IMVR A120: INTRODUCTION TO IMMERSIVE MEDIA (AR/VR)

Item	Value
Curriculum Committee Approval Date	10/19/2022
Top Code	061220 - Film Production
Units	3 Total Units
Hours	72 Total Hours (Lecture Hours 45; Lab Hours 27)
Total Outside of Class Hours	0
Course Credit Status	Credit: Degree Applicable (D)
Material Fee	No
Basic Skills	Not Basic Skills (N)
Repeatable	No
Open Entry/Open Exit	No
Grading Policy	Standard Letter (S)

Course Description

An introduction to virtual reality media production, from simple 360-degree video capture, stitching, and editing, to the basic use of open-source, game engines to add 3D graphic elements, spacial audio, and user-interactivity to create immersive videos and experiences. Students will learn key terminology, techniques, and current VR and related Immersive Media trends. Students will work together to produce 360-degree videos and basic immersive experiences, viewable on a variety of headset platforms. Enrollment Limitation: FILM A220; students who complete IMVR A120 may not enroll in or receive credit for FILM A220. ADVISORY: FILM A110, FILM A120, FILM A194. Transfer Credit: CSU.

Course Level Student Learning Outcome(s)

1. Discriminate between a variety of immersive multimedia formats and content delivery methods, including headsets, smartphones, and projection.
2. Demonstrate a basic level of proficiency in: a. 360-degree camera operation techniques b. 360-degree audio recording techniques c. VR production planning and workflow.
3. Demonstrate basic theoretical understanding of beginning 3D modeling and game engine workflow related to creating a VR experience.

Course Objectives

- 1. Understand the current industry trends, history, and future potential of VR.
- 2. List the basic techniques used in VR production.
- 3. Understand and use the unique planning and production workflow of a VR project.
- 4. Understand essential terminology used in the VR industry.
- 5. Experience and critique commercially available VR content using a variety of viewing methods.
- 6. Demonstrate effective use of a 360-degree camera.
- 7. Demonstrate proficiency in recording 360-degree audio.
- 8. Demonstrate proficiency in post-production techniques for VR.
- 9. Recognize important technologies related to VR, including AR, haptics, and motion-capture.
- 10. Understand basic 3D modeling and game-engine software techniques.
- 11. Demonstrate basic compositing of 3D assets within a game engine to create a short VR experience.

Lecture Content

I. Introduction to VR A. The history of VR and Immersive Multimedia B. Where the VR industry is today C. Major players in the VR industry D. The Future of VR and Immersive Multimedia E. Overview of accompanying research tools II. VR Workflow A. Essential terminology B. Production workflow for 360 video C. Production workflow for VR game experiences III. 360-Degree Cameras A. 360-degree video camera makes models B. Production techniques for 360-degree video IV. VR Post-Production A. Stitching B. Editing C. CG Effects V. VR Audio A. Formats for 360 spatialized audio B. Microphone placement techniques C. Ambisonic Sound Gathering VI. Writing Pre-Production for VR A. Scriptwriting for VR B. Storyboarding for VR C. Casting and Location Scouting for VR VII. Basics of 3D Modeling A. Overview of 3D modeling software applications B. Basic 3D modeling techniques and challenges VIII. Basic understanding of Game Engines and Coding A. Overview of game engine software applications B. Overview of coding platforms used in VR C. Basic game engine techniques used in VR IX. Overview of Related Immersive Media Technology A. Augmented Reality (AR) B. Mixed Reality (MR) C. Related tech: Blockchain, A.I., I.o.T. X. Haptics, Simulators, and VR Accessories A. Haptic devices B. Simulators C. Motion Capture for VR and Game Design D. Alternative Display and Projection for VR E. Domes, Planetariums, Amusement Parks F. New Developments in VR/AR/MR XI. Intro to AR/MR A. Major differ ences between VR and AR/MR

Lab Content

I. Experiencing VR with various HMDs A. Simple VR Headset + smartphone B. VR front-facing camera setup C. VR full room-scale D. Inside-out tracking E. AR Goggles II. Experiencing Commercially Available Content A. 360-video on YouTube B. 360-video in room-scale C. VR games in room-scale D. VR documentaries and tourism III. 360-degree Camera Demo IV. VR Post-Production A. VR editing demo B. VR stitching demo V. Audio A. 360-degree audio recording demo B. 360-degree audio mixing and processing demo VI. 3D Modeling and Game Design Software A. 3D modeling demo (Blender) B. Game engine demo (Unity) C. Incorporating 3D assets into game engines for VR VII. Haptics A. Haptic device demo VIII. Motion Capture A. Motion capture demo IX. Related Immersive Media A. Augmented Reality (AR) demo B. Mixed Reality (MR) demo X. FIELD TRIP TO VR PRODUCTION FACILITY

Method(s) of Instruction

- Lecture (02)
- Lab (04)

Instructional Techniques

1. Lecture 2. Demonstration 3. Video examples 4. One-on-one instruction 5. Individual assignments 6. Group assignments 7. Assignment critique 8. Examinations

Reading Assignments

Students will Read 1-2 hours per week from assigned from handouts, equipment and software manuals, and online sources.

Writing Assignments

Students will spend 1-2 hours writing a VR-formatteed treatment, script, and basic production book for their final project. Proficiency will be demonstrated by satisfactorily completing assignments and by incorporating the elements of production they have learned. Students will demonstrate critical thinking and problem solving skills through the utilization of unique VR techniques, and by working through production and postproduction challenges.

Out-of-class Assignments

Students will spend 1-2 hours creating 360-degree video and audio recordings, basic 3D graphics and VR game-engine environments, to composite them all together into a VR experience. Students will also watch online tutorials.

Demonstration of Critical Thinking

A. Assigned individual projects B. Assigned group projects C. Examinations

Required Writing, Problem Solving, Skills Demonstration

Students will be required to write a VR-formatteed treatment, script, and basic production book for their final project. Proficiency will be demonstrated by satisfactorily completing assignments and by incorporating the elements of production they have learned. Students will demonstrate critical thinking and problem solving skills through the utilization of unique VR techniques, and by working through production and postproduction challenges.

Eligible Disciplines

Broadcasting technology (film making/video, media production, radio/TV): Any bachelor's degree and two years of professional experience, or any associate degree and six years of professional experience. Multimedia: Any bachelor's degree and two years of professional experience, or any associate degree and six years of professional experience.

Other Resources

1. "Voices of VR" (weekly podcast)