

### **Course Description**

#### **DIG1772C | Introduction to Virtual & Augmented Reality Technologies | 3.00 credits**

This course introduces students to basic concepts, history and tools commonly used for stereoscopic image acquisition and immersive technologies. Students will learn origins of Virtual Reality (VR) and its current role in the industry, its applications and opportunities and how to generate and manipulate VR imagery. Prerequisite: DIG 1729C.

### **Course Competencies**

**Competency 1:** The student will demonstrate how stereoscopic image acquisition differentiates from traditional photography by:

1. Recognizing the key differences between the equipment used in traditional photography and stereoscopy
2. Identifying the steps required to acquire a stereoscopic image
3. Analyzing the roll binocular vision plays in the perception of depth
4. Defining the components of a stereo image acquisition rig

**Competency 2:** The student will demonstrate how a traditional image can be converted into a stereoscopic pair by:

1. Defining the steps involved in a stereo conversion
2. Recognizing how parallax in a 2D image sequence can be used to reconstruct depth information
3. Identifying the best- and worst-case scenarios when producing a stereo conversion
4. Analyzing how depth maps can be used in traditional software to create a stereo pair

**Competency 3:** The student will demonstrate how multiple images can be stitched together to create 360 panoramas by:

1. Recognizing how parallax can affect the coherence between similar points in photo sequence
2. Identifying key points that can be used to create a stitching relationship between multiple images
3. Defining how equirectangular images and cube maps can be used to display 360 panoramas
4. Analyzing the pros and cons of using wide angle lenses to capture images to be used in 360 panoramas

**Competency 4:** The student will demonstrate how stitching artifacts caused by parallax can be corrected using traditional image manipulation techniques by:

1. Recognizing when pixel blending can be used to fade stitching inaccuracies
2. Identifying how image warping can alter distances between objects on a photograph
3. Distinguishing between parallax and lens distortion artifacts
4. Defining general steps to remove stitching lines between 2 or more photographs

**Competency 5:** The student will demonstrate how 360 and immersive environments can be distributed using web and mobile technologies by:

1. Identifying devices that can be used to experience Virtual Reality
2. Identifying key differences between Virtual and Augmented Reality
3. Recognizing the key milestones in the evolution of Virtual Reality
4. Analyzing why Virtual Reality is now more successful than it was during its initial conception

### **Learning Outcomes:**

- Use quantitative analytical skills to evaluate and process numerical data
- Solve problems using critical and creative thinking and scientific reasoning
- Use computer and emerging technologies effectively
- Demonstrate an appreciation for aesthetics and creative activities