APTE 168 Course Outline as of Summer 2025

CATALOG INFORMATION

Dept and Nbr: APTE 168 Title: 3D ANIM: INTRO TO VR
Full Title: 3D Animation: Introduction to Virtual Reality
Last Reviewed: 5/9/2022

Units		Course Hours per Week		Nbr of Weeks	Course Hours Total	
Maximum	2.00	Lecture Scheduled	1.50	17.5	Lecture Scheduled	26.25
Minimum	2.00	Lab Scheduled	1.50	6	Lab Scheduled	26.25
		Contact DHR	0		Contact DHR	0
		Contact Total	3.00		Contact Total	52.50
		Non-contact DHR	0		Non-contact DHR	0

Total Out of Class Hours: 52.50 Total Student Learning Hours: 105.00

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:	APTECH 168

Catalog Description:
In this course students will create Virtual Reality (VR) environments in the computer, and interact with these environments using head-mounted displays and hand controllers. Students will develop models and animations in applications like Autodesk 3ds Max, and Blender, and combine them with assets available online. Students will also learn basic map-creation techniques in image-editing software like Adobe Photoshop, and use game engines such as Epic Games Unreal Engine or Unity Technologies Unity to create immersive, interactive VR experiences.

Prerequisites/Corequisites:
Course Completion of APTE 43

Recommended Preparation:

Limits on Enrollment:

Schedule of Classes Information:
Description: In this course students will create Virtual Reality (VR) environments in the computer, and interact with these environments using head-mounted displays and hand

controllers. Students will develop models and animations in applications like Autodesk 3ds Max, and Blender, and combine them with assets available online. Students will also learn basic map-creation techniques in image-editing software like Adobe Photoshop, and use game engines such as Epic Games Unreal Engine or Unity Technologies Unity to create immersive, interactive VR experiences. (Grade Only)
Prerequisites/Corequisites: Course Completion of APTE 43
Recommended:
Limits on Enrollment:
Transfer Credit:
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:	Effective:	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 and export 3D models and animations from 3ds MAX or Blender for use in virtual reality environments.
2. Construct interactive VR scenes with custom-made and pre-existing assets.
3. Adjust, maintain, and safely use VR equipment such as headsets and controllers.

Objectives:
At the conclusion of this course, the student should be able to:
1. Build and launch VR projects.
2. Create and utilize 3D models, animations, and sounds in VR projects.
3. Apply basic materials and lighting in VR projects.
4. Build executable files and deploy in VR.

Topics and Scope:

I. Virtual Reality (VR) and VR Lab Overview
   A. VR versus traditional media
   B. VR hardware and software
      1. Hardware setup and adjustments
      2. Hardware care and maintenance
   C. Presence and immersion

D. Interactivity
E. Safety concerns
1. Physical collisions
2. Vertigo
3. Photosensitive epilepsy
4. Falling, jumping, or flailing
5. Physical environment awareness
6. Securement of personal belongings

II. Gaming Engine Project Setup
A. Overview of gaming engine
B. Gaming engine interface
C. Navigation

III. Creating Environments
A. Creating levels
B. Placing and transforming objects
C. Testing levels in VR

IV. Basic Lighting
A. Light types
B. Shadows
C. Light-baking

V. Modeling and Texturing in 3ds MAX or Blender
A. Best modeling practices
B. Texturing and UV layout for real-time rendering
C. Export procedure

VI. Basic Image Editing in Image Editing Application
A. UV map template setup
B. Selecting, cutting, and pasting image elements
C. Adjusting contrast and saturation
D. Bump and normal maps
E. Final file formats

VII. Materials Development in Unreal Engine
A. Physically based materials overview
B. Material editor overview
C. Color, emissive, roughness, and metallic characteristics
D. Texture mapping

VIII. Animation and Audio Workflows for Created Asset Use in Gaming Engines
A. Object animation
B. Exporting animations from 3ds MAX or Blender
C. Audio formats
D. Importing animations and audio files in Unreal Engine or Unity
E. Procedures for triggering animation and sound

The above topics and scope apply to both lecture and lab course components in an integrated format.

Assignment:

1. Modeling and texturing assignment(s) (1-3)
2. Lighting assignment(s) (1-3)
3. Animation and audio project assignment(s) (1-3)
4. VR levels assignments (2-5)
5. Student-designed final VR project
6. Quiz(zes) (1-3)

7. Final VR project presentation and proper equipment use
All topics are covered in the lecture and lab portions of the course.

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.

Modeling, texturing, lighting, animation, audio, and VR levels assignments	Problem solving 55 - 70%

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

Final project presentation and proper use of equipment	Skill Demonstrations 5 - 15%

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

Quiz(zes) and final project	Exams 5 - 25%

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

Participation	Other Category 0 - 10%

Representative Textbooks and Materials:
Learning Virtual Reality. Parisi, Tony. O'Reilly Media. 2015 (classic)
Unreal Engine 4 Virtual Reality Projects, Build Immersive, Real-World VR Applications Using UE4, C++ & Unreal Blueprints. Mack, Kevin. Packt Publishing. 2019
Instructor prepared materials