GAME 199: GAME RIGGING AND ANIMATION

Citrus College Course Outline of Record

Heading	Value
Effective Term:	Fall 2026
Credits:	3
Total Contact Hours:	108
Lecture Hours :	36
Lab Hours:	72
Hours Arranged:	0
Outside of Class Hours:	72
Total Student Learning Hours:	180
Prerequisite:	GAME 195.
Transferable to CSU:	Yes
Transferable to UC:	Yes - Proposed
Grading Method:	Standard Letter

Catalog Course Description

In this course students learn how to prepare an animation rig accurately and anatomically in a 3D simulation environment. Prepare previously created humanoid and creature 3D models for an animation-ready state using professional production techniques. Applies classic animation principles to objects in a 3D environment. Introduces tools used for 3D animation as well as the best working practices for animating objects and characters. Applies real-life action sequences to characters. Topics include game cycle animation, weight, actions and personality for the character including advanced techniques with key frame animation including incorporating audio as well as dynamic animation to assist the character driven animation. 36 lecture hours, 72 lab hours.

Course Objectives

- Create Character rigs accurately and anatomically in a 3D simulation environment.
- Analyze the fundamental differences between IK rigging Vs FK rigging and when one is more suitable than the orther
- Create Game Engine or Simulation ready Animation cycles.
- Analyze classic Animation Principles and apply them to Character Animation Cycles.

Major Course Content

1. Setting up a model for rigging
    a. Poly edge-flow for proper deformations
    b. Avoiding non-manifold geometry to reduce errors
    c. Controlling polygon density for efficiency in a game engine
2. Creating Skeletal Systems
    a. Forward Kinematic joint setup
    b. Inverse Kinematic controllers and operation
    c. Spline Kinematic controllers and operation
    d. Reverse foot lock setup for easy foot animation
3. Set-driven keys
    a. Controllers and drivers of specialized joint animation
    b. Switches for the animator
    c. Custom channel creation
4. Skin paint weights
    a. Correctly controlling deformation of the 3D mesh
    b. Mirroring weights across the model
    c. Exporting weights to a file
5. Facial Set up
    - On point controllers directly on the facial mesh
    - Floating control surfaces next to the 3D model
    - Blendshape creation for enhanced mesh deformation
6. Simulation
    a. Non-linear deformer creation
    b. Muscles systems use and set up
    c. Hair simulation techniques
    d. Rigid body simulation for collisions
7. Mel Scripting
    a. Using functions for quicker technical set up
    b. Creating scripts for custom Maya functions
    c. Tools creation
8. Simplification for games engine and optimization
9. Keyframe and Pose to Pose Animation
    a. Setting Keyframes to record poses for the entire body
    b. Automatic Keying
    c. Deleting and Moving Keyframes
    d. Creating the most descriptive poses so the program can correctly transition from one to the next
10. Animating Transformation Channels
    a. Translation- moving objects and controllers
    b. Rotation- turning objects in space
    c. Scale- resizing objects for flexibility
    d. Visibility- hiding, showing, and swapping objects
    e. Special custom channels
11. Graph Editor Fundamentals
    a. Reading the graph editor
    b. Moving Keyframes in time and value
    c. Editing the tangent handles
    d. Navigating the Graph Editor
12. Timeline Navigation
    a. Frame rate
    b. Keyframe display
    c. Moving keys
    d. Scaling keys
    e. Copy/pasting keyframes

Lab Content

Practicum Graph Editor

1. Keys
    a. Insert Keys
    b. Add Key Tool
    c. Convert to Key
    d. Add/Remove Inbetweens
2. Tangents

a. Auto
b. Spline
c. Linear
d. Clamped
e. Flat Fixed

Practicum Trax Editor

1. Attribute Editor
2. Enable/Disable
3. Activate/Deactivate
4. Remove Empty Tracks
5. Match Clips

Practicum Time Slider

1. Frame Rate
2. Playback Start/End
3. Animation Start/End
4. Playback Speed

Practicum Skeleton

1. Joints
   a. Create Joints
   b. Insert Joints
   c. Mirror Joints
   d. Orient Joints
   e. Connect Joints
   f. Joint Labeling
2. IK
   a. Create IK Handles
   b. Create IK Spline
   c. Enable IK Handle Snap

Practicum Skin

1. Bind Skin
   a. Interactive Bind Skin
   b. Unbind Skin
   c. Go to Bind Pose
2. Weight Maps
   a. Paint Skin Weights
   b. Mirror SkinWeights
   c. Copy Skin Weights
   d. Smooth Skin Weights
   e. Normalize Weights
   f. Exports Weight Maps

Practicum Constrain

1. Parent
2. Point
3. Orient
4. Scale
5. Aim
6. Pole Vector

Suggested Reading Other Than Required Textbook

Maya Software manuals, online resources for 3D modeling

Examples of Required Writing Assignments

1 to 2 page essay on proper use of Ik Skeletal Rig Vs FK Skeletal rig for animation.

Examples of Outside Assignments

Rig and Animate a fully articulated Poly Mesh Character

Instruction Type(s)

Lab, Lecture