UNIVERSITI TEKNOLOGI MARA

CSC573: VIRTUAL REALITY

Course Name (English)	VIRTUAL REALITY APPROVED
Course Code	CSC573
MQF Credit	3
Course Description	This course will introduce the essential topics in virtual reality principles and its application. It will also incorporate the development ecosystem such as the technology of multimodal interface and real-time simulation of Virtual Reality. Virtual Reality toolkits editor will also be emphasized, as it will help to jump start on building Virtual Reality applications as required in the coursework. Beside that, the implications of the technology of Virtual Reality towards the users and society will also be discussed.
Transferable Skills	1. Explain the fundamental concept of virtual reality application. 2. Display technical skills in virtual reality application. 3. Formulates an autonomous learning in virtual reality application.
Teaching Methodologies	Lectures, Lab Work
CLO	CLO1 Explain the fundamental concept of virtual reality application. CLO2 Display technical skills in virtual reality application CLO3 Formulates an autonomous learning in virtual reality application
Pre-Requisite Courses	No course recommendations

Topics
1. Introduction 1.1) Definition 1.2) Interaction, Immersive, Imaginative, Presence and Reality Trade-Off
2. History of VR 2.1) The 1800s 2.2) The 1900s 2.3) The 2000s 2.4) VR Becomes An Industry
3. The Overview of Various Realities 3.1) Form of Realities 3.2) The Five Classic Components of a VR System
4. Input Devices: Trackers, Navigation, and Gesture 4.1) Three- Dimensional Position Trackers 4.2) Navigation and Manipulation Interfaces 4.3) Gesture Interfaces
5. Interaction Pattern and Techniques 5.1) Selection Patterns 5.2) Manipulation Patterns 5.3) Viewpoint Control Patterns 5.4) Indirect Control Patterns 5.5) Compound Patterns
6. Output Devices: Graphics, Three-Dimensional Sound and Haptics 6.1) Graphics Displays 6.2) Sound Displays 6.3) Haptic Feedback

7. Computing Architectures For VR 7.1) The Rendering Pipeline 7.2) PC Graphics Architectures 7.3) Workstation-Based Architectures 7.4) Distributed VR Architectures
8. Geometric Modeling 8.1) Virtual Object Shape 8.2) Object Visual Appearance
9. VR Programming 9.1) Toolkits and Scene Graphs 9.2) WorldToolKit 9.3) Java 3D
10. Adverse Health Effects 10.1) Motion Sickness 10.2) Eye Strain, Seizures, and Aftereffects 10.3) Hardware Challenges 10.4) Latency 10.5) Measuring Sickness 10.6) Summary Factors That Contribute to Adverse Effect 10.7) VR and Society
11. Emerging Applications of VR 11.1) VR Applications in Manufacturing 11.2) Application of VR in Robotics 11.3) Information Visualization

Assessment Breakdown	%
Continuous Assessment	60.00%
Final Assessment	40.00%

Details of Continuous Assessment

Assessment Type	Assessment Description	% of Total Mark	CLO
Group Project	Efficiently create workable virtual reality application in a team.	25%	CLO3
Individual Project	Skills in using 3D software and virtual reality toolkits.	15%	CLO2
Test	Test 1	10%	CLO1
Test	Test 2	10%	CLO1

Reading List

Recommended Text

- **Tony Parisi 2016, *Learning Virtual Reality*, 1 Ed., O'Reilly Media USA [ISBN: 9781491922835]**
- **Ann Latham Cudworth 2014, *Virtual World Design*, 4, 5, 6, CRC Press [ISBN: 1466579617]**
- **Jason Jerald 2014, *The VR Book: Human-Centered Design for Virtual Reality*, 1 Ed., ACM, Morgan and Claypool USA [ISBN: 978-1-97000-1]**

Reference Book Resources

- **Jonathan Linowes 2015, *Unity Virtual Reality Projects*, Packt Publishing [ISBN: 9781783988]**
- **Steve Aukstakalnis 2016, *Practical Augmented Reality: A Guide to the Technologies, Applications, and Human Factors for AR and VR (Usability)*, Addison-Wesley [ISBN: 9780134094]**

Article/Paper List: This Course does not have any article/paper resources

Other References: This Course does not have any other resources