rusoff@berkeley.edu and Logan van Engelhoven, logan.vanengelhoven@berkeley.edu and Jake Wolf, Jacob.a.wolf.12@gmail.com

Textbooks:

Required,
Lieu, D.K., and Sorby, S.A., Visualization, Modeling, and Graphics for Engineering Design, Cengage Publishers, 2009

Recommended,
Lieu, D.K., Graphics Interactive CD, McGraw-Hill publication, 1997.

AutoCAD 2014, free download from Autodesk.com website with UC Berkeley email account
SolidWorks 2014, free download with the SDK ID, will be provided in the class

Reference:
Earle, James, Graphics for Engineering, Prentice-Hall, 6th edition, 2003
Bertoline, Gary, Fundamentals of Graphics Communication, McGraw-Hill, 6th edition, 2011

A variety of AutoCAD and SolidWorks tutorials are available online or in bookstores. Tutorials may be used as reference material for those with little or no CAD experience. Some of the tutorials are also available in the library

Organization:

15 weeks of lecture (twice weekly). Weekly laboratories and homework assignments. One group design project. Two midterm examinations. One final examination.

The first midterm examination is scheduled for Thursday, Oct. 9. The first examination will be administered from 8:00 - 9:00 in the lecture room. No CAD is included in the first exam.
The second exam is scheduled for Thursday Nov. 6. A portion of the second examination will include the use of AutoCAD, the written and AutoCAD exam will be administered in the lab., 1171 and 2107 Etcheverry Hall, between 2:00 – 5:00 pm and 6:00 – 9:00 pm.
The final exam is scheduled for Wed. Dec. 17. The final exam will include SolidWorks, the written and SW exam will be administrated in 1171 and 2107 Etch. Hall from 11:00-2:00 and 3:00-6:00 pm.

Availability for lectures, laboratories and all examinations is required for enrollment in the class.

Homework:

Homework sets are due on Tuesdays by 5 pm. The due dates are indicated in the course syllabus. Hard copies of completed homework sets are to be submitted in the labeled box located on the south wall of the 3rd floor of Etcheverry Hall. Write your lab section number on the first page of your homework, upper right corner. Solutions will be posted on the website on Fridays. ***Late homework will be marked off by 50% and will not be accepted after the solution has been posted.***

Grading: The final course grade will be based on a normal distribution curve.
      20%   Homework and Laboratory
      20%   Design Project
      15%   Midterm Examination #1 (1 hr.)
      20%   Midterm Examination #2 (3 hrs.)
      25%   Final Examination (3 hrs.)

Laboratory:

Laboratories begin with the first week of class. The first week of class, you must attend the laboratory originally assigned to you. You may forfeit your enrollment in the class if you are absent from both the laboratory and the lecture during the first week of class. The purpose of the laboratory sections is to offer a forum where students can discuss, and receive assistance with lecture and homework material. At the beginning of each lab session, the GSI will usually present a short review of the week's lecture material, and provide useful hints for CAD work. The remainder of the lab should be spent on working on homework problems.

The computers in the design laboratories (1171 instead of 2105 and 2107 Etcheverry Hall) are available for use except when a class is in session. The use schedule will be posted outside the doors of the laboratories. The labs are locked after 6 pm and on weekends. The building is locked at 7 pm and on weekends, however, students enrolled in the class can obtain card key activation to access the labs and the building with the proximity card key feature of your student ID. Card key activation may be obtained from https://www.me.berkeley.edu/acounttool for a $5 activation fee (through CARS). You need to be listed on the bCourse roster.

Most homework assignments will require the use of the computer. The CAD workstations in rooms 2105 and 2107 Etcheverry Hall are provided for student use in this and other courses. More PC's are available for use in 2109 Etcheverry Hall. Use your CalNet ID and password to logon to the computers. Storage quota is 200 MB. You are responsible for backing up your work, use USB memory as often as necessary. There will be a grace period of 3 weeks before students without cardkeys activation will be denied access. Do not allow anyone else into the labs without asking them to also swipe their cardkey.

The software is AutoCAD 2014 by AutoDesk, for computer-assisted-drawing, and Solidsworks 2014 Educational Edition for parametric solids modeling. Both software are installed in rooms 2105, 2107.

If problems are encountered with a machine, place a note under the keyboard describing the problem, and move to another machine. Notify the system administrator by email, mesupport@me.berkeley.edu. Keep the labs secure, do not allow unauthorized access. Please notify one of the instructors or campus security of any suspicious persons or events in, or near, the design laboratory. Theft of computer equipment and personal property has been a problem in the labs. The doors to the laboratories must be kept closed at all times for security and HVAC purposes. DO NOT BLOCK OPEN THE DOORS.

NO FOOD OR DRINKS IN THE LABS. Accounts are subject to termination for this violation.

Academic Honesty

All students should be familiar with the Code of Student Conduct and know that the general rules and students rights stated in the document apply to this class (see http://uga.berkeley.edu/SAS/osc.htm). With regard to homework assignments, not only are you allowed, but you are encouraged, to discuss the problems and techniques with other students; but each student must do his or her version of the solution. Submitting someone else's work as your own or knowingly allowing someone else to turn in your work as their own will result in a zero grade for the assignment for all involved and will be reported to the Office of Student Conduct. Cheating on the examinations will result in a failing grade in the course and your action will be reported to the Office of Student Conduct for administrative review.

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Course Schedule

Week	Dates		Topics	Reading Assignment Lieu & Sorby	HW Assignment Text and handout
1	8/28		Introduction to the course and design project	Ch. 1	
2	9/2		Freehand sketching, Spatial skills	Ch. 2	
	9/4		Mental visualization, image rotation, reflection	Ch. 3	
3	9/9		Orthographic projection and standard 2D views	Ch. 10	Homework set #1
	9/11		Pictorials; freehand sketch	Ch. 12	(Freehand)
			Isometric, oblique and perspective		
4	9/16		Section views; full, offset, half and broken	Ch. 13	Homework set #2
	9/18		Auxiliary views: Full and partial	Ch. 14	(Freehand)
			Dimensioning and Tolerancing conventions, MMC	Ch. 15	
5	9/23		Geometric dimensioning and Tolerancing (GDT)	Ch. 16	Homework set #3
	9/25		Formal engineering (working) drawing and practices.	Ch. 18	(Freehand)
6	9/30		Descriptive Geometry; Introduction to 1st and 2nd		Homework set #4
	10/2		Principles of orthogonal projection		(AutoCAD)
			Descriptive Geometry; lines, distances and visibility,	Notes	
7	10/7		Design project discussion, exam review		
			Problem solving with Descriptive Geometry	Notes	
	10/9		**Midterm Examination #1 (written exam only)**		
8	10/14		More Descriptive Geometry; planes, angles,	Notes	Homework set #5
			Intersection of a line and a plane (piercing point).		(AutoCAD)
	10/16		Engineering Design Process, Concurrent Engineering	Notes	
			Design teams are formed in the lab.		
9	10/21		Introduction to 3D CAD drawings; wireframe, surface and	Ch. 6	Homework set #6
			solid modeling, Boolean operations		(AutoCAD)
	10/23		Methods of creating solid models; Boundary rep		
			Constructive Solid Geometry, Parametric modeling		
10	10/28		Design intent, parametric dimensions	Ch. 6	Homework set #7
	10/30		Solid modeling techniques; Extrusions, Revolutions and Sweeps		(AutoCAD)
			Project conceptual design sketches due		
11	11/4		Assembly modeling; Top-down and bottom-up modeling	Ch. 7	Homework set #8
			Mates in assembly, exploded views		(SolidWorks)
	11/6		**Midterm Examination #2 (written & AutoCAD exam)**		
12	**11/11**		**Holiday (Tu) – Veteran's Day**		Homework set #9
	11/13		Advance solid modeling techniques, sweeps and lofts	Notes	(SolidWorks)
13	11/18		Rapid Prototyping, Engineering analysis (FEA) using CAD		Homework set #10
	11/20		Manufacturing processes	Ch. 9	(SolidWorks)
14	11/25		Manufacturing processes	Ch. 9	
	11/27		*Holiday – Thanksgiving*		
15	12/2		Structural drawings	Notes	
	12/4		Fasteners: Screws, Bolts and rivets	Ch. 17	
	12/3 & 12/4		**Project oral presentation during the lab. period, Wednesday and Thursday**		
16	12/9	RRR	No class Work on the project		
	12/11	Week	No class **Project demo & contest on Thursday Dec. 11, 1:30 – 4:30**		

Final Exam (SolidWorks & written) – Wednesday Dec. 17, 11:00 – 2:00 and 3:00 – 6:00 pm

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