

USC Jimmy Iovine and Andre Young Academy

Arts, Technology and the Business of Innovation

ACAD – 187 Digital Toolbox: 3D Design (2 units)

Units: 2

Term-Day-Time: Spring, TTh 11:00am – 12:20pm
8 weeks. 1:20 minutes per session/2:40 minutes total

Location: Garage

Instructor: Haven Lin-Kirk

Office: TBD

Office Hours: TBD

Contact Info: TBD

Website: TBD

IT Help: Timmy Chen

Hours of Service: TBD

Contact Info: TBD

Catalog Description:

An eight-week course covering the basics of industry-standard 3D modeling, rendering, and capturing software used for product, packaging, industrial and environmental design.

Course Description:

Students will gain a general overview and understanding some of the most powerful software programs currently associated with 3d modeling, rendering, digital capture and the physical output of 3D objects for product, packaging and environmental design. Students will be introduced to 3D Software such as Maya, SolidWorks and Mudbox.

The class will also 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. Output methods will include 2d renders, 3d animations, and both additive and subtractive prototyping.

Instruction includes lectures, in class demos, homework assignments, studio exercises, and quizzes. Students will be assessed on their participation in class, completed exercises and projects as well as attendance.

Learning Objectives

1. To raise awareness about design and its implementation in the digital environment.
2. To critically analyze design use of basic 3D digital tools.
3. To gain a comprehensive understanding of 3D design tools and to explore best practices for creating both physical and digital designs.
4. Foster problem solving and critical thinking when given open and interpretive design challenges.

Topics To Be Covered:

1. To explore the most effective and current computer tools used in creating dimensional design for product, packaging and environmental design.
2. The explore the tools and techniques available through 3D software programs.
3. To gain a comprehensive understanding of 3D design tools and to explore best practices for creating both physical and digital designs.

Course Notes:

Overview: Students are responsible for all assignments, including homework, in-class work, critiques, presentations, demos, readings, process and archiving work on removable media. ACAD 179 Digital Toolbox: 3D Design is a studio-based class. It is crucial for students to attend class since often information exchanged in a group discussion or setting may not clearly be imparted through handouts or notes. Students must attend class to succeed in the course. Any more than 3 absences will impact your final grade, more than 5 and the student may fail the course. It is the students responsibility to obtain missed work and information missed if absent.

Course documents and information will be posted on Blackboard along with other key course documents such as the syllabus, class schedule and assignment due dates. Please be aware that any changes made to the course schedule over the semester and will be noted during class as well as on Blackboard.

Technological Proficiency and Hardware/Software Required:

- Regular access to computer and 3D printing
- USB Portable storage device/flash drive or other digital storage devices (flash drives, external storage devices, or CDs). It is the student's responsibility to BACK EVERYTHING UP, losing work is not an acceptable excuse for missing work. Keep everything you do including sketches and research (process). It cannot be emphasized enough that you should have a reliable backup arrangement. You should at all times have two copies of your digital files at two different locations (e.g., one copy on your flash drive that you carry around, another copy on your computer or another flash drive at home).

Software to be covered includes:

- Maya (on Mac OSX or Windows)
- SolidWorks (Windows)
- Memento (or 123d catch)
- Meshlab
- Netfabb

Hardware to be covered:

- Scanning with the X-box Kinect
- Photogrammetry with a digital camera
- Lasercutter
- Fused deposition modeling (FDM) 3D Printer
- SUPPLIES
- Laptop Notebook or access to a computer + lab
- Sketchbook
- Drawing tools – pens, pencils
- External drives, zip/jump drives, or other external storage devices for use in transferring digital files
- Scissors/ exacto knife / other cutting tools.

Required Readings and Supplementary Materials:

Lynda.com subscription- Lynda Maya Essentials, Lynda SolidWorks Essentials (lynda.com – USC students have free access to the tutorials on this site through your USC library account and Blackboard.)

youtube.com – Tons of free tutorial videos. Some arguably better than others.

Resources:

We will not be able to cover every single feature of Maya (on Mac OSX or Windows), SolidWorks (Windows), Memento (or 123d catch), Meshlab, Netfabb. Often features and techniques covered are forgotten if not regularly used. Exercise and assignments are designed to cover crucial concepts. It is highly recommended to review items covered in class by reviewing through Lyndia.com, additional in-depth information is covered in the video tutorials. The class demos and lectures will explain general concepts and techniques but the best way to fully utilize the software is to actively use them in your projects outside of the class. You are expected to deepen your knowledge of the tools on your own. It is very important that you have resources available that will answer your questions outside of class. There are many diverse ways to learn a new software application. Some people do so by having access to a book or viewing step-by-step instructions. Others like to watch tutorial videos, browse websites or the Adobe help files. The following are a few suggestions to turn for help:

Description and Assessment of Assignments:**ASSIGNMENTS:**

Assignments are to be done on time at the beginning of class and presented professionally as stipulated in the assignment. You will be graded down a full grade for each class the work is turned in late.

PRESENTATION:

Digital assignments must be turned in in the requested file format by the due date. Printed assignments must be completed and physically presented on the due date. Final assignments should be accompanied with process notes and sketches. Everything should be professionally presented - labeled with your name and contact information on the back. Late assignments will be graded down - a letter grade for each day it is turned in late.

BINDER:

All handouts, thumbnails, sketches, comps, will be collected in a binder. Save everything that you do in this class, I will look at both your binder and mounted work during exam week.

CRITIQUES/ PARTICIPATION:

The purpose of a critique is to provide feedback to a student. Positive criticism and negative criticism are both useful tools in helping us further understand concepts and the visual language. Critiques prove useful in helping us see alternative ways to improve a design solution. You are expected to participate and offer constructive help in the critiques.

UNDERSTANDING:

The tools and techniques discussed in class will be done through demonstrations. Your attentiveness and understanding are very important to master these programs involves practice and concentration.

The understanding should reveal itself in your successful completion of projects and participation in critiques.

ABILITY/ CRAFTSMANSHIP:

You will be graded on your skillfulness to bring your project's concepts successfully to life through the visual language. Craftsmanship is an important consideration in all projects. How well you execute your solution will be considered.

CREATIVITY/ EXPERIMENTATION:

You are expected to explore and stretch the limits of the solutions to the problems.

Grading Breakdown:

Assignment	Percentage	Total Points
In class assignments	25%	25
Quiz 1	5%	10
Quiz 2		10
Mid-term Project	25%	15
Final Project	25%	20
Final Exam	10%	15
Class Participation	10%	5
Attendance		-.50 after 3 rd absence
TOTAL	100	100

Grade Scale:

A	100-94
A-	93-90
B+	89-87
B	86-83
B-	82-80
C+	79-77
C	76-73
C-	72-70
D+	69-67
D	66-63
E	62 and below

Additional Policies:

Tardiness: 2 Tardys = 1 Absence. After 3 Absences, .50 will be deducted per absence from the final grade. This is a class you cannot miss! Many of the processes are successive, and online tutorials do not cover the exact content of the class. If you miss one part it is very easy to get lost. You must have a written doctor's note for excused absences.

Assignment Submission Policy:

Assignments given will be critiqued during normal class times. Student must come in prepared to present their work and give input to other students' projects during critiques. When an assignment is due, the project must be clearly labeled and left with the instructor. Sketchbooks will be checked, in class, at scheduled times. Projects not presented during critiques or turned in are considered late and will be penalized as described above. It is the student's responsibility to get assignments to the instructor if absent. Digital work may be submitted via email (with web link), details will be clearly given when assignments are given.

Final assignments should be accompanied with process notes and sketches. Everything should be professionally presented - labeled with your name and contact information on the back.

Course Schedule: A Weekly Breakdown

	Topics/Daily Activities	Readings and Homework	Deliverable/ Due Dates
Week 1 Dates	CLASS INTRODUCTION AND BASICS Basic Sculpting and Printing in 3D Polygonal Modeling Software	Lynda.com Video	<i>ASSIGNMENT 1: Design a spinning top. It must reflect a unique identity</i>

	<ul style="list-style-type: none"> Syllabus review and class introductions Introduction to 3D Design Maya software usage – Intro to navigation, shape rotation, select and transform, step repeat Review of Photoshop and image editing 		<i>and function as a spinning top.</i>
Week 2 Dates	Sculpting 3D Form in Polygonal Modeling Software <ul style="list-style-type: none"> Student will select a rigid product, photograph it from at least three sides, and make orthographic projection drawings from each side. Students will model directly from the drawing to first recreate the object, then manipulate it to reflect a new identity. Technical processes covered: Maya: Extrude and chamfer, mirror geometry, subdivisions, modeling, lattices, welding and repairing meshes. 	Lynda.com Video	<i>ASSIGNMENT 2: Students will design the outside shell of an original product and output it as a video, 2d rendering and 3d printed prototype.</i>
Week 3 Dates	Sculpting 3D Form in Polygonal Modeling Software <ul style="list-style-type: none"> Students will create images and apply them to their models as materials and textures. Technical processes covered: Maya: Selecting the best product students will design surface mapping and learn to apply images to their model, create environments, render a 2d image, prepare a full color 3d print. Output: print 2d graphic and prepare 3d print 	Lynda.com Video	Assignment 1 DUE
Week 4 Dates	Sculpting 3D Form in Polygonal Modeling Software <ul style="list-style-type: none"> Students will continue with 	Lynda.com Video	<i>Midterm Project</i>

	<p>preparing 3d printing. Students will create an animated video to present the 3d object over time.</p> <ul style="list-style-type: none"> • Technical processes covered: Maya: Cameras, lighting, animation, rendering video • Output: printing full color 3d and exporting to video. 		
Week 5 Dates	Solid Modeling and Prototyping for Subtractive Manufacturing <ul style="list-style-type: none"> • Intro to SolidWorks: Touring the interface, basic solid modeling, drawing and sketch editing tools, 	Lynda.com Video	<i>ASSIGNMENT 3: Students will design a chair or though material exploration and solid 3d modeling.</i>
Week 6 Dates	Solid Modeling and Prototyping for Subtractive Manufacturing <ul style="list-style-type: none"> • SolidWorks continued: reference geometry, building geometry, removing and refining geometry. 	Lynda.com Video	
Week 7 Dates	Precision connections and measurements in 3D <ul style="list-style-type: none"> • Students scan found objects and begin SolidWorks modeling for precision measure and fitting • SolidWorks cont: Blocks, assembly, mates, hole wizard, threads and connectors, • Input: 3D scanning with Cubify Sense and x-box connect. 		<i>ASSIGNMENT 4: Design a construction kit that merges found objects with designed objects.</i>
Week 8 Dates	Precision connections and measurements in 3D <ul style="list-style-type: none"> • Putting model together and printing • SolidWorks cont: dimentionalizing, part drawings, assembly drawings. • Output though: additive printer or subtractive cutter, 2d prints 		FINAL PROJECT AND EXAM

Any student requesting academic accommodations based on a disability is required to register with Disability Services and Programs (DSP) each semester. A letter of verification for approved accommodations can be obtained from DSP. Please be sure the letter is delivered to the instructor (or to TA) as early in the semester as possible. DSP is located in STU 301 and is open 8:30 a.m.–5:00 p.m., Monday through Friday. Website and contact information for DSP:

http://sait.usc.edu/academicsupport/centerprograms/dsp/home_index.html, (213) 740-0776 (Phone), (213) 740-6948 (TDD only), (213) 740-8216 (FAX) ability@usc.edu.

Statement on Academic Integrity:

USC seeks to maintain an optimal learning environment. General principles of academic honesty include the concept of respect for the intellectual property of others, the expectation that individual work will be submitted unless otherwise allowed by an instructor, and the obligations both to protect one's own academic work from misuse by others as well as to avoid using another's work as one's own. All students are expected to understand and abide by these principles. SCampus, the Student Guidebook, (www.usc.edu/scampus or <http://scampus.usc.edu>) contains the University Student Conduct Code (see University Governance, Section 11.00), while the recommended sanctions are located in Appendix A.

Students will be referred to the Office of Student Judicial Affairs and Community Standards for further review, should there be any suspicion of academic dishonesty. The Review process can be found at: <http://www.usc.edu/student-affairs/SJACS/>. Failure to adhere to the academic conduct standards set forth by these guidelines and our programs will not be tolerated by the USC ACAD community and can lead to dismissal.

Emergency Preparedness/Course Continuity in a Crisis:

In case of a declared emergency if travel to campus is not feasible, USC executive leadership will announce an electronic way for instructors to teach students in their residence halls or homes using a combination of Blackboard, teleconferencing, and other technologies.

Bibliography

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Lefteri, Chris. *Materials for Design*. London: Laurence King Pub., 2014. Print.

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Malafouris, Lambros. *How Things Shape the Mind: A Theory of Material Engagement*. N.p.: n.p., n.d. Print.

Manzini, Ezio. *Design, When Everybody Designs: An Introduction to Design for Social Innovation*. N.p.: n.p., n.d. Print.

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Papanek, Victor J. *Design for the Real World; Human Ecology and Social Change*. New York: Pantheon, 1972. Print.

Parsons, Tim. *Thinking, Objects: Contemporary Approaches to Product Design*. Lausanne: AVA Academia, 2009. Print.

Valentine, Louise. *Prototype: Design and Craft in the 21st Century*. N.p.: n.p., n.d. Print.

Wallschlaeger, Charles, and Cynthia Busic-Snyder. *Basic Visual Concepts and Principles: For Artists, Architects, and Designers*. Dubuque, Iowa: Brown Publ., 1992. Print.