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| **University of the Incarnate Word**  ANGD 2321 • Technical Direction Section 2 | Professor: Jingtian Li ([jili1@uiwtx.com](mailto:jili1@uiwtx.com))  Office: AD 408 • 210-832-5496  Hours: Tuesday: 10:30 AM - 1:00 PM  Thursday: 10:30 AM - Noon  Friday: 11:00 AM - 1:00 PM |
| Spring 2025 TR 1:30 PM -04:15 PM AD 406 |

**Course Overview:** This studio course covers technical issues and solutions for the game and animation production pipeline. It includes rigging, visual effects (VFX), scripting, standalone computer tools, applications, and plug-in development. Effective rigging tools and VFX techniques will be taught. Various coding languages and their applications will be explored.

**Outcomes:** Upon successfully completing this course the student will be able to: Produce effective rigs for characters and creatures; Build VFX for games and film; Write software plug-ins and simple computer.

applications.

**Audience:** This is a sophomore-level course required for all BFA ANGD majors

**Course Text:** *None.*

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| **Date** | **Lecture** | **Exercise** | **Assignments** |
| **Technical Animator** | | | |
| Rigging | | | |
| 1/14 | Basic Concept of Rigging, Grouping, Parenting, Joints, Skin Cluster, and Skin Weighting. | Rig A Finish |  |
| 1/16 | Controllers | Create Controllers for the Fish | **1 –** Rig Another Creature. |
| 1/21 | Humanoid Skeleton Setup | Making the Skeleton of our Character. | **2 –** Write an Article about Joint Orientation |
| 1/23 | Skinging | Use The ngSkinning Tool to painter the weight of the Character | **3 –** Refine the Skin of the Character |
| 1/28 | Arm Controller Setup 01 | Create the Arm Controller for the Character with IK and FK. | **4 –** Create IKFK setup on the Other Arm |
| 1/30 | Arm Controller Setup 02 | Set up IK FK Switch Visibility Control, and Hierarchy Organization. | **5 –** Finish Rigging both Arms. |
| 2/4 | Spine Rig | Create the Spine Rig of the Character. Add Twisting and Stretching Control. | **6 –** Finish the Spine Rig. |
| 2/6 | Eyebrow Rig | Create the Eyebrow Rig, and Introduction to Blend Shapes. | **7 –** Finish the other Eyebrow. |
| 2/11 | Eye Rig 01 Basic Joints and Controllers | Add Eye and Eyelid joints, Set up the Global Controls | **8 –** Finish the other Eyelids. |
| 2/13 | Eye Rig 02 Eyelid Follow and Collision | Add Eyelid Follow with Set Driven Key and Sculpt Deformer. | **9 –** Finish Rigging the Eye and Eyelids. |
| 2/18 | Auto Rig | Practice with Auto Rig Plugins. | **10 –** Paint the Skin Weighting of the Auto Rig |
| Game Animation Workflow | | | |
| 2/20 | Setup Basic Animation Blueprint in Unreal Engine 5. | Setup the Animation Blueprint of an Already Programmed Player Character | **11 –** Change the Character to Another One and Implement a Similar Animation BP. |
| 2/25 | Setup A Combo with Animation Montage. | Add a Simple Combo Animation with an Animation Montage. | **12 –** Add Similar Combo with the Other Character. |
| 2/27 | Control Rig in Unreal Engine, and Foot Planting | Implement a Control Rig That fixes the Foot Planting of the Character. | **13 –** Setup a Control Rig to the other Character and Do a Simple Animation in UE5 |
| 3/4 | Cloth and Rigid Body Simulation in Game Engine | Create the Cloth and Rigid Body Simulation for the Character in Unreal Engine 5 | **14 –** Add the Cloth and Rigid Body Simulation of the Other Character. |
| 3/6 | UE5 Meta Human and Facial Expression Capture Techniques | UE5 Meta Human and Facial Expression Capture Techniques | **15 –** Create a Meta Human and Make an Animation out of it. |
| **Python Programming and Plugin Development** | | | |
| The Python Programming Language | | | |
| 3/18 | The Python Programming Language, Variables, Types, Operators, Containers, Input, Output, and Flow Control 01. | Install PyCharm, Explore the Basics of Python. Create a Simple Guessing Game. | **16 –** Create Rock Papper Scissors |
| 3/20 | Flow Control 02, Functions & Arguments | Solve 3 Questions with Flow Control Statements. | **17 –** Commet on each Line of the Solutions of the 3 Questions. |
| 3/25 | Python Fundamentals Exercises | Solve 3 Simple Questions | **18 –** Solve the Rest of the Questions. |
| 3/27 | Python Classes. Attribute and Method (Members) | Explore the Basics of Classes and Object-Oriented Programming. Create a Class the Represent a Triangle. | **19 –** Write an Article about Class |
| 4/1 | Python OOP Exercises. | Create a Class that Represents Time | **20 –** Create a class that Represents Dates |
| Python Plugin Development | | | |
| 4/3 | Make a Controller Tool | Make a Controller Tool That Generate Controllers for a joint With Settings | **21 –** Add Color and Thickness Control of the Controller |
| 4/8 | Make an Arm Auto Rig | Making an Arm/Leg Auto Rig Tool in Maya | **22 –** Finish the Arm Auto Rig Tool |
| 4/10 | Proxy Model Generator | Create a Proxy Model Plugin in Maya that can create, and toggle proxy models for different part of the body. | **23 –** Add Another Feature to the Tool |
| 4/15 | Ghost Poser 01 – Basic Structure and Data Storage. | Layout the foundation of the Ghost Poser Plugin in Maya. | **24 –** Add Control of How Many Frames to Ghost |
| 4/17 | Ghost Poser 02 – Add Additional Controls | Add Visibility Control and Cleanup Mechanics. | **25 –** Add Another Feature of the Ghost Poser Tool |
| 4/22 | Maya to Unreal Plugin 01 - Output Skeletal Meshes with Python | Create a Maya Plugin that Automatically find all joints associated with the mesh and export a clean Skeletal Mesh. | **26 –** Add Another Feature of the Ghost Poser Tool |
| 4/24 | Maya to Unreal Plugin 02 - Import Skeletal Mesh to Unreal Engine with Python. | Create an Unreal Plugin that Automatically Import Mesh with Desired Settings. | **27 –** Add Setting to Control Animation Import. |
| 4/29 | Maya to Unreal Plugin 03 Connect Maya and Unreal Engine with Remote Execution. And Add Animation Exports. | Make the Maya Plugin Talk with Unreal Engine, and Automatically Export the Skeletal Mesh to Unreal. | **28 –** Comment on Each Line of the Finished Plugin. |
| 5/1 | Refactoring and Final Project Announcement | Clean up the Code of the Plugin, and Start Working on the Final Project |  |
|  | Project Due May 9th before midnight |  | Final Project Due |

# Grading Activities: Your final grade will be based on attendance, and assignments as described below:

# Attendance: Attendance is mandatory. Each additional absence will result in a letter drop in your final grade.

**Assignments:** Assignments and projects need to be turned in on time, there are **no late assignments accepted.** If you have turned an assignment in on time, you may refine it and turn it in again later for a better grade.

**Grade:** There are 28 assignments, each worth 10 points, the final project worth 20 points, you can get 300 points in total, and your final grade is calculated as:

(Your Grade)/3 then mapped to the UIW Grading Scale:

https://my.uiw.edu/registrar/academics/grading-scale.html

**UIW Course Policies, Guidelines and Accommodation:**

This course complies with all UIW academic policies and federal guidelines, including but not limited to: academic integrity, disability accommodations, pregnancy accommodations, Title IX non-discrimination, and class absences for religious observances.  Current policy statements will be provided to all students through the learning management system and in information provided on the first day of class.

<https://www.uiw.edu/academics/academicpolicies.html>