APTECH 63 Course Outline as of Fall 2023

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: 00 - Two Repeats if Grade was D, F, NC, or NP
Also Listed As:
Formerly:

Catalog Description:
In this course, students will create digital characters and synthetic environments as used in film, broadcast, and video games. Using software such as Autodesk 3ds Max, students will design and build increasingly complex three-dimensional (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 APTECH 43 (formerly APTECH 53)

Recommended Preparation:

Limits on Enrollment:

Schedule of Classes Information:
Description: In this course, students will create digital characters and synthetic environments as used in film, broadcast, and video games. Using software such as Autodesk 3ds Max, students will design and build increasingly complex three-dimensional (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 APTECH 43 (formerly APTECH 53)
Recommended:
Limits on Enrollment:
Transfer Credit: CSU;
Repeatability: Two Repeats if Grade was D, F, NC, or NP

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

Student Learning Outcomes:
At the conclusion of this course, the student should be able to:
1. Create animated 3D environments that are suitable for use in film, broadcast, or computer games.
2. Produce custom 3D digital characters and control systems that are suitable for use in film, broadcast, or computer games.
3. Refine models using complementary software programs like Autodesk Mudbox.
4. Create custom textures and accurately apply them to 3D models.

Objectives:
At the conclusion of this course, the student should be able to:
1. Apply a typical professional production pipeline structure and adhere to a production schedule.
2. Model new or reconstruct pre-existing 3D environments.
3. Create 3D character models of digital humans and/or creatures.
4. Use complementary software like Adobe Photoshop and Autodesk Mudbox to produce custom textures and geometry.
5. Build and apply skeletal and facial control systems to character models.

Topics and Scope:

I. Introduction to Production Pipelines
   A. Pixar production pipeline
   B. Class production pipeline

II. Design Visualization
  A. Environment design parameters
     1. Exteriors and modular interiors
     2. Foreground and background elements
     3. Lighting
  B. Character design parameters
     1. Level of realism: the uncanny valley and character design
     2. Number and relative length of limbs and appendages
     3. Clothing and personal props
     4. Character sheets: T-poses and orthographic views
III. Pre-production
  A. Modeling Strategies
     1. Modeling versus texturing
     2. Quads versus n-gons
     3. Mirroring and symmetry
  B. Modeling Techniques
     1. Polygonal and procedural modeling
     2. Modeling with reference to image planes
  C. Intermediate Poly-modeling Techniques
     1. Subdivision surfaces and edge loop modeling
     2. Hard edge versus organic/soft edge modeling
     3. Digital sculpting
  D. Non-modeled geometry
     1. Bump maps versus normal maps
     2. Displacement maps
  E. Texturing
     1. UV layouts
     2. Texture mapping and painting
     3. Composite maps
     4. Photoshop and Mudbox texture techniques
  F. Rigging
     1. Character Animation Toolkit (CAT)
     2. Morphing
     3. Controls and custom user interface (UI) elements
     4. Custom rigs
  G. Skinning
     1. Skin modifier
     2. Vertex weight tools
  H. Lighting design
     1. High key versus low key
     2. Volumetric effects, light color, temperature, and mood
     3. Projection mapping and gobos
  I. Set dressing and props
IV. Production
  A. Animation
     1. Shot layouts
     2. Turntable animations
     3. Character tests
  B. Lighting
  C. Atmospherics
V. Post-production
  A. Rendering

B. Video post effects

The above Topics and Scope apply to both lecture and lab course components in an integrated format.

Assignment:

Integrated Lecture-Lab Related Assignments:
1. Project guide readings (10-20 pages per week)
2. Scene design: Simple hand-drawn panels illustrating the major components and events of the final project scene (1-2 pages)
3. Character analysis and design: Worksheets and hand-drawn T-pose sketches and orthographic reference for modeling (1-2 pages)
4. Modeling exercises: Character components (2-5)
5. Texturing exercises: Custom textures (2-4)
6. Rigging exercise(s) (1-2)
7. 3D environment: Modeled and textured digital set (1)
8. Final project environment presentation: Multiple single frames or a flythrough rendering of a 3D environment
9. Final project character presentation: Multiple single frames, turntable, or short test animation

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.

Character analysis and environment worksheets	Writing 10 - 20%

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

Character analysis and design worksheets and sketches; scene design and events panels and sketches	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; environment models; final environment and character renderings	Skill Demonstrations 50 - 60%

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

Final character and environment presentation	Exams 10 - 20%

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

Participation		Other Category 0 - 5%

Representative Textbooks and Materials:
Digital Creature Rigging. Jones, Stewart. Focal Press. 2012 (Classic)
Topology Workbook, Volume 2. Vaughan, William. Hickory Nut Publishing. 2019
Instructor prepared materials