

## Liverpool John Moores University

Title: MIXED REALITY TECHNOLOGIES  
Status: Definitive  
Code: **6106COMP** (121264)  
Version Start Date: 01-08-2021

Owning School/Faculty: Computer Science and Mathematics  
Teaching School/Faculty: Computer Science and Mathematics

Team	Leader
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**Academic Level:** FHEQ6      **Credit Value:** 20      **Total Delivered Hours:** 57  
**Total Learning Hours:** 200      **Private Study:** 143

### Delivery Options

Course typically offered: Semester 1

Component	Contact Hours
Lecture	22
Workshop	33

**Grading Basis:** 40 %

### Assessment Details

Category	Short Description	Description	Weighting (%)	Exam Duration
Artefacts	AS1	Design and Development of Mixed Reality Application	50	
Exam	AS2	Examination	50	2

### Aims

*To describe the concepts and technologies for mixed reality.  
To explain the principles and techniques of modelling and rendering virtual reality using appropriate tools and technology.  
To provide opportunity for students to design, develop and evaluate mixed reality solution.*

## Learning Outcomes

After completing the module the student should be able to:

- 1 Elaborate the concepts, technologies and application of mixed reality.
- 2 Critically evaluate the issues associated to mixed reality and technical issues related to mixed reality technology.
- 3 Apply principles and techniques to design a mixed reality solution.
- 4 Evaluate the use of appropriate tools and technology to develop a mixed reality application

## Learning Outcomes of Assessments

The assessment item list is assessed via the learning outcomes listed:

Mixed Reality Application	1	2
Examination	3	4

## Outline Syllabus

*Mixed Reality: Definition, Augmented Telexistance, Taxonomy, Issues associated to Mixed Reality, Applications of Mixed Reality Technology.*

*Sensory Augmentation: Sound, Stereoscopic display, Force Feedback Simulation, haptic devices.*

*User input: Viewer and object tracking, Pose and gesture recognition, Motion Capture, Accelerometers, Fiducial markers, User interface issues.*

*Physical modelling and rendering: Physical simulation(collison detection & response), Animation, Visibility computation, Time-critical rendering, Multiple levels of details (LOD).*

*System Architectures: Game Engines, Mobile Augmented Reality, Flight simulators, CAVEs, Medical Imaging. Application to Game Console.*

*Networking: Collaborative Mixed Reality, peer to peer, Client-Server, Dead Reckoning, Encryption, Synchronization, Distributed Collaboration.*

## Learning Activities

Lectures – to deliver the concepts, methodologies and techniques on mixed reality technologies.

Workshop – Tutor-led workshop activities which will enable the students to practice the methods and techniques to design and protoype a mixed reality application.

Further exercises – additional exercises for students to work on in their own time.  
Directed learning – provides additional reading to enable workshop work to be completed.  
Learning materials can be accessed digitally via University Virtual Learning Environment (VLE).

## **Notes**

The module will focus on the novel input and output technologies that enables blended experience between the physical reality and virtual reality. It will also cover design of virtual world and development of mixed reality applications as well as the proposal of mixed reality solutions for a specific application. Students will be working in team taking different roles in the coursework to achieve the task provided.