COSI 164a/Intro to 3D Animation

Contact Details
Tim Hickey
Office location: Volen 138
Telephone: (617)-935-9065 (home cell)
Email: tjhickey@brandeis.edu

Meeting Times

Classes
Monday/Wednesday 8:00am-9:30am
Zoom link for classes:
https://brandeis.zoom.us/j/97601085611?pwd=T0V1VFFyV0hmUmxmZmNCY253cHpUdz09

Office Hours
Monday 1:30-3:00 on Zoom

Course Description

Skills and knowledge

By the end of this course, students will be able to:
1. create 3d models with photorealistic materials and textures
2. create action libraries of animations of 3d models
3. create short 3d animated movies
4. create interactive virtual reality scenes running in a web browser
5. explain the fundamental concepts underlying 3d modeling, animation, and virtual reality

Teaching/learning strategies
We will organize the class into sections of about 20 students, and each section will be divided into 4 study groups and will have an assigned TA that will meet with each study group once a week. You will work together as a section in breakout rooms during classes and will work with your study group to help each other complete the homework assignments and to produce a team final project consisting of an interactive 3d applications with models and animations you have created yourself.

You will learn these skills and concepts in this course by
- watching video tutorials (on zoom or pre-recorded)
- practicing the skills individually and with your team during in-class exercises
- assessing your progress with practical quizzes and creative projects
• creating a final project using all of the skills and concepts in the course, and more

Class preparation time
The class will meet 3 hours a week and I expect that you will meet with your team for at least an hour a week. You will also need to spend an average of 8 hours a week on other classwork.

Prerequisites
This class has no prerequisites, but you will need to have a computer that can run the Chrome browser.

Remote Learning:
The classes will be conducted remotely due to the pandemic situation. The lectures and recitations will be delivered via Zoom. That requires access to computer equipment and the Internet in order to participate. The lectures and recitations will be recorded for students who lives in a time zone that makes it difficult to attend the class in real-time. The slides and links to the recordings will be made available via Latte. Students are required to participate in the lectures in real-time and actively participate in class discussions if it is feasible for their time zone. Students who find it difficult to participate in real-time should contact the instructor to discuss alternatives.

You will be formed into a team/study group in the first week of class and will be expected to find a weekly time where you can meet with your team to work on creative assignments and the final project. You will also spend some time during almost every class working with your team to apply the ideas and concepts presented in the class that day.

Remote Office Hours:
Office hours are also conducted remotely via Zoom. Students who have questions can meet the instructor and TAs during their office hours. In case of time conflict, they can make an appointment with the instructor or a TA via email. The instructor and TAs will strive to answer the request for appointment within 24 hours.

Course Requirements

Academic Integrity
Every member of the University community is expected to maintain the highest standards of academic integrity. A student shall not submit work that is falsified or is not the result of the student’s own effort. Infringement of academic honesty by a student subjects that student to serious penalties, which may include failure on the assignment, failure in the course, suspension from the University or other sanctions (see section 20 of R&R). Please consult Brandeis University Rights and Responsibilities for all policies and procedures related to academic
integrity. Students may be required to submit work to TurnItIn.com software to verify originality. A student who is in doubt regarding standards of academic honesty as they apply to a specific course or assignment should consult the faculty member responsible for that course or assignment before submitting the work. Allegations of alleged academic dishonesty will be forwarded to the Department of Student Rights and Community Standards. Citation and research assistance can be found at Brandeis Library Guides - Citing Sources (https://guides.library.brandeis.edu/c.php?g=301723).

Assignments
There will be three major individual creative assignments assessing mastery of skills in modeling, animation, and interactive VR design. There will also be a team final project which will demonstrate your skills in all three areas as well as your ability to work effectively as a team member.

Exams/Quizzes
There will be three quizzes which will be cumulative, meaning each quiz requires mastery of all material learned up to that point. The quizzes will be graded with Progressive Grading, so each Quiz grade replaces all of the earlier, lower Quiz grades. The quizzes will be in class.

Participation
You must participate every day in class. We will use several software systems which allow me to ask you questions, which you answer during class (with a short time limit of a few minutes). There are also some homework problems which will be graded on participation only, e.g. reviewing other students projects.

Portfolio
The projects you create in this class can become part of your academic portfolio, in case you are looking for a job or internship or graduate school in the future which requires some knowledge of 3d modeling, animation, or interactive Virtual Reality.

Accommodations
Brandeis seeks to welcome and include all students. If you are a student who needs accommodations as outlined in an accommodations letter, I want to support you. In order to provide test accommodations, I need the letter more than 48 hours in advance. I want to provide your accommodations, but cannot do so retroactively. If you have questions about documenting a disability of requesting accommodations, please contact Student Accessibility Support (SAS https://www.brandeis.edu/accessibility/) at 781.736.3470 or access@brandeis.edu.

Course Materials
If you are having difficulty purchasing course materials, please make an appointment with your Student Financial Services or Academic Services advisor to discuss possible funding options and/or textbook alternatives. All of the materials in this course, including the software are freely available.

**Required Readings / Optional Readings**
You will be required to read some online documentation and to watch some videos and comment on them.

**Apps or Tools/Equipment**
Everyone will need to have a computer with a Chrome Web Browser installed. All of the 3D modeling, animating, and interactive Virtual Reality software will run in your browser and is free of charge. We will use [https://clara.io](https://clara.io) for 3D modeling and animation and [https://glitch.com](https://glitch.com) for hosting interactive Virtual Reality systems.

*Undergraduate students from SAS with financial need should contact Student Financial Services to discuss options available to purchase equipment and other technology and supply needs. GSAS students should contact Monique Howell in GSAS.*

**LATTE**
**LATTE** is the Brandeis learning management system: [http://latte.brandeis.edu](http://latte.brandeis.edu). Login using your UNET ID and password.

**Library**
The Brandeis Library collections and staff offer resources and services to support Brandeis students, faculty and staff. These include workshops, consultations, collaboration, materials and instruction on emerging trends in technologies such as machine learning, emerging trends in research such as data visualization, and emerging trends in scholarship such as open access. Librarians at the Circulation Desk, Research Help Desk, Archives & Special Collections, Sound & Image Media Studios, MakerLab, AutomationLab, and Digital Scholarship Lab are available to help you. [https://www.brandeis.edu/library/about/index.html](https://www.brandeis.edu/library/about/index.html)

**Privacy**
This class requires the use of tools that may disclose your coursework and identity to parties outside the class. To protect your privacy, you may choose to use a pseudonym/alias rather than your name in submitting such work. You must share the pseudonym/alias with me and any teaching assistants as needed. Alternatively, with prior consultation, you may submit such work directly to me.

**Student Support**
Brandeis University is committed to supporting all our students so they can thrive. The following resources are available to help with the many academic and non-academic factors that contribute to student success (finances, health, food supply, housing, mental health counseling, academic advising, physical and social activities, etc.). Please explore the many links on this Support at Brandeis page (https://www.brandeis.edu/support/undergraduate-students/browse.html) to find out more about the resources that Brandeis provides to help you and your classmates to achieve success.

Course Plan
The course will consist of 3 Units. Here is the tentative plan. We may adjust this depending on how much time it take a majority of the class to master the corresponding skills and concepts.

Week 1: Overview

Unit 1: Modelling.
In this unit we will learn the core principles behind creating 3D models using the web-based modeling software at https://clara.io
Week 2: Core modeling concepts and skills (mesh, coordinates, transforms)
 Week 3: Extrusion, Modeling Operations, and Deformations
Week 4: Lighting, Materials, Cameras. Import/Export and rendering.
Week 5: Modeling in other Systems (e.g. Blender)

Unit 2: Animation
In this unit, we will learn the core skills and concepts behind animation of objects and characters. We will also use clara.io for this unit.
Week 6: Keyframes and Linear Interpolation
Week 7: Advanced Animation in other Systems (e.g. Blender)

Unit 3: Interactive Virtual Reality
In this unit, we will use the A-Frame system to develop interactive VR applications which run in the browser. We will use the site https://glitch.com to host these VR applications.
Week 8: Static VR scenes
Week 9: Advanced VR features including Navigation and Shadows
Week 10: Adding Physics to a Scene
Week 11: The Entity/Component model
Week 12: Creating Custom components
Week 13: ThreeJS and Interactive Graphics

Week 14: Final Project Showcase

Additional Information
Your final course grade will be calculated using the percentages shown below:

<table>
<thead>
<tr>
<th>Class Element</th>
<th>Grade Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>In-class participation</td>
<td>10%</td>
</tr>
<tr>
<td>Team Final Project</td>
<td>20%</td>
</tr>
<tr>
<td>Assignments</td>
<td>30%</td>
</tr>
<tr>
<td>Quizzes</td>
<td>40%</td>
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</tbody>
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