



## Course Syllabus

<b>Course Code</b>	<b>Course Title</b>	<b>ECTS Credits</b>
COMP-410	Virtual Reality Game Development	6
<b>Prerequisites</b>	<b>Department</b>	<b>Semester</b>
COMP-213	Computer Science	Fall / Spring
<b>Type of Course</b>	<b>Field</b>	<b>Language of Instruction</b>
Elective	Computer Science	English
<b>Level of Course</b>	<b>Lecturer(s)</b>	<b>Year of Study</b>
1 <sup>st</sup> Cycle	Dr Chris 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	None

### Course Objectives:

The main objectives of the course are to:

- Introduce 3D Immersive Environments and content creation specifically for 3D Game development.
- Introduce students to the game creation pipeline, from design, implementation and testing.
- Introduce Virtual Reality history, hardware and software.
- Gain an understanding of how game players move in virtual environments.
- Gain an understanding of how to create a narrative immersive experience in VR.
- Enable students to create their own immersive games using various head mounted displays.
- Evaluate the differences between Desktop and VR based Computer Games.

### Learning Outcomes:

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

1. Have an appreciation for 3D digital games in both desktop and immersive context.
2. Understand the basic principles and requirements of virtual reality.
3. Be able to create 3D Game content including character generation and control.
4. Write software for using game controllers and tracking for motion control.
5. Describe historical developments of VR games and understand their social impact and their benefits in a variety of situations, such as education and serious games.
6. Understand how immersive gaming differs from classical desktop gaming.
7. Create narrative experiences and application specifically for VR.

**Course Content:**

1. Introduction to Game Content Creation using 3DS Max.
2. Overview of Game Creation Software; Introduction to Unity3D.
3. Game Asset Production Pipeline for Unity.
4. Planning Levels. Gameplay Mechanics: First-Person Perspective, Moving through the scene.
5. VR Hardware requirements including motion tracking and stereo vision HMDs. VR software scripting using C# and VR Toolkits for Unity3D.
6. Materials and Textures. Texture Unwrapping. Creating Materials in Unity3D and Photoshop.
7. Terrains and Landscapes: Painting, Sculpting, Trees and Plants.
8. Shaders: Water, Fog, Cloud, Rain, Fire.
9. Cameras (for Desktops and HMDs). Lights: Indirect Illumination. Skybox Creation.
10. Displays: Desktop Systems, Immersive Systems, HMDs, Google Cardboard, HTC Vive, GearVR and Oculus Rift.
11. Virtual Reality limitations and Immersive Gaming.
12. Interaction: Motion Control, Controller, Gaze Input Interaction.
13. Virtual Agents: Animation, Artificial Intelligence and Unity NavMesh.
14. Audio and Sound Effects. Background Sounds. Triggered Sounds.

**Learning Activities and Teaching Methods:**

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

**Assessment Methods:**

Assignments, Mid-Term exam, Final Project.

**Recommended Textbooks / Readings:**

Learning Virtual Reality: Developing Immersive Experiences and Applications for Desktop, Web, and Mobile	Tony Parisi	O'Reilly Media; 1 edition	2015	1491922834
3DS Max Modelling for Games, Vol 1, 2nd Edition	Andrew Gahan	Focal Press	2011	0240815823