

**1) Hard-Surface Model:**

Use polygonal modeling techniques to create your own hand-held product.

**2) Organic Model:**

Use organic modeling techniques and tools such as meshes and NURBS to create your own custom designed appliance.

**3) Material Experiment:**

Create a model that you can apply different types of materials to. Experiment with how much variation you are able to achieve and try to apply a texture of your own creation.

**4) Product Rendering:**

Combining all of the skills and concepts you have learned so far you are asked to invent a product and create a 3D model to represent it for communication to potential investors and buyers. Your model must be detailed enough to convey all of the qualities you would like to see in your product. You should make an attempt to apply materials and potentially texture the surfaces of your model in order to give it a more realistic appearance. The final presentation of the project should be an 11” x 17” print front, top, side, and perspective views of your product. Your design will have to go through multiple stages before you come up with a final result.

*Research:*

Do some investigation into the product area you are interested in, what companies and designers are working in that space, what are characteristics of a successful product, and where is the room for product improvement?

*Ideation:*

Brainstorm as many ideas as possible before selecting the most successful ones. Write down and sketch out your ideas to record them for evaluation later.

*Moodboarding:*

What kind of imagery inspires your vision? What visual aesthetic do you think best fits your product type? Explore and collect visual styles.

*Sketching:*

Get your visual ideas out on paper quickly in two dimensions before attempting to create them in 3D.

*Modeling:*

Turn your 2D sketches into a 3D form. Expect to spend a large amount of time refining your model.

*Materials:*

Turn your raw model into a more realistic object using the appropriate materials and textures to help add details.

*Lighting and Cameras:*

Illuminate your product to make it appear as photo-realistic as possible and arrange cameras to render it.

**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” <https://policy.usc.edu/student/scampus/part-b>. Other forms of academic dishonesty are equally unacceptable. See additional information in SCampus and university policies on scientific misconduct, <http://policy.usc.edu/scientific-misconduct>.

Discrimination, sexual assault, intimate partner violence, stalking, and harassment are prohibited by the university. You are encouraged to report all incidents to the Office of Equity and Diversity/Title IX Office <http://equity.usc.edu> and/or to the Department of Public Safety <http://dps.usc.edu>. This is important for the health and safety of the whole USC community. Faculty and staff must report any information regarding an incident to the Title IX Coordinator who will provide outreach and information to the affected party. The sexual assault resource center webpage <http://sarc.usc.edu> fully describes reporting options. Relationship and Sexual Violence Services <https://engemannshc.usc.edu/rsvp> provides 24/7 confidential support.

**Support Systems:**

A number of USC’s schools provide support for students who need help with scholarly writing. Check with your advisor or program staff to find out more. Students whose primary language is not English should check with the American Language Institute <http://ali.usc.edu>, which sponsors courses and workshops specifically for international graduate students. The Office of Disability Services and Programs <http://dsp.usc.edu> provides certification for students with disabilities and helps arrange the relevant accommodations. 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.

**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.

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*Arts, Technology and the Business  
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**3D Modeling Summer Session**

**Units:** None

**Day-Time:** Mon - Fri, 9:00am - 5:00pm

**Location:** Harris 220

**Instructor:** Aaron Siegel

**Office:** The Garage

**Office Hours:** None

**Contact Info:** aaronsie@usc.edu

**Website:** [www.datadreamer.com](http://www.datadreamer.com)

**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:**

An introduction to the core tools and concepts required to execute a 3D rendering.

**Pre-requisites:**

Basic computer keyboarding skills, web searching skills, and photography skills.

**Course Description:**

Students will be introduced to the fundamental concepts involved in the development of 3D projects as well as the core industry tools used in their creation. Students will leave the course with an understanding of the 3D modeling and rendering process, technical knowledge of Autodesk Maya, as well as collective insight into design successes and failures. The class will culminate with students inventing and designing their own products. Students will be required to share their work with classmates and participate in constructive critique sessions.

**Learning Objectives:**

**1)** A fundamental understanding of 3D modeling and rendering concepts including polygons, meshes, nurbs, boolean manipulations, materials, textures, lighting, rendering, and exporting objects.

**2)** Functional operating capacity using Autodesk Maya to work with 3D geometry to compose 3D renderings.

**3)** Ability to produce visual material for a number of mediums including print, web, and games.

**Specific Topics to be Covered:**

- 3D Modeling.
- Materials, textures, and lighting.
- Cameras and rendering.
- Applications of 3D assets.

**Software Utilized:**

- Autodesk Maya.
- Adobe Photoshop.

**Required Readings:**

- None.

**Recommended Readings:**

- Palamar, Todd. Mastering Autodesk Maya 2016: Autodesk Official Press. Indianapolis, IN: Wiley, 2016. Print.
- Faulkner, Andrew. Adobe Photoshop CC Classroom in a Book (2017 release). San Francisco, CA: Adobe, 2017. Print.
- Norman, Don. The Design of Everyday Things. New York, NY: Basic Books, 2013. Print.
- Eyal, Nir. Hooked: How to Build Habit-Forming Products. New York, NY: Penguin, 2014. Print.
- Derakhshani, Dariush. Introducing Autodesk Maya 2016: Autodesk Official Press. Indianapolis, IN: Wiley, 2015. Print.
- Arnason, H.H.. History of Modern Art. Upper Saddle River, NJ: Prentice Hall, 2003. Print.

**Recommended Online Resources:**

- TurboSquid <https://www.turbosquid.com>
- Shapeways: 3D Printing Service and Marketplace <https://www.shapeways.com>
- Continuum: 3D Printing the Future of Fashion - Mashable [4m] <https://www.youtube.com/watch?v=2xsDV7veGW4>
- Leaders of the 3D Printing Revolution - Creators [7m] <https://www.youtube.com/watch?v=IS4Xw8f9LCc>
- Getting Started with Maya - Autodesk Knowledge Network <https://knowledge.autodesk.com/support/maya>
- Maya Tutorials - Autodesk Area Learning Hub <http://area.autodesk.com/learning/maya>

# Course Schedule

- Lecture / Demonstration.
- Work Session.
- Lunch.
- Rendering.
- Presentations.

On **Monday** we begin with a dive into polygonal modeling, where we will be working with the basic 3D shapes in Maya, creating groups of objects, as well as using boolean functions to combine them.

**Tuesday** we will begin working with meshes and start utilizing tools and techniques for

modeling organic shapes, such as sculpting and controlling NURBS surfaces in order to create smooth objects.

On **Wednesday** we will focus on ways that we can improve the realism of our renderings by applying materials and textures to objects and learning to light them in interesting ways.

**Thursday** morning will give us an opportunity to work closely with cameras in order to setup the optimal conditions for rendering our 3D scenes. We will take a look at how to perfect and combine different light sources for application on the final project. In the afternoon we will begin working on the product rendering project, where students will be asked to invent

their own product or create a new version of an existing product, model and apply materials to it in Maya, illuminate it under photographic lighting conditions, and then render multiple views to be used in a project layout spread. **Friday** will be spent following a staged approach to development, giving the students a systematic process for refining and finishing their design.

TIME	MONDAY	TUESDAY	WEDNESDAY	THURSDAY	FRIDAY
9:00am	Introduction, Schedule	Polygonal Meshes	Materials	Cameras	Sketching
9:30am	Interface, Viewports		Basic Lights		
10:00am	Objects, Polygons	Sculpting Meshes	Textures	Advanced Lighting	Modeling
10:30am	Scenes, Object Groups		Photoshop Documents, Interface, Tool Bar		
11:00am	Polygonal Modeling	NURBS	Selection, Painting, Copy & Paste, Guides	Project Layout in Photoshop	
11:30am	Exporting Models, Basic Rendering		Patterns, Offset, Tiling, Bumpmaps	Photoshopping Renders, Levels, Curves	
12:00pm	Lunch	Lunch	Lunch	Lunch	Lunch
12:30pm					
1:00pm	Intro to Hard-Surface Modeling Project	Intro to Organic Modeling Project	Intro to Material Experiment Project	Intro to Product Rendering Project	Materials
1:30pm	Hard-Surface Modeling Project work	Organic Modeling Project work	Material Experiment Project work	Research	
2:00pm					Lighting and Cameras
2:30pm				Ideation	
3:00pm					
3:30pm				Moodboarding	Rendering, Exporting, Layout, and Printing
4:00pm	Rendering, Exporting, Printing and Submitting	Rendering, Exporting, Printing and Submitting	Rendering, Exporting, Printing and Submitting		Presentations
4:30pm	Presentations	Presentations	Presentations	Presentations	