APTECH 63 Course Outline as of Fall 2017

CATALOG INFORMATION

Dept and Nbr: APTECH 63 Title: 3D ANIM: MODEL, RIG
Full Title: 3D Animation: Modeling and Rigging
Last Reviewed: 9/22/2025

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:
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 APTECH 43 (formerly APTECH 53)

Recommended Preparation:

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 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:

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. Use 3ds Max software to create animated three dimensional (3D) environments that are suitable for use in film, broadcast or computer games.
2. Use 3ds Max software to produce custom 3D digital characters and control systems that are suitable for use in film, broadcast or computer games.
3. Refine models built in 3ds Max using complementary software programs like Autodesk Mudbox.

Objectives:
During this course, the students will:
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 production designs and concept art for animated 3D scenes and characters.
4. Model new or reconstruct pre-existing 3D environments.
5. Create 3D character models of digital humans and/or creatures.
6. Use complementary 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.
8. Create facial animation systems for digital characters.
9. Output final imagery in a variety of formats.

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. Industry 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 vs. previsualization
      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 and 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 and personal props
      4. Character sheets and poses
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 coordinate layouts

a. The Unwrap UVW modifier
b. Pelt mapping
3. Texture mapping and painting
4. Viewport canvas

G. Rigging
1. Character Animation Toolkit (CATrig)
2. Custom rigs: bones
a. Forward and inverse kinematics
b. Constraints
3. Morphing: wiring parameters
4. Controls and custom user intervace (UI) elements

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. Shot layouts
1. Turntable views
2. Character tests

B. Shading

C. Lighting

D. Atmospherics and effects shots

VI. Post-Production

A. Rendering

B. Video post effects

Topics covered in Lecture will be applied and practiced in Lab.

Assignment:

Lab Related Assignments:
1. Texture library for backgrounds and materials (at least 6 images)
2. Model file library for merging into scenes (at least 2 files)
3. Concept designs, hand-drawn (1-2)
4. Character sheets (1-2)
5. Character modeling projects (2-5)
6. Custom texturing projects (2-4)
7. Rigging projects (1-2)
8. 3D environment models (1-2)
9. Final 3D environment rendering (1)
10. Final character rendering (1)

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.

Concept designs and character sheets	Problem solving 10 - 20%

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

Modeling, texturing and rigging projects; environment models. Final environment and character renderings	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 and model libraries	Other Category 10 - 20%

Representative Textbooks and Materials:
How to Cheat in 3DS Max 2015. McCarthy, Michael. Focal Press. 2014
Digital Modeling. Vaughan, William. New Riders. 2012 (classic)
Instructor prepared materials