

UW CSE 490

Summer A & B 2020

Website

Canvas: <https://canvas.uw.edu/courses/1381122>

Personnel

Instructors:

Dave Hunt - Character classes, kloctower@gmail.com

Natalie Burke - World and look-dev classes, natburke@cs.washington.edu

TAs:

- Ellie Derocher
- Matthew Grinnell
- Terrell Strong

Office Hours: Listed on Class Webpage

Important Email Addresses

Staff Mailing List: cse490j-staff@cs.washington.edu

- If you need to contact the staff (and TAs), ask them a question, let them know of tardiness or absences, this is the email you must use.

Class Mailing List: cse490j@cs.washington.edu

Support Email: support@cs.washington.edu

When you have a computer or account issue, email the support help desk.

- Please CC Dave or Natalie on the email, so we can keep up to date on the status of any issues and/or requests

General Information

Schedule

Summer Quarter [UW academic calendar 2020](#)

- Instruction begins: June 22
- Last day of instruction: August 21
- Summer holidays: July 3
- Online teaching confirmed for A and B terms.

Classes:

- Character class time: Tuesdays, 10:30am to 1:40pm
- World class time: Thursday, 5:30pm to 8:30pm
- Grades due from faculty at 5:00 p.m. via GradeBook/GradePage: August 25

Monday	Tuesday	Wednesday	Thursday	Friday
June 22	23 Character class 1	24	25 World class 1	26
29	30 Character class 2	July 1	2 World class 2	3
6	7 Character class 3	8	9 World class 3	10
13	14 Character class 4	15	16 World class 4	17
20	21 Character class 5	22	23 World class 5	24
27	28 Character class 6	29	30 World class 6	31
August 3	4 Character class 7	5	6 World class 7	7
10	11 Character class 8	12	13 World class 8	14
17	18 Final class	19	20 Final critique	21

Course Overview

In this 9 week class students will learn to create their own animated character and world for a cinematic in real-time 3d in Unity, with art content creation in Maya. Classes alternate between a

character and a world building focus, with assignments that are designed to complement each other in skill progression. Covered are the fundamentals of real-time cinematic production including character creation, world building, look development and animation. Students get hands-on experience working with real world industry tools and production pipelines. No prior experience required and all aspects of cinematic production are covered in the class.

Character class schedule

1. Character design
2. Skeleton and block model
3. Gray model
4. Gray model pose testing
5. Costume modeling
6. Rigging, Animation - idle, wave
7. Animation - walk
8. Animation - jump

World class schedule

1. Art style guide/world building
2. Level design concepts, Whiteboxing
3. Probuilder (modeling in Unity)
4. Terrain
5. Shader Graph visual effects
6. PBR shading
7. Lighting, GI
8. Cinemachine, Camera animation

Class format

- 3 hour class, twice a week
 - 1 to 1.5 hour lecture and demo
 - 2 hours (remainder) supervised class lab time

Course Material

As soon as possible, register for Unity Student: <https://store.unity.com/academic/unity-student>. This requires a GitHub account as it is part of the GitHub Student Developer Pack: <https://education.github.com/pack>. You may be required to submit proof of enrollment and verification can take a few weeks (GitHub will provide an estimate if this is needed). Unity Student gives access to all learning material for free as well as a number of asset packages (called Snaps). These educational material and assets will be used throughout this class.

For the Autodesk Maya educational license students will have to login at <https://www.autodesk.com/education/home> and they will be required to send a photo of their school ID to autodesk. It should be a quick process for them to approve it and send a license.

Grading Guidelines

Participation and contribution in lectures and labs: 25%


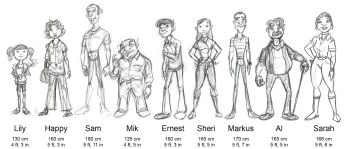

Assignments (2 per week): 65%

- Rubrics for each assignment will be given at time of assignment. Assignments are graded out of 100 (unless stated otherwise in the rubric)


Final: 10%

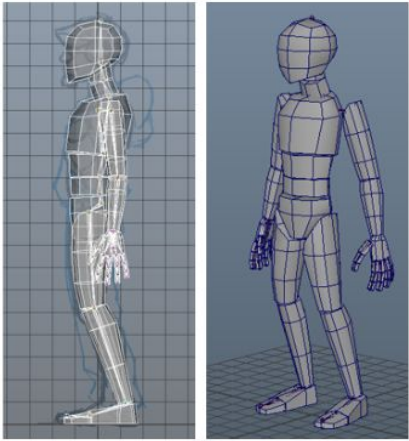
Classes

Character and World classes are designed to work in tandem so that students can create a complete animated cinematic experience with both world and character together for the final result.

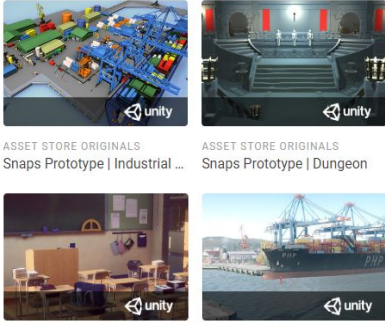
Character class 1	Character design
  	<p>Lecture presentation</p> <ul style="list-style-type: none"> - Class intro, character pre-production process <p>Assignment</p> <ul style="list-style-type: none"> - Write character description and story [Miro] - Draw concept art and front/side orthographics - Set up reference images in Maya <p>Skills learned:</p> <ul style="list-style-type: none"> - Sketching concept art - Intro to Maya, reference image setup <p>Turn in:</p> <ul style="list-style-type: none"> - Character concept art [Miro] - Orthographics: front and side [Miro] - Screenshots of ref images in Maya [Miro] - Character description [Miro] - Short character backstory [Miro] - Reference images scene [Maya] <p>Programs: Maya, Miro</p>

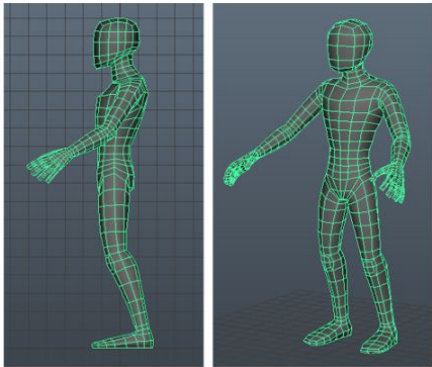
World class 1	Art style design
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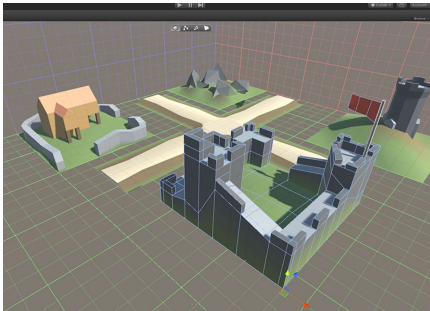
 <p>The screenshot shows a Miro board with several panels. At the top left is an 'Onboarding' panel. Next to it are 'Tool List' and 'Asset List' panels. Below these is a 'Planning' panel with a flowchart. At the bottom left is a 'Midterm Assignment' panel with a 'Style Guide' and 'LookDev Scene' sections. The 'Style Guide' includes 'Part 1: Art direction' and 'Part 2: Interaction'. The 'LookDev Scene' shows a 3D character model.</p>	<p>Lecture presentation: (View past MIRO board examples)</p> <ul style="list-style-type: none"> - World Building - What is a style guide? - Unity Project creation and scene setup using Universal RP. - Importing textures and creation your first material <p>Assignment:</p> <ul style="list-style-type: none"> - Create narrative for your world and an Art Style Guide - Create Unity Project that uses the Universal Render Pipeline, assign material made with your character concept to a cube. <p>Skills learned:</p> <ul style="list-style-type: none"> - World Building (Miro) - Unity scene setup - Making a material in Unity <p>Programs: MIRO, Unity</p>
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Character class 2	Skeleton and block model
 <p>The image shows two wireframe models of a character. The left model is a side view, showing the spine, ribcage, and limbs. The right model is a front view, showing the head, torso, and legs. Both models are composed of a grid of vertices and edges, representing a skeletal structure.</p>	<p>Lecture presentation</p> <ul style="list-style-type: none"> - Block model / gray model iterations <p>Assignment</p> <ul style="list-style-type: none"> - Build skeleton based on orthographics [Maya] - Build block model [Maya] - Add to basic player control [Unity] <p>Skills learned:</p> <ul style="list-style-type: none"> - Skeleton building [Maya] - Polygon modeling basics: object t-r-s, vertices, edges, faces, insert edge loops [Maya] - Animator state machine setup [Unity] <p>Programs: Maya, Unity</p>

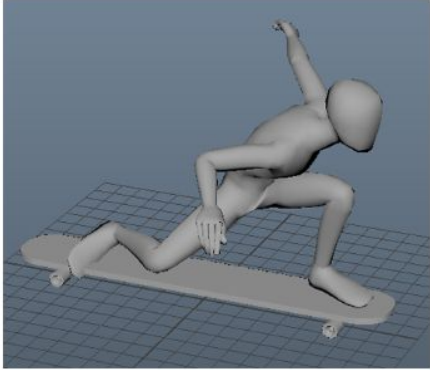
World class 2	Level Design
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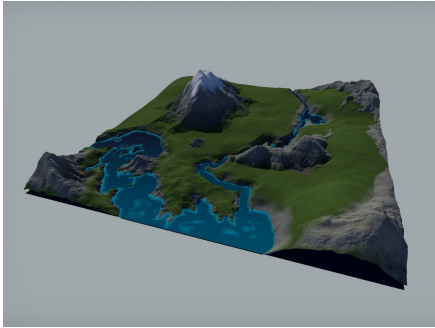
 <p>ASSET STORE ORIGINALS Snaps Prototype Industrial ...</p> <p>ASSET STORE ORIGINALS Snaps Prototype Dungeon</p> <p>ASSET STORE ORIGINALS Snaps Art HD School</p> <p>ASSET STORE ORIGINALS Snaps Art HD Industrial Har..</p> <p>Unity Snaps student bundle (\$489 value)</p>	<p>Lecture presentation:</p> <ul style="list-style-type: none"> - Level design concepts - White boxing <p>Assignment:</p> <ul style="list-style-type: none"> - Block out your Unity scene using snaps geo or basic primitives <p>Skills learned:</p> <ul style="list-style-type: none"> - Level design - Unity fundamentals - prefabs, placing and transforming gameobjects <p>Programs: Unity</p>
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Character class 3	Gray model
	<p>Lecture presentation:</p> <ul style="list-style-type: none"> - Polygon topology for characters - resources - Polygon modeling demo part 2 [Maya] <p>Assignment</p> <ul style="list-style-type: none"> - Combine blocks, manifold gray model [Maya] - Add to basic player control for critique [Unity] <p>Skills learned:</p> <ul style="list-style-type: none"> - Polygon topology theory [Maya] - Polygon modeling part 2: combine, merge [Maya] <p>Programs: Maya, Unity</p>

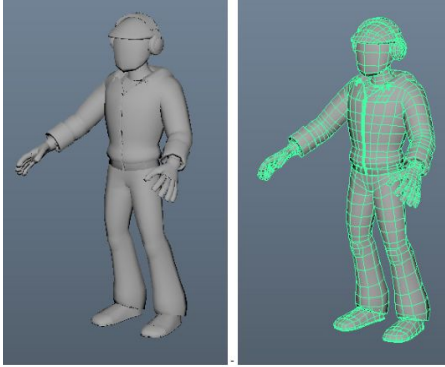
World class 3	Prop Modeling
	<p>Lecture presentation:</p> <ul style="list-style-type: none"> - Probuilder - Modeling fundamentals - UVs <p>Assignment:</p> <ul style="list-style-type: none"> - Create a unique prop in world with probuilder - Create UVs for it <p>Skills learned:</p>

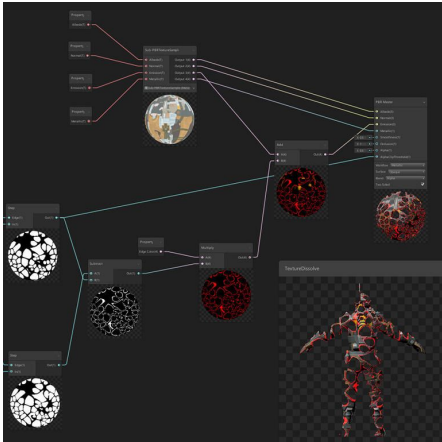
	<ul style="list-style-type: none"> - Modeling fundamentals - UV concepts - Probuilder <p>Programs: Unity</p>
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Character class 4	Gray model pose test
	<p>Lecture presentation:</p> <ul style="list-style-type: none"> - Character deformations: skin weights - Creating dynamic character poses <p>Assignment</p> <ul style="list-style-type: none"> - Paint skin weights [Maya] - Pose testing with Timeline for critique [Unity] <p>Skills learned:</p> <ul style="list-style-type: none"> - Skin weights [Maya] - Character posing [Unity] - Sequencing poses with Timeline [Unity] <p>Programs: Maya, Unity</p>

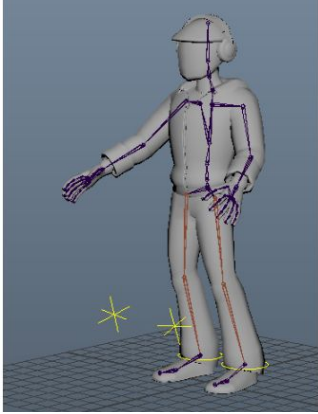
World class 4	Terrain
	<p>Lecture presentation:</p> <ul style="list-style-type: none"> - Environment in games - Terrain fundamentals <p>Assignment:</p> <ul style="list-style-type: none"> - Add terrain to your world and sculpt it <p>Skills learned:</p> <ul style="list-style-type: none"> - Organic environment art - Terrain creation <p>Programs: Unity, Terrain Tools Packages</p>

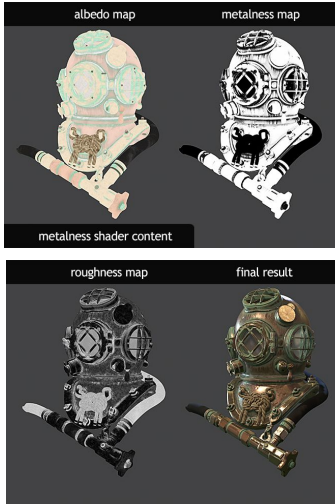
Character class 5	Costume model
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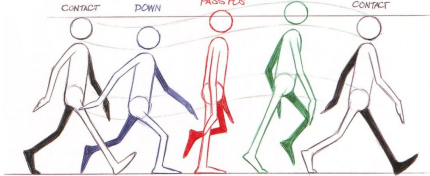
	<p>Lecture presentation:</p> <ul style="list-style-type: none"> - Polygon modeling demo part 3 [Maya] <p>Assignment</p> <ul style="list-style-type: none"> - Model the character's costume [Maya] - Add to basic player control for critique [Unity] <p>Skills learned:</p> <ul style="list-style-type: none"> - Polygon modeling: cut, extrude, duplicate [Maya] - Copy skin weights [Maya] <p>Programs: Maya, Unity</p>
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World class 5	Shader Graph
	<p>Lecture presentation:</p> <ul style="list-style-type: none"> - Shader Graph - Basic math for visual effects - Animated materials <p>Assignment:</p> <ul style="list-style-type: none"> - Use Shader Graph to create a material with a unique effect for your character. This effect should match the art style <p>Skills learned:</p> <ul style="list-style-type: none"> - Shader Graph - Math <p>Programs: Unity, Shader Graph</p>


Character class 6	Rigging and Animation - idle, wave
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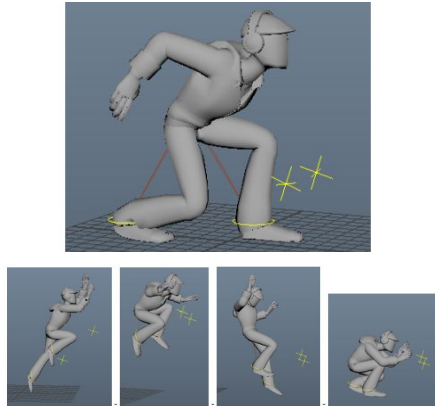
	<p>Lecture presentation:</p> <ul style="list-style-type: none"> - Rigging for animation <p>Assignment</p> <ul style="list-style-type: none"> - Set up animation rig [Unity] - Animate idle and wave <p>Skills learned:</p> <ul style="list-style-type: none"> - Building control rigs [Unity] - Basic animation [Unity] <p>Programs: Unity</p>
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World class 6	PBR
	<p>Lecture presentation:</p> <ul style="list-style-type: none"> - PBR - Industry standard texturing <p>Assignment:</p> <ul style="list-style-type: none"> - Add PBR materials to your custom world prop <p>Skills learned:</p> <ul style="list-style-type: none"> - What is PBR? - How to create textures for PBR materials <p>Programs: Photoshop, Unity</p>


Character class 7	Animation - walk
	<p>Lecture presentation:</p> <ul style="list-style-type: none"> - Creating a walk cycle animation <p>Assignment</p> <ul style="list-style-type: none"> - Animate walk cycle [Unity] - Add idle and walk to player control [Unity] <p>Skills learned:</p> <ul style="list-style-type: none"> - Animating motion cycles [Unity] - Animation state machine setup [Unity]

	Programs: Unity
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World class 7	Lighting
	<p>Lecture presentation:</p> <ul style="list-style-type: none"> - GI - Post Processing <p>Assignment:</p> <ul style="list-style-type: none"> - Light the scene <p>Skills learned:</p> <ul style="list-style-type: none"> - Real time lighting concepts - What GI is - How to bake lighting <p>Programs: Unity</p>

Character class 8	Animation - jump
	<p>Lecture presentation:</p> <ul style="list-style-type: none"> - Creating a jump animation <p>Assignment</p> <ul style="list-style-type: none"> - Animate jump [Unity] - Add jump to player control [Unity] <p>Skills learned:</p> <ul style="list-style-type: none"> - Animating body mechanics [Unity] - Animation state machine setup [Unity] <p>Programs: Unity</p>

World class 8	Cinemachine
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	<p>Lecture presentation:</p> <ul style="list-style-type: none"> - Cinemachine - Timeline <p>Assignment:</p> <ul style="list-style-type: none"> - Create a short film using their character, animations and world <p>Skills learned:</p> <ul style="list-style-type: none"> - Camera animation - Cinemachine/timeline for linear animation <p>Programs: Unity, Cinemachine</p>
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World Building Classes Assignments and grading

There is an assignment given per week. Assignments build on each other using the same Unity Project. The final project turned in will bring together your work from the character and world building classes into one Unity Project.

World Building Assignments are due before classes on Thursday (by 5:30pm)

Some assignments will be graded as a groups

Assignment 1 is due July 2nd 5:30pm (100 points)

Assignment 2, Assignment 3 and Assignment 4 will result in a single project and graded together. This project is due July 23rd 5:30pm (300 points)

Assignment 5 is due July 30th 5:30pm (100 points)

Assignment 6 and 7 will result in edits to the earlier project and will be graded together. This project is due August 13th 5:30pm (200 points)

Grading rubrics (each out of 100) and project specifics will be provided at time of assignment.

Character Classes Assignments and grading

Assignments will be given each week and due before class the following week. Grading rubrics will be provided with each assignment on the day of class instruction.

Final

Your final is due August 20th at 5:30pm.

The final is worth 10% of your entire course grade.

Your final will be a culmination of all the assignments you worked on until now.

You will be creating a short video that must contain your character performing 2 animations in their world. The camera framing for these animations must showcase the character in front of the key parts of the world you have spent the most time on. The cinematic is what will be graded for the quality.

The grading rubric will be handed out closer to the final date.

Lab

Lab is scheduled time for you to work on assignments alongside other students while TAs, staff and instructors are available for help. Since this is an online course you must be proactive to use these lab times and ask questions when needed. Classes are long and will not be spent as lectures only. Half of each class will be time set aside for students to work on the homework. During this time the professor and TAs will be available to answer questions from individuals and screen share through solutions as needed.

Work expectations

It is assumed that your work will be on time. Incomplete work will be turned in on time so that it can be evaluated with everyone else. Under some rare and extenuating circumstances, the staff may decide to grade revised projects.

Religious Accommodations

Washington state law requires that UW develop a policy for accommodation of student absences or significant hardship due to reasons of faith or conscience, or for organized religious activities. The UW's policy, including more information about how to request an accommodation, is available at Religious Accommodations Policy

(<https://registrar.washington.edu/staffandfaculty/religious-accommodations-policy/>).

Accommodations must be requested within the first two weeks of this course using the Religious Accommodations Request form

(<https://registrar.washington.edu/students/religious-accommodations-request/>).

Attendance Policy

We take daily attendance. If you are late or absent to your digital class your grade will reflect this. If you miss more than half the class, you will be marked absent.