

<b>Project Title</b>	Mixed Reality (blended) - Creative Computing
<b>Deadline</b>	<b>Presentation : Monday 12<sup>th</sup> December at allocated times</b> <b>Project Report : Friday 16<sup>th</sup> December 4:00pm</b>
<b>Submission Method</b>	Presentation in person Project report uploaded on Aula
<b>Project Staff</b>	Badheer Ballam

<b>Module Title</b>	Mixed Reality	<b>Level / Semester</b>	Level 7
<b>Module Code</b>	MCS22102	<b>Credit / Weighting</b>	20 Credits
<b>Module Leaders</b>	Badheer Ballam	<b>Date of Issue</b>	October 2022

Project cover image





## Project Brief

### Introduction:

The convergence of physical and virtual reality is taking place. Modern societies are spending more and more time “living” via a 2D digital screen. We communicate, manage our finances, order food, find accommodation and even seek lasting emotional relationships via these digital screens. This is now becoming the norm of society.

The next step of this digital interaction will take place in the 3D world – whether that be via a VR headset, AR glasses or even AR contact lenses. The world’s largest companies are investing heavily into mixed reality and its current and future applications.

Students that are proficient in developing mixed reality technologies and applications will gain a great advantage in the upcoming next stage of “Spatial computing”.

This unit will introduce students to the fundamental concepts of Mixed reality (XR). Students will explore industry specific use case and identify suitable areas for development. Students will develop proficiency in; 3D content creation, Optimization for devices, applying physics to increase immersion and developing interactivity by utilising visual scripting for rapid prototyping. In addition to the visual dimension, this unit will explore how speech recognition can be incorporated into this new reality with an emphasis on voice user interface.

### Task 1 – Project Presentation

#### Create a functional Virtual Reality Interactive Application for a selected industry.

This application should add clear value for the end user while showcasing your understanding of Mixed Reality /VR best practices. Demonstration of advanced features e.g. **Speech recognition** to elevate the user experience.

Project Presentation in class. Individual projects (5 - 10 minutes.) 50% marks

### Task 2 – Project Portfolio

Write a report (2000 words) containing:

- Analyse how Mixed Reality is currently being used by your selected industry (or what is being used instead)
- Evaluate the potential developments in this area
- Discuss how your **Virtual Reality App** may solve a problem in your selected Industry (Health/Retail/etc).
- Conduct research to identify the **pain points** (aka opportunities) within the selected industry and formulate **solutions**.
- Research and evaluate the key elements of a successful VR app/experience. Include background research and
- outline your project approach.
- Technical documentation about your project presentation (hardware and software used)
- Include images and video documentation (max. 2 minutes) of your project.



## Weekly plan

Week 1 – Introduction to Mixed Reality. History of CGI and VR. Project brief and deliverables. Introduction to Autodesk Maya.

Week 2 – Find the **pain points** in a selected industry. Unity Visual Scripting for rapid prototyping. SWOT analysis of Visual Scripting/State machines.

Week 3 – VR in Unity. Introduction to XR Interaction Toolkit. Create an explorable **VR Scene**

Week 4 – VR in Unity 2 – Adding logic via Visual Scripting to the environment. Create an interactive VR Scene **with Logic**.

Week 5 – AR in Unity with Logic. Create an functional **AR Scene**

Week 6 – Grounding your scene with Physics, Gravity, and rigid bodies. **Formative assessment**.

Week 7 – **Intro to Artificial Intelligence for Ideation**. Maya Level 2. Model/ Texture/ Export FBX and Optimise for devices.

Week 8 – Adding **Speech recognition** to your project. Design your VR piece, hands-on session with individual feedback.

Week 9 - Create your **VR piece**, a refining session with individual feedback.

Week 10 - Final project presentation and project portfolio feedback session.

## Essential Reading List -- Harvard referenced

Shed, Mark. Understanding State Machines, 2018

Linowes, Jonathan. Unity 2020 Virtual Reality Projects, 2020

McErlean, Kelly. Interactive Narratives and Transmedia Storytelling: Creating Immersive Stories across New Media Platforms. Focal Press, 2018.

Case Studies:

[VR in business Oculus: Johnsons and Johnson](#)

[Unity AR - Case Study Wallace & Gromit](#)

[Digital Domain's "Digital Doug"](#)

Other links

[Introduction to Maya - 1 Hour Quick Start](#)

[The first 3D software in History](#)

[What is Maya - History](#)

[Intro to Playmaker](#)

[Best Practices](#)

[How Virtual Reality Became a Reality](#)

[Inside The Metaverse: What Does The Future Of Virtual Reality Feel Like?](#)

[Unity VR - YouTube](#)

[What I Learned from Spending a Week in Virtual Reality | Jak Wilmot](#)

[How immersive technologies \(AR/VR\) will shape our future | Dinesh Punni](#)

## Other useful information

### Further reading and other resources

Software: Autodesk Maya

Software: Unity

Software: Playmaker – Visual Scripting

Hardware: Oculus/HTC Vive (Steam VR)

<b>Assessment and tutor feedback date</b>	<p>Student will receive feedback and assessment within 20 working days of submission by: XXXX</p> <p>Students who miss the deadline or fail this project may be required to complete a retrieval project which demonstrates that the learning outcomes have been achieved. Students should be aware that retrieval submissions are capped at a bare pass grade, unless the extenuating circumstances panel uphold an evidenced application. The deadline for retrieval submissions will be determined at an Assessment Board.</p>
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Module Learning Outcomes	
Lo1	Understand the set off advanced tools for AR/VR production
Lo2	Develop skills in programming an AR/VR Experience
Lo3	Critically evaluate the impact of AR/VR in a selected industry
Lo4	Identify the impact of XR technologies on human interaction
Lo5	Evaluate the current state in the art of Virtual Reality hardware and software technologies in the context of a selected industry

Assessment Criteria	
AC_1	Identify and carefully investigate specific sources and development tools for Mixed Reality creation.
AC_2	Design a Virtual Reality applications using specific hardware and software tools
AC_3	Critically analyse virtual reality experiences in commercial, applied, and creative contexts
AC_4	Evaluate the current state in the art of Virtual Reality hardware and software technologies in the context of a selected industry

Assessment Methods and Tasks		
More detailed assessment tasks to be specified in the brief		
Assessment tasks	Submission Method	Weighting %
Project Presentation, digital media piece (5 - 15 minutes)	In class presentation	50%
<p>Write a project report containing (2000 words)</p> <p>1) Demonstrate how your story maybe communicated for three different platforms and audiences.</p> <p>2) Research and evaluate the key elements in a range of selected digital stories. Include background research and outlining your project approach.</p> <p>3) Technical documentation about your project presentation (hardware and software used) Include images and video documentation (max. 2 min) of your digital media piece</p>	Upload to Aula in PDF format	50%