



CSCI 281 – 3D Pipelines for Games

Units: 4

Time: MW 10am-11:50am

Location: Online Zoom Meeting Room (Info on Blackboard)

Instructor: Scott Easley

Office: Online

Office Hours: tbd & By Request

Contact Info: seasley@usc.edu

TA: Frank Pol

Contact Info: fpol@usc.edu

Office Hours: tbd & By Request

Course Description

An applied introduction to the techniques used for modeling, animating, texturing, rendering, and creating 3D content for games, cinematics, visual effects, animation, and visualizations.

Learning Objectives

Gain a thorough applied foundation in the practice of 3D modeling, texturing, animation, surfacing, and visual special effects. Understand the processes involved in the creation of 3D content for animation, games, entertainment, and design. Use industry leading software and tools to explore the production cycle of animation, how pipelines are implemented to support the production process, and how to manage vision, budget, and time constraints. Develop an understanding of the diverse methods available for achieving similar results and the decision-making processes involved at various stages of project development. Gain insight into the differences among the various animation tools. Understanding the opportunities and tracks in the field of 3D animation.

Prerequisite(s): No Prerequisite

Recommended Preparation: Experience with 2d graphics, 3d modeling, or CAD useful but not required.

Course Notes

There is no text for the course, however each student is expected to make use of the many resources available online, including Autodesk learning documentation, Linda.com resources, and course materials on Blackboard. Course materials, assignment submissions, lecture slides, and updates will be posted on Blackboard. This course is for a letter grade. The grading scale for the course is listed below. Students should plan to bring note taking materials, sketchbooks, or other materials for brainstorming, note taking, sketching, and design work.

Technological Proficiency and Hardware/Software

- Autodesk Maya 2019
- Adobe Photoshop or Pixlr Editor

USC technology rental program

We realize 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 application](#). The Student Basic Needs team will contact all applicants in early August and distribute equipment to eligible applicants prior to the start of the fall semester.

USC Technology Support Links

[Zoom information for students](#)

[Blackboard help for students](#)

[Software available to USC Campus](#)

Required Readings and Supplementary Materials

Materials available on Blackboard.usc.edu

Description and Assessment of Assignments

Projects will be assigned and submitted via Blackboard. Many assignments will have a deliverable set of 2d and 3d assets but should be supported with the supplementary files and assets required in the assignment details.

Grading Breakdown

All assignments and grading criteria will be posted and submitted via Blackboard.usc.edu.

Assignment	Points	% of Grade
Pball Modeling	10	5
Pball Model UV layout	10	5
Pball Model Texturing	10	5
Vehicle Modeling	10	5
Vehicle Model UV Layout	10	5
Vehicle Model Texturing	10	5
Dorm Prop (Model, UV, Texture)	10	5
Vehicle with auto-expression wheels	10	5
Vehicle on rails with expression wheels	10	5
Camera on rails, renders with Arnold	10	5
Car setup with camera, rails, rendering	40	5
Finished movies from storyboard	40	20
Participation	20	10
TOTAL	200	100

Attendance/Tardiness Policy:

Students should be in class every day and for every lab session. If you are not able to attend, you must contact your advisor and instructor. Unexcused absences will negatively affect your grade. Students must arrive to class promptly. Points will be deducted for tardiness. Repeat tardiness will increase the points deduction per instance of tardiness. Additionally, any student who does not show up within 15 minutes of the start of either the morning and afternoon sessions will be reported to the summer program advisor. Please set an extra alarm and show up on time!

Grading Scale (Example)

Course final grades will be determined using the following scale

A	95-100
A-	90-94
B+	87-89
B	83-86
B-	80-82
C+	77-79
C	73-76
C-	70-72
D+	67-69
D	63-66
D-	60-62
F	59 and below

Assignment Rubrics

Assignments and Rubrics will be available on Blackboard.usc.edu

Assignment Submission Policy

All assignments, submission rules, and details will be published on Blackboard.usc.edu.

Grading Timeline

Assignments will be graded as quickly and efficiently as possible. Due to the five day per week course schedule, grades may not be posted until the weekend following each week.

Synchronous session recording notice

The synchronous sessions will be recorded and provided to all students asynchronously.

Information for faculty on recording class sessions can be found on the [Academic FAQs for Faculty](#) on the USC COVID-19 Resource Center.

Sharing of course materials outside of the learning environment

Sharing of any synchronous and asynchronous course content outside of the learning environment is prohibited.

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 relationship to the class, whether obtained in class, via email, on the Internet or via any other media. (See Section C.1 Class Notes Policy).

Residential and Hybrid Streaming Model Courses

Continuously updated requirements about COVID-19 can be found on the [USC COVID-19 resource center website](#).

Course evaluation

Course evaluation occurs at the end of the semester university-wide. It is an important review of students' experience in the class. The process and intent of the end-of-semester evaluation should be provided. In addition, a mid-semester evaluation is recommended practice for early course correction. See CET support document [Mid-semester Evaluations](#).

Course Schedule: A Weekly Breakdown

Below is the detailed course calendar that includes a list of deliverables (homework assignments, examinations, etc.) broken down on a weekly basis. It includes:

- Subject matter, topic and activity
- Required preparatory reading or tasks (e.g., viewing videos)
- Deliverables and when each deliverable is due.

	Topics/Daily Activities	In Class/Study	Deliverables
Week 1	<p>Introduction to course: Special hours to accommodate orientation:</p> <p>Content: USC code of conduct USC Blackboard, USC Lynda.com</p>	<p>Areas of Interest: Describe favorite aspects of games or movies you are interested in.</p> <p>Expectations of Class: What you will learn, what is graded and handed in and at what time.</p>	<p>Homework: Download Maya 2019 successfully onto your local laptop or desktop and have it dependably working for next class. Construct sub-folders of 'Work' and 'Final' for class in assigned folders.</p>
Week 2	<p>Introduction to Maya Maya and web support resources: Online help, class webpage, tutorials, etc.</p>	<p>Part 1: Basic 3d objects, manipulating both objects and components.</p> <p>Part 2: Finish 3d model of Pball</p>	<p>Homework: Finish 3d model of Pball using lab time and online tutorial, hand it in assigned 'Final' folder.</p>
Week 3	<p>Complex Maya modeling</p>	<p>Part 1: UVs versus polygon modeling. (Unwrapping)</p> <p>Part 2 Lab: Sort out the UVs in pBall 3d model for existing texture.</p>	<p>Homework: Finish UV layout of Pball using lab time and online tutorial, hand in finished work to 'Final' folder.</p>
Week 4	<p>Laying out 'Shoobox Garage'</p>	<p>Part 1: Use polygons as guides with orthographic images for accurate construction of 3d models.</p> <p>Part 2 Lab: Construct 'Shoobox Garage' 3d image guides.</p>	<p>Homework: Choose vehicle for creation, set up planes using image guides</p>

Week 5	Modeling Vehicle from Guides	<p>Part 1: Using 'hinges' in poly planes to set angles and bends in 3d construction.</p> <p>Part 2 Lab: Model half of the digital vehicle using guides.</p>	<p>Homework: 3d model half of the vehicle, using guides to show significant changes in the geometry and keeping the construction low-poly.</p>
Week 6	Advanced UV Layout	<p>Part 1: Use advanced UV techniques of snapping rotating/moving by degrees for arrangement</p> <p>Part 2 Lab: Organize all UVs on the half-car model</p>	<p>Homework: Slice and arrange UVs from car into a perfect square.</p>
Week 7	Texturing Vehicle using online images.	<p>Part 1: Exporting UV layout image into pixlr.com or Photoshop as guide for found images to texture the vehicle.</p> <p>Part 2 Lab: Texture the half vehicle 3d model, mirror geo.</p>	<p>Homework: Texture the car, mirror the geometry combine chassis with separate wheels, delete all shoebox guides and save model in Final folder.</p>
Week 8	Animation: Keyframes and motion paths	<p>Part 1: Write expression on all four wheels to get them to automatically roll as vehicle moves on motion path and groups to make 'differential'.</p> <p>Part 2 Lab: Make another expression to guide steering</p>	<p>Homework: Finish modeling/UV unwrapping dorm prop - submit to online folder.</p>

Week 9	Animation: Expressions	<p>Part 1: Construct complex expression for locator to be 5 frames ahead of vehicle, use aim constraint to guide steering</p> <p>Part 2 Lab: Use motion path and constraints to animate camera to look at car</p>	Homework:
Week 10	References	<p>Part 1: Projects and References and how they are used to create large scenes with consistency</p> <p>Part 2 Lab: Set up shelf icons to go to your project, references to make room scene.</p>	Homework: Use references to create an environment from several dorm props and a table in use with your vehicle.
Week 11	Animation: Camera Motion Path	<p>Part 1: Motion paths in use with cameras for rendering multiple scenes with same BG</p> <p>Part 2 Lab: Set up references to work with motion path camera in three separate Maya scenes</p>	Homework: Create motion path for camera, set up three separate 'clips'
Week 12	Playblast Rendering and	<p>Part 1: Rendering out image sequences from maya to become movies. Custom tools to make clips into movies.</p> <p>Part 2 Lab: Set up three clips to render in Maya to be movies.</p>	Homework: Release of final assignment: Storyboard. Start rendering out final clips according to storyboard.
Week 13	Rendering in Arnold	How to utilize Arnold renderer for images with	Homework:

		HDMI background, use new toolsets to sew movie together	Render scenes in Arnold, continue rendering clips.
Final 11/20	Render Separate clips	<i>Finish final movie – no class</i>	Homework: Upload final long movie by end of day 05/12

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 scientific misconduct, policy.usc.edu/scientific-misconduct.

Support Systems:

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

engemannshc.usc.edu/counseling

Free and confidential mental health treatment for students, including short-term psychotherapy, group counseling, stress fitness workshops, and crisis intervention.

Student Health Leave Coordinator – 213-821-4710

Located in the USC Support and Advocacy office, the Health Leave Coordinator processes requests for health leaves of absence and advocates for students taking such leaves when needed.

<https://policy.usc.edu/student-health-leave-absence/>

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) 740-4900 – 24/7 on call

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, 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

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

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

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

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.

Diversity and Inclusion

Diversity and Inclusion are foundational to the SCA community. We are committed to fostering a welcoming and supportive environment where students of all identities and backgrounds can flourish. The classroom should be a space for open discussion of ideas and self-expression; however, SCA will not tolerate verbal or written abuse, threats, harassment, intimidation or violence against person or property. If students are concerned about these matters in the classroom setting they are encouraged to contact their SCA Diversity and Inclusion Liaison, <http://cinema.usc.edu/about/diversity.cfm>; e-mail diversity@cinema.usc.edu. You can also report discrimination based on a protected class here <https://equity.usc.edu/harassment-or-discrimination/>

Disruptive Student Behavior:

Behavior that persistently or grossly interferes with classroom activities is considered disruptive behavior and may be subject to disciplinary action. Such behavior inhibits other students' ability to learn and an instructor's ability to teach. A student responsible for disruptive behavior may be required to leave class pending discussion and resolution of the problem and may be reported to the Office of Student Judicial Affairs for disciplinary action.

PLEASE NOTE:

FOOD AND DRINKS (OTHER THAN WATER) ARE NOT PERMITTED IN ANY INSTRUCTIONAL SPACES IN THE CINEMATIC ARTS COMPLEX