

# USC Viterbi

School of Engineering  
*Information  
Technology Program*

## **ITP 228 – Computer-Aided Modeling for 3D Product Design**

**Units: 2**

**Fall 2020—Monday/Wednesday—2:00pm – 3:20pm**

**Location:** KAP 148

**Instructor:** Raymond Kim

**Office:** OHE 530G

**Office Hours:** TBD

**Contact Info:** [raymonmk@usc.edu](mailto: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](mailto: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

Students will be able to manipulate and create objects in three dimensions using 2D sketches, surfaces, extrusions, cuts, and lofts. Students will demonstrate ability to produce models and convert them to printable file formats. Students will demonstrate ability to design models for ease of manufacturing using 3D printing methods.

## 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.

## 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

| Assignment    | % of Grade |  |
|---------------|------------|--|
| Homework 1    | 10         |  |
| Homework 2    | 10         |  |
| Homework 3    | 10         |  |
| Homework 4    | 10         |  |
| Homework 5    | 10         |  |
| Homework 6    | 10         |  |
| Final Project | 40         |  |
|               |            |  |
| <b>TOTAL</b>  | <b>100</b> |  |

## 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

|                | Topics/Daily Activities   | Readings         | Homework                          | Deliverable                             |
|----------------|---|------------------|-----------------------------------|---|
| <b>Week 1</b>  | Working in 3D space<br>Changing views<br>Basic Sketching              | SP Week 1 Videos |                                   |   |
| <b>Week 2</b>  | Sketch relationships<br>Dimensions and constraints                    | SP Week 2 Videos | Homework 1: Basic Sketching       |   |
| <b>Week 3</b>  | Creating 3D Parts: Extrusions<br>Creating 3D Parts: Cutting           | SP Week 3 Videos | Homework 2:<br>Constrained Design | Homework 1 Due                          |
| <b>Week 4</b>  | <b>NO CLASS: LABOR DAY</b><br>Creating 3D Parts: Sweeps and Revolves  | SP Week 4 Videos | Homework 3: Advanced Parts        | Homework 2 Due                          |
| <b>Week 5</b>  | Working with complex geometry: Lofts                                  | SP Week 5 Videos |                                   |   |
| <b>Week 6</b>  | Working with complex geometry: Surfaces                               | SP Week 6 Videos | Homework 4: Multi-Part Printing   | Homework 3 Due                          |
| <b>Week 7</b>  | Putting it all together: Assemblies                                   | SP Week 7 Videos |                                   | Proposal Due                            |
| <b>Week 8</b>  | Understanding how it fits together: Motion                            | SP Week 8 Videos | Homework 5: Print-in-place        |   |
| <b>Week 9</b>  | 3D Printing Material Selection  |                  |                                   |   |
| <b>Week 10</b> | 3D Printing considerations: Building enclosures and mechanical parts  |                  | Homework 6: Building Enclosures   | Homework 5 Due                          |
| <b>Week 11</b> | 3D Printing Basics: Organizing Prints<br>Infill: Weight vs. Structure |                  |                                   |   |
| <b>Week 12</b> | 3D Printing Basics: Print-in-Place<br>Overhangs                       |                  |                                   |   |
| <b>Week 13</b> | Advanced Topics in 3D Printing  |                  |                                   | Homework 6 Due                          |
| <b>FINAL</b>   |   |                  |                                   | Final Project Due<br>Final Presentation |

## 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](http://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](http://policy.usc.edu/scientific-misconduct).

### Support Systems:

*Counseling and Mental Health - (213) 740-9355 – 24/7 on call*  
[studenthealth.usc.edu/counseling](http://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](http://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](http://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](http://equity.usc.edu), [titleix.usc.edu](http://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](http://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](http://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*

[campussupport.usc.edu](http://campussupport.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](http://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](http://dps.usc.edu), [emergency.usc.edu](http://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](http://dps.usc.edu)

Non-emergency assistance or information.