**CTAN-599 Special Topics – Environment Modeling**
**2.0 Units**
**Spring semester 2024, Thursdays 7 - 9:50pm**

**Location:** SCA 356 7-9:50pm

**Instructor:** Jaewon Lee
**Office Hours:** Thurs 7-10pm
**Contact Info:** jlee6574@usc.edu

**Teaching Assistant:** Nina Ceklic
**Office Hours:**
**Contact Info:** ceklic@usc.edu

**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 TBD, 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, the lecture covers the modeling techniques required for creating urban and nature environment scenes with related props (tree/plants, rocks, buildings, street elements and furniture etc.) and the vehicle model (car, airplane, mechanic etc.). Each student is expected to build a vehicle model and nature/urban environment models for the midterm and the final project. Curves, polygon, and subdivision modeling will be demonstrated to explain the pros and cons of each geometry type, and further expand students' knowledge in 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 how to use vehicle blueprint images and set up the image planes.
- Learn how 3D models are used in productions by other departments.
- Understand common production standards for 3D models.
- Students can use various tools and methods to create the hard surface model or even a scene more appropriately such as Substance Painter.
- 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 Knowledge of 3D software.

**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, Maxon Zbrush, 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
- Maxon 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**

Student will practice how to implement the concepts to the final 3D models from their own ideas or from the concepts given. Topics include efficient modeling techniques such as marking menu and usage of short keys.

The student will work on one vehicle model and 2 environment scene model from their choosing. In addition to weekly classroom activities, at least 3 hours per week of out-of-class preparation will be required and complex enough to challenge them but still meet their assignment deadlines.

- **Assignments** (Each week) will complete in-class assignments that support class objects.
- **First project** (4 weeks) will work on a hard surface project such as cars, airplanes, or mechanics in Maya with the techniques learned. Pick any vehicles with blueprints.
- **Mid-term** (4 weeks) will work on a nature environment scene such as a forest, a rocky place, or a mixed nature scene. Must include tree, plant or rock, any nature props.
- **Final Project** (5weeks) will be able to create an urban environment scene such as a street, buildings, architects, or an interior scene. Must include street prop (streetlight, mailbox, fire hydrant etc.), house, or table, chair any interior props.

The learning outcome will be assessed by these criteria:

- Aesthetically: How well does the 3D model match the reference art and images for the hard surface model?
- Technically: How closely the 3D model meets the technical specifications discussed in the lecture.

**AI (*Artificial Intelligence/Generative software*)**

AI may be used as reference or inspiration for your work, but we do not accept AI-generated art as your own original work as it is deemed derivative of other works whose originators may not have granted permission for its use.

**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.
- **Assignments:** Each week students will be given weekly assignments. These assignments are required to be completed by next following week class. Assignments will need to be uploaded into a class online drive, to be reviewed prior to class.
- **First Project:** Students will create a vehicle model such as car, airplane, mechanic from their chosen blueprint images.
- **Mid-term & Final Project:** Students will create a nature scene using the knowledge that will have been taught so far. A scene must be composed with nature elements such as rocks, ground, and trees etc. And students will create an urbane environment such as buildings, street, interior and more, at least 5 street props/furniture included. Each student will prepare reference images then build and compose all elements together in order to complete entire scene.

| Assessment Tool (assignments) | Points | % of Grade |
|---|---|---|
| Class participation | 10 | 10 |
| Assignment (includes 'First Project) | 30 | 30 |
| Mid-term | 30 | 30 |
| Final project | 30 | 30 |
| **TOTAL** | 100 | 100 |

**Grading Scale**

Course final grades will be determined using the following scale:

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| 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 1/11** | • Introductions<br>• Animation production overview<br>• Intro to Maya<br>• Maya UI, scene creation, directories, modeling tools | |
| **Week 2 1/18** | • Continue tools in maya<br>• Maya image plane setup | **Due 1/25**<br>• Pick a vehicle and complete image plane setup. |

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| | • Low polygon modeling demo<br>• Modeling pipeline | |
| **Week 3**<br>**1/25** | • Create outlines from blueprints<br>• Learn how to manipulate the curves<br>• Use 'Loft' tool to create surfaces | **Due 2/01**<br>• Complete the outlines of the vehicle. |
| **Week 4**<br>**2/01** | • Polygon Tools: Extrude, Multi-cut<br>• Learn how to clean up and adjust the resolution<br>• Maya materials: Lambert, Blinn, Phong<br>• Assign materials & maps: Hypershade | **Due 2/08**<br>• Complete the main body panels. |
| **Week 5**<br>**2/08** | • Add details with various polygon tools<br>• Create holes and add bevel etc.<br>• Using Primitives to build parts<br>• Deformer – Lattice tool | **Due 2/15**<br>• Clean up surface curvature.<br>• Complete the rough panel works |
| **Week 6**<br>**2/15** | • Learn how to create tire<br>• Create the panel gap<br>• Use X-ray tool | **Due 2/22**<br>• Increase the resolution.<br>• Add small parts details.<br>• Start to collect nature envir refs |
| **Week 7**<br>**2/22** | • Low polygon Modeling Techniques<br>- use 'Create Polygon' tool<br>• Multi-cut tool/Split Polygon tool options | **Due 2/29**<br>• **Submit First Project**<br>• Prepare nature envir plan |
| **Week 8**<br>**2/29** | • Prop modeling<br>- Rock, tree, and plants<br>- Lamp, chair, table etc.<br>• Using maya sculpting tools | **Due 3/07**<br>• Props for the nature enivr scene |
| **Week 9**<br>**3/07** | • Nature environment modeling<br>- Ground, cliff<br>• Create a nature environment scene with elements created in the class. | **Due 3/21**<br>• Continue to work on Mid-term |

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| **3/11-15** | **Recess** | |
| **Week 10 3/21** | • UV basics- UV tools<br>• Unwrap UVs<br>• File formats | **Due 3/28**<br>• Continue to work on Mid-term<br>• Start to collect urbane envir refs. |
| **Week 11 3/28** | • City environment modeling<br>- Road, building, streetlight, trash can etc.<br>• Create a city environment scene with elements created.<br>• | **Due 4/04**<br>• **Submit Mid-term Project**<br>• Prepare urban envir plan. |
| **Week 12 4/04** | • Texture maps<br>- Color, Bump, Spec and Normal<br>• Learn how to create color maps in Photoshop with Maya Snapshot<br>• Create Normal map in Maya<br>• Introduction of Zbrush<br>- UI, menu, tools, brushes etc.<br>• Extract Normal map in Zbrush | **Due 4/11**<br>• Create normal maps.<br>• UV works. |
| **Week 13 4/11** | • Intro to Substance Painter.<br>- UI, work space<br>- Layers<br>- Smart materials<br>• Maya and Substance Painter work process | **Due 4/18**<br>• Create textures and assign maps in Maya |
| **Week 14 4/18** | • Renderer - Maya Arnold<br>• Light setting with Arnold lights<br>• Learn how to assign the textures to Arnold shader | **Due 4/25**<br>• Continue to work.<br>• Expect 80% complete (ex. Texture). |
| **Week 15 4/25** | • Rendering<br>• Final checkup & critiques | **FINAL 5/02**<br>• Render set up and final tweaks.<br>• Prepare the final presentation.<br>. |
| **4/27-30** | **Study Days** | |
| **FINAL 5/02** | | **Submit Final Project by 5/02 7PM**<br>• Provide the rendered images or clip.<br>• Provide an environment model sheet.<br>• Description includes initial designs of the environment scene. |

## 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/scientifichttp://policy.usc.edu/scientific-misconductmisconduct.

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