GAME 193: ADVANCED ENVIRONMENT AND VEHICLE MODELING

Citrus College Course Outline of Record

Heading	Value
Effective Term:	Fall 2024
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 190 and GAME 191.
Strongly Recommended:	ART 150.
District General Education:	C1. Arts
Transferable to CSU:	Yes
Transferable to UC:	Yes - Approved
Grading Method:	Standard Letter

Catalog Course Description

A comprehensive study of game industry modeling techniques for both hard surface and organic models. Advanced 3D modeling techniques in creating environment and vehicle models with specific limitations on tri/poly count. Topics include Polygonal modeling tools, Subdivision Surface tools, and NURBS (Non Uniform Rational B Splines) modeling tool sets. An introduction to background design and layout as well as shot planning and composition as it applies to storytelling in a game/simulation environment with a focus on creating architectural interiors and exteriors representing houses, buildings and entire worlds contained under a roof. 36 lecture hours, 72 lab hours.

Course Objectives

- Understand Strategies and uses of Polygonal Modeling.
- Ability to Identify and properly use Polygonal Components (Vertex Points, Edges, Faces).
- Create Photo-realistic and stylized 3D Models for use in Game Engine or Animations.
- Analyze and use industry standard techniques used in Game Modeling and Animation.
- Apply Textures and basic lighting to render and output files for portfolio.

Major Course Content

1. Advanced N.U.R.B.S. (Non Uniform Rational B-Splines) Modeling
    a. Birail
    b. Extrude
    c. Stich
    d. Surface Fillet
    e. Rebuild
    f. Reverse Direction
2. Curves
    a. Bend
    b. Curl
    c. Smooth
    d. Rebuild
    e. Reverse Direction
3. Advanced Modeling Tools
    a. Mesh
        i. Retopologize
        ii. Quadrangulate
        iii. Transfer Attributes
        iv. Clean Up (Optimize Mesh)
    b. Edit mesh
        i. Average Vertices
        ii. Delete Edge/Vertices
        iii. Circularize
        iv. Project Curve on Mesh
    c. Mesh Tools
        i. Crease Tool
        ii. Create polygon
        iii. Make Hole
    d. Mesh Display
        i. Harden Edge
        ii. Soften Edge
        iii. Reverse Normals
        iv. Set to face
        v. Lock/Unlock Normals
    e. Advanced Deformers
        i. Cluster
        ii. Proximity Wrap
4. Modify Commands
    a. Reset Transformation
    b. Freeze Transformation
    c. Center Pivot
    d. Bake Pivot
5. Attributes
    a. Add Attributes
    b. Edit Attributes
    c. Delete Attributes
6. Select Tools
    a. Select All
    b. Inverse Selection
    c. Select Similar

Lab Content

Practicum Duplicate Special Options

1. Translate
    a. X Coordinate
    b. Y Coordinate
    c. Z Coordinate
2. Rotate

   a. X Coordinate
   b. Y Coordinate
   c. Z Coordinate
3. Scale
   a. X Coordinate
   b. Y Coordinate
   c. Z Coordinate
4. Geometry
   a. Copy
   b. Instance
   c. World
   d. New Group

Practicum Display

1. Grid
2. Heads Up
   a. Polygon Count
   b. Origin Axis
   c. Symmetry
   d. object Details
   e. View Axis
3. Polygons
   a. Backface Culling
   b. Vertices
   c. UV's
   d. Face Normals
   e. Vertex Normals
   f. Face Centers

Practicum Create Primitive

1. N.U.R.B.S.
   a. Sphere
   b. Cube
   c. Cylinder
   d. Cone
   e. Plane
   f. Torus
2. Polygon
   a. Simple Primitives
      i. Sphere
      ii. Cube
      iii. Cylinder
      iv. Cone
      v. Plane
      vi. Torus
   b. Advanced Primitives
      i. Pipe
      ii. Helix
      iii. Gear
      iv. Pyramid

Practicum Advanced Polygon Modeling

1. Extrude
2. Combine
3. Separate
4. Bevel
5. Bridge
6. Add Division
7. Multicut Tool
8. Retopology Tools
   a. Extrude
      i. Create Polygon
      ii. Append Polygon
      iii. Face Extrusion
      iv. Edge Extrusion
   b. Quad Draw
   c. Connect

Practicum Poly Inputs

1. Size
   a. With
   b. Height
   c. Depth
   d. Radius
   e. Inner Radius
2. Division
   a. Subdivision Width
   b. Subdivision Height
   c. Subdivision depth

Practicum Arnold Rendering System

1. Lights
   a. Area Light
   b. Skydome Light
   c. Mesh Light
   d. Photometric Light
   e. Light Portal
   f. Physical Sky
2. Material Shaders
3. Volume Shaders

Suggested Reading Other Than Required Textbook

Online resources for Maya and Z Brush software systems, other online research

Examples of Required Writing Assignments

1 to 2 page paper on difference between polygon modeling and N.U.R.B.S. modeling.

Examples of Outside Assignments

Create hard surface and organic assets to put in game engine

Instruction Type(s)

Lab, Lecture

IGETC Area 3: Arts and Humanities

3A. Fine Arts