

USC Iovine and Young Academy

Arts, Technology and the Business of Innovation

ACAD 187 - Digital Toolbox: 3D Design

Units: 2

Day-Time: Fall 2022, Tuesday/Thursday, 9:00am - 11:50am

Location: IYH 210

Instructor: Aaron Siegel

Office: IYH Lobby or Zoom meeting room listed on Blackboard.

Office Hours: In person: TR, 12pm - 1:45pm IYH lobby.

Zoom: Mondays, 6pm - 8pm.

Contact Info: aaronsie@usc.edu

IT Help:

<https://uscedu.sharepoint.com/sites/IYASStudent/SitePages/IT-Resources.aspx>

Hours of Service: M-F, 9:00am - 6:00pm

Contact Info: iyahelp@usc.edu, 213-821-6917

USC Technology Support Links

[Zoom information for students](#)

[Blackboard help for students](#)

[Software available to USC Campus](#)

Course Description

ACAD 187 - Digital Toolbox: 3D Design will teach students the basics of 3D modeling, lighting, materials, 3d printing, photorealistic rendering, as well as the pipeline for importing 3D assets into interactive applications. This class will focus on elemental skills, concepts, and problem solving methods in these programs and challenge students to apply these building blocks creatively in a variety of increasingly sophisticated and innovative design solutions. Software instruction will include Autodesk Fusion360, the Unity3D game development environment, Adobe Dimension, and some Adobe Photoshop and Illustrator. Output methods will include rendered still images, plastic 3D prints, and interactive software experiences.

Learning Objectives and Outcomes

1. Fundamental understanding of working with 3D modeling software.
2. Experimentation with concepts related to product design and construction.
3. Proficiency in output of 3D rendered imagery and 3D modeled assets.

Recommended Preparation: Sign up for an Autodesk account and install the Fusion360 education license software prior to the first class session in order to be prepared to start working on day one. Sign up for a Unity 3D account and install the Unity 3D Student plan. Purchase a short-term license of Adobe Creative Cloud as Dimension, Photoshop, and Illustrator will be needed for week 3 and beyond.

Course Notes

The class will be a mix of technical demonstrations, software workshop exercises, lectures on the history and contemporary applications of 3D design, as well as collective critique sessions. Technical demonstrations may be recorded and shared with the students afterward for further review. Lecture materials will be made available on Blackboard.

Technological Proficiency and Hardware/Software Required

- Laptop computer with authorized installations of the following software:
 - Autodesk Fusion 360
 - Adobe Dimension CC
 - Adobe Photoshop CC
 - Adobe Illustrator CC
 - Unity3D
- Three-button mouse (highly recommended).

USC Technology Rental Program

The university realizes that attending classes online and completing coursework remotely requires access to technology that not all students possess. If you need resources to successfully participate in your classes, such as a laptop or internet hotspot, you may be eligible for the university's equipment rental program. To apply, please submit an [USC Technology Rental Program Application](#).

Assignments

1. Checkpoint #1: Solid Model Ideas. (5%)
 - Submit 5 options for solid model ideas based on photos of existing objects.
2. Project #1: Solid Model and Print. (20%)
 - Fusion 360 based modeling project. Create a 3D model of the object you proposed and had approved during checkpoint #1. Print the object on one of the Prusa 3D printers to be presented in class on the due date. Include a section view rendering from Fusion360 of your model from the front, top, side, and perspective views. Include high quality photos of your final 3D print from the front, top, side, and perspective views. Submit all of your digital assets (Fusion360 project file, OBJ model, renders, and photos) in a ZIP file via blackboard.
3. Checkpoint #2: Scene Render Ideas. (5%)
 - Submit 5 options for scene rendering concepts to incorporate your solid model into a photorealistic looking environment. Use illustrations to help communicate your ideas.
4. Project #2: Scene Renderings. (20%)
 - Create three (3) photorealistic scenes incorporating the solid model object you created for project #1 utilizing the idea that was approved during checkpoint #2. Create three small scenes in which you light and render the object, making use of an environmental photo and realistic textures and materials. Render at least one photorealistic UHD (3840 x 2160) final version of each scene to be presented in class on the due date. Submit all of your digital assets (Adobe Dimension project file, materials, textures, OBJ, and renders) in a ZIP file via blackboard.
5. Checkpoint #3: Game Project Ideas (**Group Project**). (5%)
 - Submit 5 written options for game project concepts.
6. Project #3: Game Project (**Group Project**). (30%)
 - Working as a group, develop a game using Unity3D utilizing assets you have modeled in Fusion360. Your models should utilize materials and textures that were created in Photoshop and applied in Unity. Your game must utilize a simple environment with multiple light sources and a camera and incorporate interaction allowing the user to move their view or character around using the mouse and keyboard. Submit all of your digital assets (unity project file, exported application, models, textures, etc) in a ZIP file via blackboard.

Grading Breakdown		Grading Scale		
Project #1: Solid Model and Print	20%		A = 100 - 95	A- = 94 - 90
Project #2: Scene Rendering	20%	B+ = 89 - 87	B = 86 - 83	B- = 82 - 80
Project #3: Interactive Project.	30%	C+ = 79 - 77	C = 76 - 73	C- = 72 - 70
Checkpoints (3)	15%	D+ = 69 - 67	D = 66 - 63	D- = 62 - 60
Quizzes (5% x3)	15%	F = 59 and below		

Weekly Class Schedule

Week	Tuesday	Thursday
1	10/18: Introduction to Fusion 360 Interface. Solid Modeling. Sketching.	10/20: DUE: Checkpoint #1: Solid Model Ideas. Fusion 360 Exporting. 3D Printing Software.
2	10/25: Surface Modeling.	10/27: DUE: Complete Quiz #1 before class. Basic Rendering.
3	11/1: DUE: Project #1: Solid Model and 3D Print.	11/3: DUE: Checkpoint #2: Scene Render Ideas. Introduction to Adobe Dimension. Asset Management.
4	11/8: DUE: Complete Quiz #2 before class. Materials / Textures. Lighting.	11/10: DUE: Project #2: Scene Renderings.
5	11/15: Introduction to Unity3D. Importing Assets. Example Packages.	11/17: DUE: Checkpoint #3: Game Project Ideas. Materials. Prefabs. Lighting, Cameras.
6	11/22: Physics. Collisions. Components.	11/24: Thanksgiving - NO CLASS!
7	11/29: Scripting.	12/1: DUE: Complete Quiz #3 before class. Compiling and Exporting.
8	12/8: Thursday, December 8th, 11am - 1pm. DUE: Project #3: Game Project.	

HOW TO PURCHASE SOFTWARE AT THE DISCOUNTED ACADEMY RATE THROUGH THE USC BOOKSTORE:

The following first year software are now available for purchase online through the USC Iovine and Young software catalog at the Academy discounted rate:

<u>Software</u>	<u>IYA Short-Term License at USC Bookstore</u>
Adobe Creative Cloud	\$70 2021-2022 annual license

To purchase:

- Visit: <https://commerce.cashnet.com/IOVINE>
- Select the software license(s) you would like to purchase by clicking “View Details” or the software title, and make your purchase.
- You will receive an order confirmation receipt at the email address you provided.
- You will be notified by email when the software license has been activated.

If you have any questions about this process, please do not hesitate to contact Academy IT Support at iyahelp@usc.edu.

Assignment Rubrics

Student work will be assessed based on:

- Level of understanding and execution of software skills on assignments.
- Degree of complexity of the assignment goal both creatively and technically.
- Innovative application of tools and concepts covered in class.

Assignment Submission Policy

Submit all of your digital assets for your assignments via Blackboard at least one hour prior to the start of the class session. ***Templates, plugins, or example packages are not allowed on any assignments or in-class lab exercises. All work (including images, illustrations, photos, textures, 3D models, and scripts) must be created from scratch by you.***

Grading Timeline

Checkpoints and assignments will be reviewed, graded, and provided with feedback within a week of submission.

Late work

Late work will be reduced by 10% each class session after it is due. After three class sessions, work can no longer be submitted for grade consideration.

Participation

In-class participation is an important and required component of the learning methodology for this course. You are expected to attend class and coordinate with classmates on group projects, as well as maintain communication and progression of your group assignments outside of class. Come to an agreement with group mates on a specific medium for communication and how to make up for a missed class session or meeting.

Classroom norms

Students are expected to be respectful of each other and the space in which they inhabit. We are all here to have a positive learning experience, have fun, get to know each other, and grow as creative thinkers. Students being disruptive to the class who do not cease their activities will be asked to leave and if necessary will be escorted out by DPS officers.

Zoom etiquette

Students unable to attend class in person will be able to attend synchronously on Zoom. It is expected that students will have their camera on for the duration of class. You may be called on in order to participate in class discussions, critiques, or sharing/presenting work. If you are unable to keep your camera on during the synchronous Zoom session, contact the instructor prior to the class session to discuss expectations and accommodations needed.

Synchronous session recording notice

Synchronous sessions will be recorded and provided to all students asynchronously (through recorded Zoom sessions integrated into Blackboard). USC has a policy that prohibits sharing of any synchronous and asynchronous course content outside of the learning environment.

SCampus Section 11.12(B)

Distribution or use of notes or recordings based on university classes or lectures without the express permission of the instructor for purposes other than individual or group study is a violation of the USC Student Conduct Code. This includes, but is not limited to, providing materials for distribution by services publishing class notes. This restriction on unauthorized use also applies to all information, which had been distributed to students or in any way had been displayed for use in relation to the class, whether obtained in class, via email, on the Internet or via any other media. (See Section C.1 Class Notes Policy).

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 $\frac{1}{3}$ 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 may 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. Additionally, students who need accommodations for religious observations should provide advanced notice to instructors and student athletes should provide

Travel Request Letters. All accommodations remain at the discretion of the instructor, and appropriate documentation may be required.

Fall 2022 addendum:

- Unless students provide an accommodation letter from USC's Office of Student Accessibility Services (OSAS) 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.

Iovine and Young Hall Cleanout

The Academy is unable to store student projects and materials beyond the end of the semester. Students must remove all projects and personal materials from the Creators Studio, lockers/locker room, and other classrooms by the end of each semester. **All projects and materials left in Iovine and Young Hall will be discarded two days after final exams end. No exceptions.**

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 [Research and Scholarship Misconduct](#).

Students and Disability Accommodations:

USC welcomes students with disabilities into all of the University's educational programs. The Office of Student Accessibility Services (OSAS) is responsible for the determination of appropriate accommodations for students who encounter disability-related barriers. Once a student has completed the OSAS process (registration, initial appointment, and submitted documentation) and accommodations are determined to be reasonable and appropriate, a Letter of Accommodation (LOA) will be available to generate for each course. The LOA must be given to each course instructor by the student and followed up with a discussion. This should be done as early in the semester as possible as accommodations are not retroactive. More information can be found at osas.usc.edu. You may contact OSAS at (213) 740-0776 or via email at osasfrontdesk@usc.edu.

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 for Equity, Equal Opportunity, and Title IX (EEO-TIX) - (213) 740-5086

eetix.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.symplcity.com/care_report

Avenue to report incidents of bias, hate crimes, and microaggressions to the Office for Equity, Equal Opportunity, and Title for appropriate investigation, supportive measures, and response.

The Office of Student Accessibility Services (OSAS) - (213) 740-0776

osas.usc.edu

OSAS ensures equal access for students with disabilities through providing academic accommodations and auxiliary aids in accordance with federal laws and university policy.

USC Campus Support and Intervention - (213) 821-4710

campussupport.usc.edu

Assists students and families in resolving complex personal, financial, and academic issues adversely affecting their success as a student.

Diversity, Equity and Inclusion - (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.

Office of the Ombuds - (213) 821-9556 (UPC) / (323-442-0382 (HSC)

ombuds.usc.edu

A safe and confidential place to share your USC-related issues with a University Ombuds who will work with you to explore options or paths to manage your concern.

Occupational Therapy Faculty Practice - (323) 442-3340 or otfp@med.usc.edu

chan.usc.edu/otfp

Confidential Lifestyle Redesign services for USC students to support health promoting habits and routines that enhance quality of life and academic performance.