

## **E 128 - Advanced Engineering Graphical Communication, Spring Semester 2008**

**Instructor:** Prof. D.K. Lieu                      email: [dlieu@me.berkeley.edu](mailto:dlieu@me.berkeley.edu)  
5128 Etcheverry Hall  
642-4014  
Office Hours: TuTh 10-12

**GSI's:** Kim Lau, [lauk@berkeley.edu](mailto:lauk@berkeley.edu)  
TBA

**Readers:** TBA

### **Description:**

Advanced, 3-dimensional graphics tools for engineering design. Parametric solids modeling: parts modeling using constructive solids, sweeping, rotation, Boolean operations, and feature based modeling. Assembly modeling and creation of working drawings. Computer rendering, viewing, and presentation of solids. Technical presentation using computer animation and multimedia techniques. A design project is required. E28, or equivalent, is required for this course. 3 units.

Lectures:            TuTh 2-3 PM, 2105 Etcheverry Hall  
Laboratory:        W 6-9 PM, 2105 Etcheverry Hall

### **Required Textbooks:**

*Autodesk Viz 2007 Fundamentals*, Ethier and Ethier, Pearson Prentice Hall Publishers, 2007 (or later).

*Pro/Engineer Wildfire 3.0 Instructor*, David Kelly, McGraw-Hill Publishers, 2006 (or later).

### **Organization:**

15 weeks of lecture. Open laboratories. Weekly or semi-weekly homework assignments. One group design project.

### **Laboratory:**

Laboratories begin with the second week of class. The laboratories have an "open" format. After your enrollment is confirmed, attendance in laboratory sections is required for at least one hour during the scheduled time. The purpose of the laboratory sections is to provide a forum where students can discuss, and receive assistance with, lecture and homework material with the instructor, GSI, and other students. Although laboratory attendance is not required for the entire session, it is highly recommended.

### **Facilities:**

The building is locked at 5:00 PM and on weekends, however, students enrolled in the class can access the building with a card key. The laboratories are locked at all times, and are accessible only with a card key. Card activation will be through Sherell Gordon in room 5104 Etcheverry Hall. The activation fee is \$10.

The CAD workstations in room 2105 and 2107 Etcheverry Hall are provided for student use in this course. The computers in 2109 Etcheverry Hall are older machines with low graphics capability, and can be used if the 2105 and 2107 labs are in use or full. The student stations in the 2105, 2107 and 2109 laboratories are networked to a fileserver and a printer in each room. Each student will receive approximately 300 MB of file storage space on the fileserver. Each student is recommended to have a USB drive, for file transfer and back-up. Most homework assignments will require the use of the computer workstation. The software used for this course will be PTC Pro/ENGINEER Wildfire 3.0, and Autodesk 3D Studio Viz 2007.

If problems are encountered with a machine, place a note under the keyboard describing the problem, and move to another machine, otherwise the instructors have no way of knowing that a machine is down. Keep the room 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.

**\*\*\*\*\* WARNINGS \*\*\*\*\***

**FOOD AND DRINK ARE NOT PERMITTED INSIDE THE LABORATORIES.**

**DO NOT PROVIDE ROOM ACCESS OR MACHINE ACCESS TO ANYONE NOT ENROLLED IN THE COURSE.**

**DO NOT MAKE COPIES OF THE SOFTWARE OR MANUALS, NOT EVEN FOR PERSONAL USE. THIS IS ILLEGAL.**

**DO NOT INSTALL ANY SOFTWARE NOT LICENSED FOR USE ON ANY OF THE MACHINES. THIS IS ILLEGAL.**

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**Scoring:**       60% Homework  
                  40% Final Project

## Engineering 128, Spring Semester 2008

<u>Week</u>	<u>Dates</u>	<u>Material</u>
1	1/24	Class introduction, attendance, computer accounts. <b>Solid Part Modeling.</b> The file system. The user interface: The desktop, moving and viewing in 3D, interrogating models.
2	1/29, 1/31	Working with the Sketcher. Sketcher mode and tools. Creating geometry and constraints. Sketched features. Extrusion and rotation to create solids. Soft and hard dimensions.
3	2/5, 2/7	Creating holes and other features. Shelling. Using reference geometry. Parent/Child relationships.
4	2/12, 2/14	Sweeps and Blends. Sweep trajectories and parallel blends. Parametric relations and parameters.
5	2/19, 2/21	<b>Project Organization.</b> Duplicating features. Using copy and mirror options. Resolving regeneration problems.
6	2/26, 2/28	<b>Technical Animation.</b> Animator user interface, moving and viewing in 3D, visibility and shading options. 2-D shaping with vertices. Translation, rotation, and scaling.
7	3/4, 3/6	Working with 3D primitives. Boolean operations. Importing of 3D files. 3-D surface generation with lofting.
8	3/11, 3/13	Getting the point across. What needs to be shown? Storyboarding.
9	3/18, 3/20	Editing of complex 3-D models. Scale, Twist, Teeter, and Fit Operations. 3D Loft Paths. Importing and exporting model files.
10	4/1, 4/3	The Material Editor. Rendering. Stock materials. Custom materials. Creating backgrounds and scenes. Lighting. Cameras views.
11	4/8, 4/10	Animation. Key Frames. Motion of parts. Lights, and cameras. Tension, continuity, and bias, and other controllers. Morphing of geometry and materials
12	4/15, 4/17	Parent-Child relationships of joined parts. Inverse kinematics. Special effects. Audio files. Exporting of animation files. <b>Project Reviews.</b>
13	4/22, 4/24	<b>Technical Documentation.</b> Working drawings. Standard, isometric, and section Views. Dimensioning. Tolerancing, datums, and control features.
14	4/29, 5/1	<b>Assembly Modeling.</b> The surface normal vector. Assembly constraints. Exploded views. Bill-of-Materials. Layers and suppression of parts and layers.
15	5/6, 5/8	Information tools. Measurement, mass properties, interference. Customizing the modeler interface.

\* Notes:                   Spring Break is 24-28 March