APTECH 63 Course Outline as of Spring 2011

CATALOG INFORMATION

Dept and Nbr: APTECH 63   Title: 3D ANIM: MODEL, RIG
Full Title: 3D Animation: Modeling and Rigging
Last Reviewed: 11/14/2022

Units		Course Hours per Week		Nbr of Weeks	Course Hours Total	
Maximum	4.00	Lecture Scheduled	3.50	17.5	Lecture Scheduled	61.25
Minimum	4.00	Lab Scheduled	1.50	6	Lab Scheduled	26.25
		Contact DHR	0		Contact DHR	0
		Contact Total	5.00		Contact Total	87.50
		Non-contact DHR	0		Non-contact DHR	0

Total Out of Class Hours: 122.50   Total Student Learning Hours: 210.00

Title 5 Category: AA Degree Applicable
Grading: Grade Only
Repeatability: 39 - Total 2 Times
Also Listed As:
Formerly:

Catalog Description:
This course covers the creation of digital characters and synthetic environments for film, broadcast and video games. Using Autodesk 3ds Max software, students will design and build increasingly complex 3D sets, props, and characters. They will also craft control systems for effectively animating these digital components. Efficient workflow and the creation of animator-friendly rigs will be emphasized, and complementary software will be used for texturing and refining of models.

Prerequisites/Corequisites:
Course Completion of APTE 43 (or APTECH 43 or APTECH 53)

Recommended Preparation:
Course Completion of ART 12 and CS 70.11B

Limits on Enrollment:

Schedule of Classes Information:
Description: This course covers the creation of digital characters and synthetic environments for film, broadcast and video games. Using Autodesk 3ds Max software, students will design and build increasingly complex 3D sets, props, and characters. They will also craft control systems

for effectively animating these digital components. Efficient workflow and the creation of animator-friendly rigs will be emphasized, and complementary software will be used for texturing and refining of models. (Grade Only)
Prerequisites/Corequisites: Course Completion of APTE 43 (or APTECH 43 or APTECH 53)
Recommended: Course Completion of ART 12 and CS 70.11B
Limits on Enrollment:
Transfer Credit: CSU;
Repeatability: Total 2 Times

ARTICULATION, MAJOR, and CERTIFICATION INFORMATION:

			Effective:	Inactive:
AS Degree:	**Area**		Effective:	Inactive:
CSU GE:	**Transfer Area**		Effective:	Inactive:
IGETC:	**Transfer Area**		Effective:	Inactive:
CSU Transfer:	Transferable	Effective:	Fall 2008	Inactive:
UC Transfer:		Effective:		Inactive:

CID:

Certificate/Major Applicable:
Both Certificate and Major Applicable

COURSE CONTENT

Outcomes and Objectives:
Upon completion of this course, students will be able to:
1. Apply a typical professional production pipeline structure, and adhere to a production schedule.
2. Analyze 3D sets and characters from animated films and broadcast media, and synthesize methods for recreating these elements in their own projects.
3. Develop realistic and/or imaginary production designs and concept art for animated 3D scenes and characters.
4. Model new or reconstruct pre-existing 3D environments that include animated effects such as water, fire, clouds and dynamic components.
5. Create 3D character models of digital humans and/or creatures.
6. Use complimentary software like Adobe Photoshop and Autodesk Mudbox to produce custom textures and non-modeled geometry.
7. Build and apply skeletal control rigs to character models using standardized and custom-made bone systems.
8. Create facial animation systems for digital characters.
9. Output final imagery and animations in a variety of formats.
10. Repeating students will:
 a. Update their skills on new software releases.
 b. Utilize new toolsets and applications related to new software releases.
 c. Increase the level of complexity and sophistication of their projects.

Topics and Scope:

I. Survey of 3D environments, effects and characters from film, broadcast and games.
 A. Analysis of animation elements and methods of execution
 B. Review of strategies for recreating animations with 3ds Max and complimentary software
II. Introduction to production pipelines
 A. Pixar production pipeline
 B. Class Production Pipeline
  1. Design visualization
  2. Pre-production
  3. Production
        4. Post-production
III. Design Visualization
 A. Story development
  1. Treatment
  2. Storyboards
  3. Voice and live action recording (optional)
  4. Animatics
  5. Class scene requirements and limits
 B. Concept art - characters, sets, visual effects
  1. Visual Development versus Previs
  2. Building image and texture libraries
 C. Environment design parameters
  1. Scale: microscopic to galactic
  2. Atmospheric and animated elements: fog, fire, fluids, cloth, etc.
  3. End-use & polygon counts
  4. Props
 D. Character design parameters
  1. Level of Realism: The Uncanny Valley and character design
  2. Number and relative length of limbs and appendages
  3. Clothing & personal props
  4. Character sheets: T-poses, etc.
 E. Effects research & design
IV. Pre-production
 A. Proceduralism and the modifier stack
 B. Modeling Strategies
  1. Modeling vs. texturing
  2. Quads vs. n-gons
  3. Appropriate level of detail: frequency vs. camera placement
  4. Derivative modeling and cloning
 C. Modeling Techniques
  1. Review: spline, patch and box modeling
  2. Modeling with reference to image planes
 D. Intermediate Poly-modeling Techniques
  1. Subdivision surfaces and edge loop modeling
  2. Graphite modeling ribbon
  3. Turbosmooth and Mesh smooth
  4. Hard edge vs. organic/soft edge modeling
 E. Non-modeled geometry
  1. Bump maps
  2. Displacement maps
 F. Texturing
  1. Photoshop and Mudbox texture techniques
  2. Creating and modifying UV layouts

    a. The Unwrap UVW modifier
    b. Pelt mapping
  3. Texture mapping & painting
  4. Baking maps, displacement maps, etc.
 G. Rigging and avars (animation variables)
  1. Biped
  2. Custom rigs: Bones
   a. Forward and inverse kinematics
   b. Constraints
  3. Morphing: Wiring Parameters
  4. Controls and custom UI elements
  5. Character Animation Toolkit
 H. Skinning
  1. Skin modifier vs. Physique
  2. Skin wrap modifier and low-resolution meshes
 I. Lighting design
  1. High key vs. low key
  2. Volumetric effects, light color, temperature and mood
  3. Projection mapping, gobos, etc.
 J. Set dressing and props
V. Production
 A. Animation
  1. Shot layouts
  2. Turntable animations
  3. Character tests
 B. Particles and space warps
 C. Shading
 D. Lighting
 E. Atmospherics and effects shots
VI. Post-production
 A. Rendering
 B. Video post effects
VII. With Repeat:
    A. New software releases
    B. New toolsets and applications related to new software releases
    C. Project complexity and sophistication

Assignment:

Note: These are representative assignments; actual projects will take into consideration new software features, class expertise, etc.

1. Texture library: students build an ongoing collection of images for backgrounds and materials (6 images or more).
2. Models and effects library: students build a collection of 3ds Max files for merging into other scenes (2 or more of each).
3. Storyboard: Simple hand-drawn panels illustrating the major components and events of the final project animation (1-2 pages).
4. Character sheet: Students create T-pose and orthographic drawings to be scanned into the computer for reference when modeling.
5. Modeling exercises: creating character components (2-5).
6. Texturing exercises: creating custom textures and displacement maps (2-4).

7. Rigging exercises (1-2).
8. 3D Environment: Students design and model a digital set.
9. Final project scene: Multiple single frames or a flythrough rendering of 3D environment with or without character model
10. Final character rendering (2-4 frames, turntable or short test animation).
11. Repeating students will accomplish assignments using new software features, and complete projects of increasing complexity.

Methods of Evaluation/Basis of Grade:

Writing: Assessment tools that demonstrate writing skills and/or require students to select, organize and explain ideas in writing.

None, This is a degree applicable course but assessment tools based on writing are not included because problem solving assessments and skill demonstrations are more appropriate for this course.	Writing 0 - 0%

Problem Solving: Assessment tools, other than exams, that demonstrate competence in computational or non-computational problem solving skills.

Storyboards, character sheets, all exercises	Problem solving 10 - 20%

Skill Demonstrations: All skill-based and physical demonstrations used for assessment purposes including skill performance exams.

Modeling, texturing and rigging exercises; Final project scene & character renderings/animations	Skill Demonstrations 60 - 70%

Exams: All forms of formal testing, other than skill performance exams.

None	Exams 0 - 0%

Other: Includes any assessment tools that do not logically fit into the above categories.

Texture, model and effects libraries	Other Category 10 - 20%

Representative Textbooks and Materials:
How to Cheat in 3DS Max 2010: Get Spectacular Results Fast by Michele Bousquet, Focal Press, 2009
Poly-Modeling with 3DS Max, Todd Daniele, Focal Press, 2009
Instructor prepared materials