

**Summary Information**

|                            |                                  |
|----------------------------|----------------------------------|
| <b>Module Code</b>         | 6606YCOM                         |
| <b>Formal Module Title</b> | Mixed Reality Technologies       |
| <b>Owning School</b>       | Computer Science and Mathematics |
| <b>Career</b>              | Undergraduate                    |
| <b>Credits</b>             | 20                               |
| <b>Academic level</b>      | FHEQ Level 6                     |
| <b>Grading Schema</b>      | 40                               |

**Module Contacts****Module Leader**

| <b>Contact Name</b> | <b>Applies to all offerings</b> | <b>Offerings</b> |
|---------------------|---------------------------------|------------------|
| Glyn Hughes         | Yes                             | N/A              |

**Module Team Member**

| <b>Contact Name</b> | <b>Applies to all offerings</b> | <b>Offerings</b> |
|---------------------|---------------------------------|------------------|
|---------------------|---------------------------------|------------------|

**Partner Module Team**

| <b>Contact Name</b> | <b>Applies to all offerings</b> | <b>Offerings</b> |
|---------------------|---------------------------------|------------------|
|---------------------|---------------------------------|------------------|

**Teaching Responsibility**

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|--|
| <b>LJMU Schools involved in Delivery</b> |
| LJMU Partner Taught                      |

## Partner Teaching Institution

| Institution Name                                   |
|--|
| YPC International College (Kolej Antarabangsa YPC) |

## Learning Methods

| Learning Method Type | Hours |
|----------------------|-------|
| Lecture              | 22    |
| Workshop             | 33    |

## Module Offering(s)

| Offering Code | Location | Start Month | Duration |
|---------------|----------|-------------|----------|
| SEP-PAR       | PAR      | September   | 12 Weeks |

## Aims and Outcomes

|             |  |
|-------------|--|
| <b>Aims</b> | 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:

| Code | Description  |
|------|--|
| MLO1 | Elaborate the concepts, technologies and application of mixed reality.   |
| MLO2 | Critically evaluate the issues associated to mixed reality and technical issues related to mixed reality technology. |
| MLO3 | Apply principles and techniques to design a mixed reality solution.  |
| MLO4 | Evaluate the use of appropriate tools and technology to develop a mixed reality application                          |

## Module Content

### 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 (collision 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.

### Module Overview

#### Additional Information

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.

### Assessments

| Assignment Category | Assessment Name           | Weight | Exam/Test Length (hours) | Learning Outcome Mapping |
|---------------------|---------------------------|--------|--------------------------|--------------------------|
| Technology          | Mixed Reality Application | 50     | 0                        | MLO2, MLO1               |
| Exam                | Examination               | 50     | 2                        | MLO4, MLO3               |