



## Course Syllabus

<b>Course Code</b>	<b>Course Title</b>	<b>ECTS Credits</b>
MULT-380	Virtual & Augmented Reality	6
<b>Prerequisites</b>	<b>Department</b>	<b>Semester</b>
MULT-361	Design & Multimedia	Spring
<b>Type of Course</b>	<b>Field</b>	<b>Language of Instruction</b>
Elective	Design & Multimedia	English
<b>Level of Course</b>	<b>Lecturer(s)</b>	<b>Year of Study</b>
1 <sup>st</sup> Cycle	Dr C G Christou	3 <sup>rd</sup> /4 <sup>th</sup>
<b>Mode of Delivery</b>	<b>Work Placement</b>	<b>Corequisites</b>
Face-to-face	N/A	

### Course Objectives:

The main objectives of the course are to:

- Enable students to communicate their ideas using virtual, augmented and extended reality technologies.
- Cover the historical background of VR.
- Evaluate hardware and software requirements for VR systems, including display devices, body tracking, controllers and motion control techniques.
- Introduce the Unity3D game engine and its use for VR/AR/XR experiences.
- Introduce immersive cinema and immersive experiences and how to create them.
- Introduce 360° image and video capture. Develop 360° viewing applications using Unity3D.
- Explore the psychological and physiological issues relating to VR and its use.
- Consider some of the challenges of VR including realism, navigation difficulties and simulator sickness.
- Discuss challenges of creating meaningful narratives for immersive viewing and compare to conventional cinematic experiences.

**Learning Outcomes:**

After completion of the course students are expected to be able to:

1. Create novel experiences encompassing immersive VR.
2. Chart and describe the historical and technological developments that made VR possible.
3. Identify issues and problems relating to different VR hardware systems.
4. Assess different hardware setups, including CAVEs, HMDs and tracking systems.
5. Explain the basic psychological and physiological issues relating to VR use, such as cybersickness.
6. Choose appropriate components for constructing a 3D VR experience.
7. Design 3D environments, characters, and general content for these VR experiences.
8. Create software and applications for 360° VR for Android platforms.
9. Identify fields of application and new fields of exploration of VR technologies.

**Course Content:**

1. Introduction to VR hardware and software.
2. Software development for immersive systems using Unity3D and SteamVR (HTC Vive), Google Cardboard VR and OpenVR.
3. History of VR systems from initial beginnings to modern day developments.
4. Seeing in 3D, binocular disparity. History of 3D media. Immersive experiences.
5. Introduction to the Unity3D Game engine for VR/ARXR experience creation.
6. Application development for mobile phones, HTC Vive and Oculus Quest.
7. Position and Orientation Tracking (Outside-in, Inside-out), Hand Tracking, Controllers.
8. Interaction: Motion Control (Smooth motion, Teleport methods), Gaze-based Input Interaction with virtual objects.
9. Problems with immersive systems: cybersickness, nausea, adaptation.
10. Cinematic Virtual Reality: Comparison with conventional (2D) cinematic storytelling.

**Learning Activities and Teaching Methods:**

Lectures, Lab Presentations, Lab Tutorials, Quizzes, Practical Exercises and Assignments.

**Assessment Methods:**

<b>Assessment Type</b>
Assignment 1
Mid Term exam
Assignment 2
Final Project
Homework & Attendance

**Required Textbooks / Readings:**

<b>Title</b>	<b>Author(s)</b>	<b>Publisher</b>	<b>Year</b>	<b>ISBN</b>
Unity Virtual Reality Projects 2 <sup>nd</sup> Edition	Jonathan Linowes	Packt Publishing	2018	1788478800

**Recommended Textbooks / Readings:**

<b>Title</b>	<b>Author(s)</b>	<b>Publisher</b>	<b>Year</b>	<b>ISBN</b>
Unity 2018 Augmented Reality Projects	Jesse Glover	Packt Publishing	2018	9781788838764