



CTAN - 485L Pipeline and Character Modeling for Animation
2.0 Units
Fall semester 2022, Tuesdays 7 - 9:50pm

Location: SCI L113 7-9:50pm

Instructor: Jaewon Lee

Office Hours: Tues 7-10pm

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Teaching Assistant: Jingtong (Rosemary) Wu

Office Hours:

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IT Help: Creative Tech Help Desk

Tech support:

creativetech@cinema.usc.edu

Contact Info: 213-821-4571

THIS IS AN IN-PERSON CLASS

In accordance with university recommendations, all meetings of this class will be held in person. Students who become ill and need to self-isolate will be supported in their efforts to stay current with classwork and assignments, to the extent possible. **Please contact Professor Lee and your SA, Rosemary, at least one hour prior to class start time if you become ill and need to self-isolate.** Do not come to class if you are experiencing any symptoms of COVID-19 or other illnesses. Requests for longer term exemptions will be considered on a case-by-case basis, and must be supported by a written accommodation request from the USC Office of Student Accessibility Services (OSAS)

Course Description

This course teaches 3D modeling and pipeline integration of 3D models for the use in production. Also, students will learn the fundamental human anatomy and practice human body modeling. Students will use modeling and texturing software to create and color their models while adhering to common standards used in production pipelines.

This is a practical class, teaching the students techniques that can be used right away to expedite the CGI asset creation process. The practical nature of the class means there is no required weekly reading but there are weekly assignments. Additional resources will be provided that are tailored to the concepts and objectives of that week.

Learning Objectives

- Learn how to create 3D model from 2D designs.
- Learn the basic human anatomy for 3D modeling fundamental
- Learn how 3D models are used in productions by other departments.
- Understand common production standards for 3D models.
- Learn the concepts for creating hair, fur, feathers, and clothing for characters.
- Create 3D models and texture them for their animation projects or personal enlightenment.
- Learning how to present their work to a group.

Recommended Preparation: Basic understanding of 3D modeling in Maya, Zbrush and using Photoshop is advisable, not mandatory.

Course Notes

This course will be taught on campus for the Fall semester and will receive a Letter grade.

Technological Proficiency and Hardware/Software Required

Autodesk Maya 2020, Pixologic Zbrush 2020, Adobe Substance Painter and Photoshop. We will discuss other software packages that are commonly used in production for modeling, texturing, cloth, hair, lighting and rendering.

Supplementary Materials

- Autodesk Maya: <https://academy.autodesk.com/software/maya>
- Pixologic Zbrush: <http://pixologic.com/zclassroom/>
- Adobe Photoshop: <https://helpx.adobe.com/photoshop/tutorials.html>
- Substance Painter: <https://academy.substance3d.com/>

- Arnold Rendering: <https://vimeo.com/arnoldrenderer>

Description and Assessment of Assignments

Characters are generally the most complex assets on a CGI project. The principles and techniques learned during this course can also be applied to inanimate assets such as prop and environment 3D models.

The student will work on one male or female body provided by the instructor and on two characters of their choosing. Ideally the characters students choose will be for their personal projects and complex enough to challenge them but still meet their assignment deadlines.

- **Character 1** (4 weeks) will work as a test subject where the new techniques and pipeline will be learned. Pick male or female anatomy-based reference.
- **Character 2** (5 weeks) will work as a test subject where the new techniques in Maya and Zbrush will be learned. Pick any character from animated film.
- **Character 3** (5 weeks) will work reinforcing the techniques and methods learned with Character 1 and 2 in addition to learning alternative modeling techniques in production.

The learning outcome will be assessed by these criteria:

1. Aesthetically: How well does the 3D model resemble the reference art and images for the character?
2. Technically: How closely the 3D model meets the technical specifications discussed in the lecture.

Grading Breakdown

Evaluation criteria

- **Participation:** Students will be assessed based on class engagement and implementation of the techniques learned during the weekly lecture and how the students apply the feedback given by the instructor and the other students. Participation also includes presenting your work to the group.
- **Weekly Assignments:** Each week students will be given weekly assignments. These assignments are required to be completed by next week class. All weekly assignments will need to be uploaded into a class online drive, to be reviewed prior to class.
- **Final Project:** Students will model and texture two characters of their choosing and provide a video turntable of each character. In addition, the students will create a character model sheet of their character using renders of their character and a character description and include their initial designs of the character

Assessment Tool (assignments)	Points	% of Grade
Class participation	15	15
Weekly Assignments	50	50
Final project	35	35
TOTAL	100	100

Grading Scale

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 Submission Policy

Each weekly submission will need to be uploaded before 6:00 pm PST by the Tuesday prior to the next class.

Grading Timeline

Grading for each assignment will be completed by the following Sunday night after the submission is due.

Additional Policies

Any student arriving 10 minutes late will be marked “LATE”. Three “LATES” constitute an absence. Three absences will result in failure. The only exceptions will be valid emergencies with appropriate documentation. Impersonating other classmates when signing roll sheet will not be tolerated and will be subject to disciplinary action

Course Schedule: A Weekly Breakdown

	Topics/Daily Activities	Deliverables
Week 1 8/23	<ul style="list-style-type: none"> • Introductions • Animation production overview • Intro to Maya • Maya UI, scene creation, directories, modeling tools 	
Week 2 8/30	<ul style="list-style-type: none"> • Continue tools in maya • Maya image plane setup • Low polygon modeling demo Modeling pipeline 	Due 9/06 <ol style="list-style-type: none"> 1. Complete the simple modeling 2. Import image planes of male or female reference in Maya
Week 3 9/6	<ul style="list-style-type: none"> • Human head & face anatomy • Head modeling 	Due 9/13 <ol style="list-style-type: none"> 1. Complete the face area of the head
Week 4 9/13	<ul style="list-style-type: none"> • Face extras (ear, brow etc.) • Body anatomy Body modeling • Analyzing an animation style and how that applies to your character. 	Due 9/20 <ol style="list-style-type: none"> 1. Complete the head model of male/female 2. Complete the body model
Week 5 9/20	<ul style="list-style-type: none"> • Anatomy model continued Body extras • Unwrap UVs UV- UDIM • Maps – JPEG, PNG, EXR, USD 	Due 9/27 <ol style="list-style-type: none"> 1. Finalize the male/female model. 2. Pick a character from an animated film that you like for first modeling assignment

Week 6 9/27	<ul style="list-style-type: none"> • Maya to Zbrush and Zbrush to Maya • Zbrush intro and modeling approaches. • Sculpting in Zbrush. <p>Subtools and polygroups</p>	Due 10/4 <ol style="list-style-type: none"> 1. Start character 2. 20% complete. 2. Export your rough character model from Maya and import it into Zbrush. 3. Import your character reference image(s) into Zbrush.
Week 7 10/4	<ul style="list-style-type: none"> • Zbrush model continued. <p>Exploring more tools. UVs in Zbrush.</p> <ul style="list-style-type: none"> • Texture- using Photoshop <p>Intro to substance painter</p>	Due 10/11 <ol style="list-style-type: none"> 1. Continue working on your character adding details. 2. Keep working on your character. 50% complete.
Week 8 10/11	<ul style="list-style-type: none"> • Substance Painter continued. • Painting in Zbrush. • Generate normal map • Posing your character in Zbrush 	Due 10/18 <ol style="list-style-type: none"> 1. Continue adding final details to your Zbrush sculpture. 2. Create normal maps for your character in Zbrush.
Oct. 13-14	Fall Recess	

Week 9 10/18	<ul style="list-style-type: none"> • Retopology in Maya & Zbrush • Rigging characters in Maya • Posing characters and neutral pose 	Due 10/25 <ol style="list-style-type: none"> 1. Adjust character to meet character modeling standards. Neutral model. 2. Create a clean topology and UVs for your character's body.
Week 10 10/25	<ul style="list-style-type: none"> • Maya shaders. • Lighting in Maya • Arnold shaders & rendering • Maya Playblast, Viewport 2.0 	Due 11/1 <ol style="list-style-type: none"> 1. Finalize character 2 with a pose. 2. Create PSD network with your character. Import maps. 3. Single render in Maya.
Week 11 11/1	<ul style="list-style-type: none"> • CG cloth discussion. • CG Footwear discussion. • Cloth modeling standards. 	Due 11/8 <ol style="list-style-type: none"> 1. Start character 3 in either Maya or Zbrush. 20% complete. 2. Create an article of clothing for your character. 3. Create footwear for your character.

Week 12 11/8	<ul style="list-style-type: none"> CG hair, fur, and feather discussion. Xgen in Maya. Fibermesh in Zbrush. 	Due 11/15 <ol style="list-style-type: none"> Create some form of hair for your character using Xgen in Maya or fibermesh in Zbrush. Continue modeling your character. 50% complete.
Week 13 11/15	<ul style="list-style-type: none"> Generic character meshes Facial expressions and facial anatomy. Blend shapes. 	Due 11/22 <ol style="list-style-type: none"> Continue modeling your character. 80% complete. Create 1 facial expression with your character.
Week 14 11/22	<ul style="list-style-type: none"> Introduction of popular software in CG Scripts, plug-ins Q & A 	Due 11/29 <ol style="list-style-type: none"> Test render images of character
Nov. 23-27	Thanksgiving Break	
Week 15 11/29	<ul style="list-style-type: none"> Turntable & rendering setup Final checkup & critiques 	Due 12/13 FINAL <ol style="list-style-type: none"> Prepare the Final Final tweaks for next week's presentation.
Dec. 3-6	Study Days	
FINAL 12/13	<ul style="list-style-type: none"> Present your character. Discuss the character and show your movie and character packet. Analyzing your design in relation to your rough model. 	Submit by 12/13 7pm-9:50pm <ol style="list-style-type: none"> Provide a video turntable of each character. Create a character model sheet of their character using renders of their character and a character description and include their initial designs of the character.

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, <http://policy.usc.edu/scientific-misconduct>.

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.

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 and 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 of Equity and Diversity (OED)- (213) 740-5086 | Title IX – (213) 821-8298

equity.usc.edu, titleix.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. 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. The university also prohibits sexual assault, non-consensual sexual contact, sexual misconduct, intimate partner violence, stalking, malicious dissuasion, retaliation, and violation of interim measures.

Reporting Incidents of Bias or Harassment - (213) 740-5086 or (213) 821-8298 [usc-](http://usc-advocate.symplicity.com/care-report)

advocate.symplicity.com/care-report

Avenue to report incidents of bias, hate crimes, and microaggressions to the Office of Equity and Diversity | Title IX for appropriate investigation, supportive measures, 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 Campus Support & 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 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) 442-1200 – 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.

PLEASE NOTE:

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