## Modeling Products I1 ACAD189



**Units: 2**

**Term: Fall 2021 Day: T/TH Time: 6-8PM**

**Location:** [IYH](https://web-app.usc.edu/maps/?b=IYH) 210

**Instructor:** Adam Hughes

**Office: TBD**

**Office Hours:** T/TH 12-2PM or by Apt.

**Contact Info: adamhugh@USC.edu**

**IT Help:** <http://iovine-young.usc.edu/ait/index.html>

**Hours of Service:** M–F, 8:30am–5:30pm

**Contact Info:** iyhelp@usc.edu, 213.821.6140

**Catalogue Description**

Course includes an investigation of techniques specific to intermediate CAD design and design improvements and manufacturing prototypes Students will be encouraged to creatively make design improvements using simulation, modify design for production, use DDM (direct digital manufacturing) for prototypes and technically critique each other’s work.

**Course Description**

Introduction to the study of part design and modeling for manufacturing are necessary traits for todays markets and success. The course offers students who have received the theoretical understand of engineering/business practices and (prerequisite course) Modeling Products 1 and provides insight on the next step of the process: critiquing the design, tooling, manufacturing, prototyping and taking a product to market.

Coursework begins by introducing advanced Solidworks techniques to students and developing a CAD foundation. Students will investigate means of production and manufacturing using traditional tools offered in Solidworks (Plastics, FEA, CAM, Visualize and Surfacing). The end goal will be to create a product and develop all aspects of delivery (design, tooling, packaging) using CAD, Simulation and DDM (direct digital manufacturing)

**Learning Objectives**

Students will be able to demonstrate:

• A knowledge of advanced tools in the Solidworks software suite
• Competency in 3D design software add-in tools (Plastics, FEA, CAM, Visualize)
• An improved understanding of the scope/depth of manufacturing processes
• A knowledge of Direct Digital Manufacturing and Prototyping (CAM)

• Capability to critique a product/design/Tell-Show-Tell presentation technique

• Capability to virtually test and optimize designs / Cost & Production research

**Prerequisite(s):** Windows 10, Modeling Products 1 ACAD 188

**Co-Requisite(s):** None

**Concurrent Enrollment:** None

**Course Notes**

All course work is assigned and recorded through blackboard. Students with PC’s will need Windows 10 installed with all the latest updates / service packs and at least 20GB free for SOLIDWORKS install. Students with MAC Books will need to bootcamp their computer, install Windows 10 and Install SOLIDWORKS. The IT department in Iovine and Young Academy will assist with this effort and provide windows 10 activations

**Technological Proficiency and Hardware/Software Required**

SOLIDWORKS (Student Edition)

**USC Iovine and Young Academy Software Purchase**

The following software are now available for purchase online through USC Bookstore. Please check your course syllabi to see what Academy courses require the software.

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| **Software** | **IYA Short-Term License at USC Bookstore** |
| SolidWorks | $35 semester license (expires May 10, 2019)  |
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How to purchase software at the Academy rate through the USC Bookstore:

1. Visit the USC Bookstore online [here](https://www.uscbookstore.com/usciyasoftware).
2. Select the software license(s) you would like to purchase (search Solidworks)
3. When you proceed to checkout, add the Promo Code “IYASoftware” (This will override the listed taxes)
4. For shipping, select FedEx Home Delivery (free)
5. Once you complete your online purchase, you will receive a confirmation email/receipt.
6. **Upload your receipt**[**here**](https://iovineyoung.wufoo.com/forms/shortterm-software-license-request-form/)**if you are an undergraduate student, and** [**here**](https://iovineyoung.wufoo.com/forms/msidbt-shortterm-software-license-request-form/) **if you are a graduate student to receive access to your purchased license**
7. You will be notified by email when the license has been activated

**Required Readings and Supplementary Materials**

SOLIDWORKS 2019-2021 Intermediate Skills by Paul Tran

SOLIDWORKS software suite installed in Windows 7 or 10 on Laptop for class use

(IT for assistance will be available TBD)

Solidworks Premium, FEA, CAM, Plastics, CFD (flow), Visualize, MBD

**Description and Assessment of Assignments**

Students are responsible for all assignments, including homework, in-class work, critiques, presentations, demos, readings, process, and archiving work on removable media. It is the student’s responsibility to obtain missed work and information missed if absent. For this type of Solidworks class, it is crucial for students to attend class since often information is exchanged in a group discussion, critique or similar setting may not imparted through handouts or notes. Students are responsible to schedule time, outside class time, to access 3D equipment and practice manufacturing techniques. Students must attend class to succeed in the course.

**Grading Breakdown**

Projects will be evaluated based on their adherence to given guidelines, attention to craft and overall appropriateness. Initiative, progress and follow-through will also be considered. Both giving and receiving feedback will be crucial to your success in the class; therefore your participation grade is based on your active involvement in class and critiques. Assignments will be docked one full letter grade each week they are late. Absence is not an excuse for late work.

94 – 100 A = 4.0
90 – 93 A- = 3.7
85 – 89 B+ = 3.3
80 – 84 B = 3.0
75 – 79 B- = 2.7
70 – 74 C+ = 2.3
65 – 69 C = 2.0

20% Final exam

40% Design Project
Project grades will be assigned according to a point system based on the following:

 • Competency in key concepts
 • Viability of improvements
 • Creativity of improvements
 • Functionality of improvements
 • Presentation/craftsmanship

20% Assignments; In Class Assignments

20% Quizzes/Homework;

FINAL Design Project

Groups will be selected and project statement announced. Throughout the course, everything we learn and practice can be rolled into the design project. At the close of the class, all students are required to participate in the presentation and groups will submit a completed product ready to market and produce (3D print complete part). It’s the students goal to approach the delivery of their product design as if it were an investment meeting and you were seeking funding. The scope of the project will be to pick an existing product and improve it or develop your own widget. You will be graded on the presentation pitch, manufacturing pitch, technology high-points, use of Solidworks tools, functionality, creativity and viability of the improvements. All of the work for the entirety of the project will be submitted and peer evaluations will validate all group members’ efforts.

**Assignment Rubrics**

Files will be graded on accuracy, design intent, creative effort and knowledge

**Assignment Submission Policy**

All course work is assigned and recorded through blackboard.

**Grading Timeline**

Timeline for grading and feedback will be completed within the week of assignment due date

**Academy Attendance Policy**

The Academy maintains rigorous academic standards for its students and on-time attendance at all class meetings is expected.  Each student will be allowed two excused absences over the course of the semester for which no explanation is required. Students are admonished to not waste excused absences on non-critical issues, and to use them carefully for illness or other issues that may arise unexpectedly.  Except in the case of prolonged illness or other serious issue (see below), no additional absences will be excused. Each unexcused absence will result in the lowering of the final grade by ⅓ of a grade (e.g., an A will be lowered to A-, and A- will be lowered to a B+, etc.). In addition, being tardy to class will count as one-third of an absence. Three tardies will equal a full course absence.

Students remain responsible for any missed work from excused or unexcused absences.  Immediately following an absence, students should contact the instructor to obtain missed assignments or lecture notes and to confirm new deadlines or due dates.  Extensions or other accommodations are at the discretion of the instructor.

Automatically excused absences normally many not be used for quiz, exam or presentation days.  Using an excused absence for a quiz, exam or presentation, such as in the case of sudden illness or other emergency, is at the discretion of the instructor.

In the case of prolonged illness, family emergencies, or other unforeseen serious issues, the student should contact the instructor to arrange for accommodation. Accommodation may also be made for essential professional or career-related events or opportunities.  All accommodations remain at the discretion of the instructor, and appropriate documentation may be required.

*Fall 2021 addendum:*

* Unless students provide an accommodation letter from USC’s Office of Student Accessibility Services or a letter from IYA Student Services detailing visa or travel restrictions, attendance and active participation is expected in the classroom. Any student with such accommodations should submit their accommodation document to the instructor as soon as possible to discuss appropriate accommodations. Either classroom recordings or live remote access to the class via Zoom will be provided.
* Students who are experiencing illness should not attend class in person. Please inform the instructor in advance of any class sessions that you can’t attend for medical reasons, and accommodations will be arranged to view recorded lectures and submit alternatives to any missed class participation. Students will not be penalized for not attending class in person under these circumstances.
* In the event that you find yourself experiencing COVID-19 related symptoms, in keeping with university recommendations, you should Stay home! This is the best way to prevent spreading COVID-19 as supported by scientific evidence; Please do not come to an in-person class if you are feeling ill, particularly if you are experiencing symptoms of COVID-19

**Additional Policies**

Students will need to attend orientation in the Lab at the Iovine and Young Academy in order to complete assignments in 3D printing. 3D printing material costs and use of materials out of the LAB have associated costs and are the student’s responsibility

**WEEKLY COURSE SCHEDULE**

Prior to Class Review Ch 1-3 in Solidworks 2021 Intermediate Tools Book by Paul Tran

**WEEK 1** SOLIDWORKS 2021 Intermediate Tools (Ch 4,7,8) Working with Multibody Parts, Sweep with Guide Curves, Lofts and Boundaries

 In class assignment/practice

 DDM Discussion

**WEEK 2** SOLIDWORKS 2021 Intermediate Tools (Ch 9-10) Surfaces and Patches, Configuration Features

 In class assignment/practice

 In class exercise (group product improvement)

**WEEK 3** SOLIDWORKS 2021 Intermediate Tools (Ch 14,17) Using the Lip and Groove Options, SOLIDWORKS MBD

 In class assignment/practice

 FEA, Plastics Intro

 *Design Project* Announcement (groups selected)

**WEEK 4** SOLIDWORKS 2021 Intermediate Tools (Ch 20,22) Using Subtract & Intersect, Hybrid Modeling

 In class assignment/practice

 CAM, Visualize Intro

 Direct Digital Manufacturing Discussion/Techniques

**WEEK 5** SOLIDWORKS 2021 Advanced Tools (Ch 8,10,11) Using Surfaces, Using Filled Surfaces, Surfaces vs. Solid Modeling

 In class assignment/practice

Prototype DDM

**WEEK 6** SOLIDWORKS 2021 Advanced Tools (Ch 13, 17) Sheet Metal Parts, Creating a Core & Cavity  vs. Solid Modeling

 In class assignment/practice

Design Project Discussion

**WEEK 7** SOLIDWORKS 2021 Advanced Tools Review for Project

 In class assignment/practice

 Design Project Critique

**WEEK 8** Design Project Presentation (12 min Team limit 5 minute discussion Q&A)

 **Final Exam**

**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](https://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:**

*Student Health Counseling Services - (213) 740-7711 – 24/7 on call*

[engemannshc.usc.edu/counseling](https://engemannshc.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://www.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) 740-4900 – 24/7 on call*

[engemannshc.usc.edu/rsvp](https://engemannshc.usc.edu/rsvp/)

Free and confidential therapy services, workshops, and training for situations related to gender-based harm.

*Office of Equity and Diversity (OED) | Title IX - (213) 740-5086*

[equity.usc.edu](https://equity.usc.edu/), [titleix.usc.edu](http://titleix.usc.edu)

Information about how to get help or help a survivor of harassment or discrimination, rights of protected classes, reporting options, and additional resources for students, faculty, staff, visitors, and applicants. The university prohibits discrimination or harassment based on the following protected characteristics: race, color, national origin, ancestry, religion, sex, gender, gender identity, gender expression, sexual orientation, age, physical disability, medical condition, mental disability, marital status, pregnancy, veteran status, genetic information, and any other characteristic which may be specified in applicable laws and governmental regulations.

*Bias Assessment Response and Support - (213) 740-2421*

[studentaffairs.usc.edu/bias-assessment-response-support](https://studentaffairs.usc.edu/bias-assessment-response-support/)

Avenue to report incidents of bias, hate crimes, and microaggressions for appropriate investigation 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 Support and Advocacy - (213) 821-4710*

[studentaffairs.usc.edu/ssa](https://studentaffairs.usc.edu/ssa/)

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](https://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.

**Emergency Preparedness/Course Continuity in a Crisis:**

If an officially-declared emergency makes travel to campus infeasible, *USC Emergency Information* <http://emergency.usc.edu>will provide safety and other updates, including ways in which instruction will be continued by means of blackboard, teleconferencing, and other technology.