E 128 / ME 292C - Advanced Engineering Graphical Communication
Fall Semester 2020

Instructor: Prof. D.K. Lieu   email: dlieu@me.berkeley.edu
5128 Etcheverry Hall
642-4014
Office Hours: MW 10-12 AM (by Zoom at 632 057 7019)

GSI/Readers: Jungpyo Lee
Office Hours: TBA

TBA
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Description:

Advanced 3-dimensional graphics tools for engineering design. Parametric solids modeling: parts modeling using constructive solids, sweeps, 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. E26, or equivalent, is required for this course. 3 units.

Lectures: TuTh 12:30 – 2 (by Zoom at 632 057 7019)
Laboratory: Th 6:30-9:30 PM (Zoom channel TBA)

Recommended Textbooks:

3DS Max 2020 Complete Reference Guide, Kelly Murdock, ISBN: 978-1630572532, SDC Publications

Creo Parametric 6.0 Tutorial, R. Toogood, ISBN: 978-1-63057-207-5, SDC Publications

Organization:

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

Final projects for E128 students will be the modeling and animation of a mechanical device of moderate complexity. The animation must include the assembly and operation of the device, including at least one operating principle that is difficult to visualize during normal operation.

Final projects of ME292C students must, in addition, be of a device of original product concept of moderate mechanical complexity that does not yet exist in the marketplace. The animation must include the assembly and operation of the device, including at least one operating principle that is difficult to visualize during normal operation.ME292C students must be in a project group with other ME292C students.

To find E128 final projects from previous years, go to http://www.youtube.com.
Search for *E128 project.*

Laboratory:

Laboratories begin the second week of class. In-person lab attendance is not required. 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.

All homework assignments will require the use of a computer with the course software. You are required to have a back-up copy of all your homework assignments, dated on or before their due dates. The software used for this course will be PTC Creo Parametric 6.0, and Autodesk 3D Studio Max 2020.

Scoring: 　　60% Homework
　　　　　　　40% Final Project

E128/ME292C, Fall 2020

Week	Dates	Material
1	8/27	Class introduction, attendance, computer accounts. The file system. .
2	9/1, 9/3	**Solid Part Modeling**. The user interface: The desktop, moving and viewing in 3D, interrogating models. Sketcher mode and tools. Creating geometry and constraints. Construction geometry. Soft and hard dimensions.
3	9/8, 9/10	Extrusion and rotation to create solids. Creating features. Shelling.
4	9/15, 9/17	Using reference geometry. Parent/Child relationships. Sweeps and Blends. Sweep trajectories and parallel blends.
5	9/22, 9/24	Parametric relations and parameters . Duplicating features. Copy and mirror. Arrays. Part families.
6	9/29, 10/1	**Project Organization.** Formation of project teams. **Technical Animation.** Animator user interface, moving and viewing in 3D, visibility and shading options. 2-D shaping with vertices. Translation, rotation, and scaling.
7	10/6, 10/8	Working with 3D primitives. Boolean operations. Importing of 3D files. 3-D surface generation with lofting. Translation, rotation, and scaling. Duplication of objects.
8	10/13, 10/15	Editing of complex 3-D models. Scale, Twist, Teeter, and Fit Operations. 3D Loft Paths. Importing and exporting model files.
9	10/20, 10/22	The Material Editor. Rendering. Stock materials. Custom materials. Composite materials and Decaling. Creating backgrounds and scenes. Lighting. Camera views.
10	10/27, 10/29	Animation. Key Frames. Motion of parts. Lights, and cameras. Tension, continuity, and bias (TCB), and other controllers. Morphing of geometry and materials
11	11/3, 11/5	Parent-Child relationships of joined parts. Inverse kinematics.
12	11/10, 11/12	Special effects. Audio files. Exporting of animation files. **Assembly Modeling.** The surface normal vector. Assembly constraints.
13	11/17, 11/19	**Technical Documentation.** Working drawings, standard and supplementary views. Dimensioning and tolerancing, GD&T
14	11/24*	Academic holidays
15	12/1, 12/3	Focus on Projects. Review.

* Notes: 7 September is an academic holiday (Labor Day)
        11 November is an academic holiday (Veterans' Day)
        25 November is a non-instruction day
        26, 27 November are academic holidays (Thanksgiving)