ITP 228 – Computer-Aided Modeling for 3D Product Design
Units: 2
Fall 2022

Location: TBD

Instructor: Raymond Kim
Office: TBD
Office Hours: TBD
Contact Info: raymonmk@usc.edu

Teaching Assistant: TBD
Office: TBD
Office Hours: TBD
Contact Info: TBD

IT Help: Provided by Viterbi IT
Hours of Service: 8am–5pm M-F
Walk-in: DRB 205
Contact Info: (213) 740-0517
Email: engrhelp@usc.edu
Course Description
In this course, students will learn the fundamentals of 3D modeling. The course focuses on being able to think, plan, and create in three dimensional space using extrusions, surfaces, and equation driven curves drawn in two dimensional sketches. Emphasis is put on design for 3D printing technologies for rapid prototyping of models.

Required Online Subscription
This course will make use of online tutorial videos designed to enhance student learning. Online videos are part of a subscription that lasts for one full calendar year.

To sign up, please visit: https://app.solidprofessor.com/iframes/studentstore.asp

Learning Objectives
At the end of the course students will be able to:
- Visualize, plan, and create sketches in 2-dimensional space
- Properly dimension sketch parameters for manufacturing
- Create objects in 3-dimensional space
- Utilize solid-body tools to create extrudes, sweeps, revolves and lofts
- Create and visualize multi-body assemblies with full articulation considering 6 DOF motion
- Plan, stage, and print 3D models using SLA and FDM printing methodologies

Format
This course will make use of Blackboard for content and assignments. Lecture slides and any supplemental course content will be posted to Blackboard for use by all students. Any and all announcements for the course will be posted to Blackboard. All assignments will be posted to Blackboard and will be submitted through Blackboard. Please familiarize yourself with Blackboard before the course begins.

Assignments
Students will be given assignments to be completed outside of class. Assignments will consist of a model, or set of models to be completed and turned in to Blackboard. Some assignments will require an actual printed product as part of the requirements.

Final Project
Students will be tasked with a final product to be printed. The final project will be to design, model, and print a system/object of the student’s choosing. The project must contain no less than 5 different parts and must be approved by the instructor for complexity and difficulty. The final project is graded on the following:
- 15% - Proposal
- 40% - Modeling
- 30% - Final Printed Prototype
- 15% - Presentation

Students must submit a proposal for approval by the instructor. Once the proposal has been approved, students may begin working on their project. If the proposal is not approved, students must resubmit a new proposal or idea.

Students will be required to do a short (~10 minute) presentation on their product. They must discuss the design, modeling, and printing processes.
Grading Breakdown

<table>
<thead>
<tr>
<th>Assignment</th>
<th>% of Grade</th>
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<tbody>
<tr>
<td>Homework 1</td>
<td>10</td>
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<td>Homework 2</td>
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<td>Homework 3</td>
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<td>Homework 4</td>
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<td>Homework 5</td>
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<tr>
<td>Homework 6</td>
<td>10</td>
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<tr>
<td>Final Project</td>
<td>40</td>
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<td>TOTAL</td>
<td>100</td>
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Grading Scale
Course final grades will be determined using the following scale

A  93-100
A- 90-92.99
B+ 87-89.99
B  83-86.99
B- 80-82.99
C+ 77-79.99
C  73-76.99
C- 70-72.99
D+ 67-69.99
D  63-66.99
D- 60-62.99
F  59 and below

Assignment Submission Policy
All assignments are to be submitted through Blackboard.

Grading Timeline
Grading shall be completed no later than one week after due date.

Late Work
No late work will be accepted.
## Course Schedule: A Weekly Breakdown

<table>
<thead>
<tr>
<th>Week</th>
<th>Topics/Daily Activities</th>
<th>Readings</th>
<th>Homework</th>
<th>Deliverable</th>
</tr>
</thead>
<tbody>
<tr>
<td>Week 1</td>
<td>Working in 3D space</td>
<td>SP Week 1 Videos</td>
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<td></td>
<td>Changing views</td>
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<tr>
<td></td>
<td>Basic Sketching</td>
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<tr>
<td>Week 2</td>
<td>Sketch relationships</td>
<td>SP Week 2 Videos</td>
<td>Homework 1: Basic Sketching</td>
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<td></td>
<td>Dimensions and constraints</td>
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<tr>
<td>Week 3</td>
<td>Creating 3D Parts: Extrusions</td>
<td>SP Week 3 Videos</td>
<td>Homework 2: Constrained Design</td>
<td>Homework 1 Due</td>
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<tr>
<td></td>
<td>Creating 3D Parts: Cutting</td>
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<tr>
<td>Week 4</td>
<td>Creating 3D Parts: Sweeps</td>
<td>SP Week 4 Videos</td>
<td>Homework 3: Advanced Parts</td>
<td>Homework 2 Due</td>
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<td>Creating 3D Parts: Revolves</td>
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<td>Week 5</td>
<td>Working with complex geometry: Lofts</td>
<td>SP Week 5 Videos</td>
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<tr>
<td>Week 6</td>
<td>Working with complex geometry: Surfaces</td>
<td>SP Week 6 Videos</td>
<td>Homework 4: Multi-Part Printing</td>
<td>Homework 3 Due</td>
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<tr>
<td>Week 7</td>
<td>Putting it all together: Assemblies</td>
<td>SP Week 7 Videos</td>
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<td>Proposal Due</td>
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<td>Week 8</td>
<td>Understanding how it fits together: Motion</td>
<td>SP Week 8 Videos</td>
<td>Homework 5: Print-in-place</td>
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<td>Week 9</td>
<td>3D Printing Material Selection</td>
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<td>Week 10</td>
<td>3D Printing considerations: Building enclosures and mechanical parts</td>
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<td>Homework 6: Building Enclosures</td>
<td>Homework 5 Due</td>
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<td>Week 11</td>
<td>3D Printing Basics: The Build Plate</td>
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<td>Week 12</td>
<td>3D Printing Basics: Organizing Prints Overhangs</td>
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<td>Week 13</td>
<td>Print Parameters</td>
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<td>Print Speed and Layer Height</td>
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<td>Week 14</td>
<td>Infill: Weight vs. Structure Supports</td>
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<td>Week 15</td>
<td>Advanced Topics in 3D Printing</td>
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<tr>
<td>FINAL</td>
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<td>Final Project Due</td>
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<td>Final Presentation</td>
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Statement on Academic Conduct and Support Systems

Academic Conduct:

Plagiarism – presenting someone else’s ideas as your own, either verbatim or recast in your own words – is a serious academic offense with serious consequences. Please familiarize yourself with the discussion of plagiarism in SCampus in Part B, Section 11, “Behavior Violating University Standards” policy.usc.edu/scampus-part-b. Other forms of academic dishonesty are equally unacceptable. See additional information in SCampus and university policies on scientific misconduct, policy.usc.edu/scientific-misconduct.

Support Systems:

Counseling and Mental Health - (213) 740-9355 – 24/7 on call studenthealth.usc.edu/counseling
Free and confidential mental health treatment for students, including short-term psychotherapy, group counseling, stress fitness workshops, and crisis intervention.

National Suicide Prevention Lifeline - 1 (800) 273-8255 – 24/7 on call suicidepreventionlifeline.org
Free and confidential emotional support to people in suicidal crisis or emotional distress 24 hours a day, 7 days a week.

Relationship and Sexual Violence Prevention Services (RSVP) - (213) 740-9355(WELL), press “0” after hours – 24/7 on call studenthealth.usc.edu/sexual-assault
Free and confidential therapy services, workshops, and training for situations related to gender-based harm.

Office of Equity and Diversity (OED) - (213) 740-5086 | Title IX – (213) 821-8298 equity.usc.edu, titleix.usc.edu
Information about how to get help or help someone affected by harassment or discrimination, rights of protected classes, reporting options, and additional resources for students, faculty, staff, visitors, and applicants.

Reporting Incidents of Bias or Harassment - (213) 740-5086 or (213) 821-8298 usc-advocate.symplicity.com/care_report
Avenue to report incidents of bias, hate crimes, and microaggressions to the Office of Equity and Diversity | Title IX for appropriate investigation, supportive measures, and response.

The Office of Disability Services and Programs - (213) 740-0776 dsp.usc.edu
Support and accommodations for students with disabilities. Services include assistance in providing readers/notetakers/interpreters, special accommodations for test taking needs, assistance with architectural barriers, assistive technology, and support for individual needs.
USC Campus Support and Intervention - (213) 821-4710
campusupport.usc.edu
Assists students and families in resolving complex personal, financial, and academic issues adversely affecting their success as a student.

Diversity at USC - (213) 740-2101
diversity.usc.edu
Information on events, programs and training, the Provost’s Diversity and Inclusion Council, Diversity Liaisons for each academic school, chronology, participation, and various resources for students.

USC Emergency - UPC: (213) 740-4321, HSC: (323) 442-1000 – 24/7 on call
dps.usc.edu, emergency.usc.edu
Emergency assistance and avenue to report a crime. Latest updates regarding safety, including ways in which instruction will be continued if an officially declared emergency makes travel to campus infeasible.

USC Department of Public Safety - UPC: (213) 740-6000, HSC: (323) 442-120 – 24/7 on call
dps.usc.edu
Non-emergency assistance or information.