# DART G160: INTERACTION DESIGN FOR MOBILE

| Item | Value |
|---|---|
| Curriculum Committee Approval Date | 11/19/2024 |
| Top Code | 061410 - Multimedia |
| Units | 3 Total Units |
| Hours | 90 Total Hours (Lecture Hours 36; Lab Hours 54) |
| 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),<br>• Pass/No Pass (B) |

## Course Description

This course will prepare students with the skills to design and create an interactive multimedia project with augmented reality capabilities. In addition, this course will cover a variety of issues and approaches in regard to educational programming using interactive media. The potential for use of new technologies for effective communication with various audiences will be examined via related literature, field observations and critiques/assessments. Introduction to interactive media authoring software. Topics include interface, animation, interactivity, defining properties, creating and modifying objects, integrating media files, and publishing for a variety of formats. Students will author and publish interactive applications demonstrating basic competency with an interactive media authoring environment. Transfer Credit: CSU.

## Course Level Student Learning Outcome(s)

1. Apply 3D perception, displays, interaction and tracking technology to immersive projects.
2. Manipulate 3D objects through translation, scaling, and rotation.
3. Demonstrate use of digital wayfinding.
4. Analyze system controls from menus to multimodal interaction.
5. Explain symbolic input in immersive environments.
6. Create metaphors for 3D user interfaces, from desktop to immersive, including augmented reality and virtual reality.

## Course Objectives

- 1. Evaluate different Augmented Reality (AR) alternatives.
- 2. Design comparative evaluations to test the effectiveness of various AR applications
- 3. Develop immersive virtual reality applications.
- 4. Build AR prototype systems.

## Lecture Content

Introduction to AR Examples Construction Maintenance Training Medical Educational Entertainment Navigation Advertising and commerce Games Displays Multimodal Visual perception Spatial displays Tracking Coordinate system Characteristics of tracking technology Stationary tracking systems Mobile sensors Optical tracking Sensor fusion Computer Vision for AR Marker tracking Multiple-camera infrared tracking Natural feature tracking by detection Incremental tracking Simultaneous localization and mapping Outdoor tracking Calibration and Registration Camera calibration Display calibration Registration Visual Coherence Occlusion Photometric registration Common illumination Diminished reality Camera simulation Situated Visualization Challenges Visualization registration Annotations and labeling X-Ray visualization Spatial manipulation Information filtering Interaction Output modalities Input modalities Tangible interfaces Virtual users interfaces on real surfaces Haptic interaction Modeling and Annotation Specifying geometry Specifying appearance Semi-automatic reconstruction Authoring Requirements of AR authoring Elements of authoring Stand-alone authoring solutions Web technology Navigation Foundations of human navigation Route visualization Viewpoint guidance Multiple perspectives

## Lab Content

Research examples of AR projects Develop a case study Complete lab lessons using Aero Interface Tools Navigation Tracking Annotaion Display Animation Audio Develop AR project #1  Outline goals Create project workflow Create 2D/3D assets Program AR project Test AR project Develop AR project #2  Outline goals Create project workflow Create 2D/3D assets Program AR project Test AR project

## Method(s) of Instruction

- Lecture (02)
- DE Live Online Lecture (02S)
- DE Online Lecture (02X)
- Lab (04)
- DE Live Online Lab (04S)
- DE Online Lab (04X)

## Reading Assignments

Reading assignemnets from textbooks: Augmented Reality: Principles and Practice, D. Schmalstieg and T. H llerer Virtual Reality, Steven M. LaValle Internet web sites and articles focused on Augmented Reality Industry journals and magazines In-class hand-outs

## Writing Assignments

Research documents Case study findings Project goals/descriptions/ outlines Analysis of AR applications

## Out-of-class Assignments

Experience, use, and test exisiting AR applications Create a database of successful AR aplications Create 2D/3D assets for AR projects

## Demonstration of Critical Thinking

Students will be given an opportunity to experience augmented reality applications and to discuss their findings. They will critique various applications and present alternative solutions.

## Required Writing, Problem Solving, Skills Demonstration

Students will write essays about the background and current state of the art of augmented reality (AR) hardware and software. Problem-solving skills will be demonstrated when students troubleshoot their application designs and test for quality control and user experience. Students will

demonstrate their ability by creating functional software applications and user interfaces that make effective use of AR technology.

## Eligible Disciplines

Graphic arts (desktop publishing): Any bachelor's degree and two years of professional experience, or any associate degree and six years of professional experience.

## Textbooks Resources

1. Required Pangilinan, E., Lukas, S., Mohan, V.. Creating Augmented and Virtual Realities: Theory and Practice for Next-Generation Spatial Computing, 1st ed. O'Reilly Media, 2019 Rationale: Covers same material in the course.