VCIL-2440: 3D SIMULATION

Cuyahoga Community College

Viewing: VCIL-2440 : 3D Simulation
Board of Trustees:
March 2020

Academic Term:
Fall 2020

Subject Code
VCIL - VC-Illustration

Course Number:
2440

Title:
3D Simulation

Catalog Description:
Advanced technical and aesthetic issues concerning 3D modeling, 3D motion graphics and 3D animation using industry standard software. Course emphasizes static and dynamic animation strategies utilizing joints, inverse kinematics, dynamics, constraints, set driven keys, rigid body dynamics, effectors and node based animations to create product, instructional, character or environmental 3D simulations and animations. Applied projects for use in-various visualization disciplines including Game Design, Serious Games, Augmented and Virtual Reality.

Credit Hour(s):
3

Lecture Hour(s):
1
Lab Hour(s):
4

Requisites

Prerequisite and Corequisite
VCIL-2040 3D Motion; or departmental approval.

Outcomes
Course Outcome(s):
Design a dynamic 3D simulation for instructional, information and aesthetic presentation.

Objective(s):
1. Describe various 3D simulation tools and strategies used by 3D visualization industry.
2. Research animation and simulation principles and practices.
3. Develop preproduction and planning strategies for 3D simulation.
4. Design 3D models for use in 3D simulation application.
5. Apply advanced/dynamic animation practices to move, rotate, scale and modify objects, lights and cameras to achieve simulation strategy.
6. Create keyframe and dynamic animations of objects, lights and cameras.
7. Render animation according to required project specifications for postproduction or final output.

Methods of Evaluation:
1. Written assignments
2. Laboratory exercises
3. Case studies

4. Exams
5. Quizzes
6. Projects
7. Presentations
8. Portfolio

Course Content Outline:
1. Review of 3D modeling content creation
    a. Primitives
    b. Polygons
    c. Non-Uniform rational Basis Spline (NURBS)
    d. Splines
    e. Deformers
2. Concept and production
    a. Audience, simulation and outcome
    b. Thumbnail and concept sketches
    c. Animation roughs
3. Dynamic animation techniques
    a. Joints
        i. Binding
        ii. Weighting
    b. Inverse kinematics (IK)
        i. IK chains
        ii. Goals/controllers
    c. Dynamics
        i. Wind
        ii. Friction
        iii. Turbulence
        iv. Gravity
        v. Rotation
        vi. Deflectors
        vii. Solid body dynamics
        viii. Soft body dynamics
        ix. Collision
        x. Sampling
4. Node based animation
    a. Set driven keys
        i. Driver
        ii. Driven
    b. Nodes
        i. Input
        ii. Connection
    c. Rendering
        i. View
        ii. Region
        iii. Interactive render
        iv. Preview
5. Render settings
    a. Path
    b. Format
    c. Multipass
    d. Codec
6. Output
7. Presentation

Resources

Tickoo, Sham. CADCIM Technologies; 6 edition, 2018.

Edited by Erin Pangilinan, Steve Lukas, and Vasanth Mohan. *Creating Augmented and Virtual Realities*. O'Reilly, 2019.

John Bucher. *Storytelling for Virtual Reality*. O'Reilly, 2019. https://learning.oreilly.com/library/view/storytelling-for-virtual/9781351809245/xhtml/halftitle.xhtml

Resources Other
1. http://www.cgsociety.or (http://www.cgsociety.org)g
2. http://unity3d.com/

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