

CATALOG INFORMATION

Dept and Nbr: CS 77.11                      Title: VIRTUAL PRODUCTION  
Full Title: Introduction to Virtual Production  
Last Reviewed: 2/12/2024

Units		Course Hours per Week		Nbr of Weeks	Course Hours Total	
Maximum	3.00	Lecture Scheduled	3.00	17.5	Lecture Scheduled	52.50
Minimum	3.00	Lab Scheduled	0	8	Lab Scheduled	0
		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: 105.00

Total Student Learning Hours: 157.50

Title 5 Category: AA Degree Applicable  
Grading:                      Grade or P/NP  
Repeatability:            00 - Two Repeats if Grade was D, F, NC, or NP  
Also Listed As:  
Formerly:

**Catalog Description:**  
Students will learn the technical and visual aspects of three-dimensional virtual production for digital video and film. Topics will include all stages of virtual production, including pre-production, storyboards, blocking, lighting, sets, and props. Students will gain knowledge and technical skills, including real-time three-dimensional visualization using game engines, motion capture, workflows, camera functions and movement, industry terminology, as well as learn about crew duties and responsibilities.

**Prerequisites/Corequisites:**

**Recommended Preparation:**  
Completion of CS 42 and APTECH 43 recommended, or prior experience with 3D modelling and game engines.

**Limits on Enrollment:**

**Schedule of Classes Information:**  
Description: Students will learn the technical and visual aspects of three-dimensional virtual production for digital video and film. Topics will include all stages of virtual production,

including pre-production, storyboards, blocking, lighting, sets, and props. Students will gain knowledge and technical skills, including real-time three-dimensional visualization using game engines, motion capture, workflows, camera functions and movement, industry terminology, as well as learn about crew duties and responsibilities. (Grade or P/NP)

Prerequisites/Corequisites:

Recommended: Completion of CS 42 and APTECH 43 recommended, or prior experience with 3D modelling and game engines.

Limits on Enrollment:

Transfer Credit: CSU;

Repeatability: Two Repeats if Grade was D, F, NC, or NP

## **ARTICULATION, MAJOR, and CERTIFICATION INFORMATION:**

<b>AS Degree:</b>	<b>Area</b>	Effective:	Inactive:
<b>CSU GE:</b>	<b>Transfer Area</b>	Effective:	Inactive:
<b>IGETC:</b>	<b>Transfer Area</b>	Effective:	Inactive:
<b>CSU Transfer:</b>	Transferable	Effective: Fall 2023	Inactive:
<b>UC Transfer:</b>		Effective:	Inactive:

**CID:**

**Certificate/Major Applicable:**

Certificate Applicable Course

## **COURSE CONTENT**

**Student Learning Outcomes:**

At the conclusion of this course, the student should be able to:

1. Design and create a virtual production project from concept to final product.
2. Collaborate effectively with production team.
3. Adapt professional skills to most current virtual production technology industry standards.

**Objectives:**

At the conclusion of this course, the student should be able to:

1. Develop and implement virtual production, three-dimensional, and visual storytelling aesthetics.
2. Develop and implement virtual production content development.
3. Develop a functioning virtual production prototype.
4. Explain software technologies including virtual production platforms, stagecraft, virtual production sets, and environments.

**Topics and Scope:**

I. Introduction

- A. History and origins of the real-time revolution
- B. A working definition of virtual production

II. Virtual Production Features and Benefits

- A. Key features of virtual production

- B. Benefits of virtual production by work area
- III. Approaches to Virtual Production
  - A. Types of virtual production
  - B. Collaboration and team roles
- IV. Real-time Content Engine Virtual Production Basics
  - A. Software tools used in virtual production
  - B. Working with game engines: setup and workflow
- V. Pre-visualization
  - A. Designing the scene
  - B. Pre-visualizing scene in game engine
  - C. World building and storytelling
  - D. Location, props, and costumes
- VI. Pre-production
  - A. Planning the scene
  - B. Developing a greybox prototype of a scene
  - C. Building a three-dimensional set and environment
  - D. Storyboards
  - E. Blocking and mapping
  - F. Staging
  - G. Creating a design document
  - H. Creating a project outline and flowchart
- VII. Motion Capture
  - A. Body motion capture and tracking
  - B. Facial expression capture and tracking
- VIII. Stagecraft
  - A. Video walls
  - B. Green screen and chroma key technologies
  - C. Related on-set technologies
  - D. Animating and recording scenes
- IX. Cinematography
  - A. Designing shots and shot lists
  - B. Shooting scene on set
  - C. Crew roles and staffing for on-set shooting
- X. Lighting
  - A. Virtual lighting in game engines
  - B. On-set lighting for performance
- XI. Sound
  - A. Virtual sound design and considerations
  - B. On-set sound design and considerations
- XII. Post-production - Production of final frames
- XIII. The Future of Virtual Production in Film and Video

### **Assignment:**

1. Read about virtual production theory and application (approximately 20-30 pages per week)
2. View and critique third-party virtual production content
3. Preparations for virtual production, including software setup, recording, and playback
4. Create a design document for project(s) (1-2)
5. Create an outline and flow chart for project(s) (1-2)
6. Compose and light scene(s) in game engine (1-2)
7. Pre-visualize scene(s) in game engine (1-2)
8. Build greybox scene prototypes(s) in game engine (1-2)

9. Map and block scene(s) including shots and shot lists (1-2)
10. Plan and conduct motion and face capture
11. Shoot scene(s) including on-set props, audio, and costumes (1-2)
12. Presentation of virtual production project(s) (1-2)
13. Critique of in-class project(s) (1-2)
14. Exam(s) including a midterm and/or final exam (1-2)

### 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.

Design document(s); critique(s) of third-party content; critique(s) of in-class projects and collaboration

Writing  
10 - 30%

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

Outline(s) and flow chart(s); shot list(s)

Problem solving  
20 - 40%

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

Preparations for virtual production; composition and lighting of scene(s); pre-visualization of scene(s); greybox prototype(s); motion and face capture; shooting of scene(s)

Skill Demonstrations  
25 - 55%

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

Midterm and/or final exam

Exams  
10 - 30%

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

Presentation of virtual production project(s)

Other Category  
5 - 10%

### Representative Textbooks and Materials:

Unreal Engine 4 Virtual Reality Projects: Build immersive, real-world VR applications using UE4, C++, and Unreal Blueprints. Mack, Kevin and Ruud, Robert. Packt Publishing. 2019 (classic)

Filming the Fantastic with Virtual Technology: Filmmaking on the Digital Backlot. Sawicki, Mark and Moody, Juniko. Routledge. 2020

Master Shots Vol 3: The Director's Vision: 100 Setups, Scenes and Moves for Your Breakthrough Movie. Kenworthy, Christopher. Michael Wiese Productions. 2013 (classic)

Instructor prepared material