Course Name	Mixed Reality Technologies		تقنيات الواقع المختلط	
Course Information	**Course Code**	**Course No.**	**Credit Hour**	**Prerequisite(s)**
	0911-1676	676	3 (3-0-6)	**Machine Learning for CV**

Course Track	☐ Program Core	☒ Electives

Course Description. Mixed Reality (MR) is the use of both Virtual Reality (VR) and Augmented Reality (AR) technologies to create an environment where physical and virtual objects can exist and interact in real-time. In this course, basics of Virtual Reality (VR), Augmented Reality (AR), Mixed reality (MR) and Mobile VR technologies will be introduced. Basics of 3D graphics' object creation and laying them in an environment will be taught. Techniques like materials and texturing that give realistic appearance to the objects will be discussed. Audio techniques will also be covered to experience sound great as well as looking great. Interface design principles will be reviewed from human factors and technological perspectives. Hardware, software, and design aspects of virtual interfaces will be investigated. Pitfalls and performance issues to make sure the environment runs fast enough in VR will be discussed. Professional game and VR/AR engine, Unity3D will be introduced. The course will culminate in a project in which you will create your own VR/AR or mixed reality experience. This course will also teach VR interaction, how to move around in VR and how to interact with the objects in real world. The psychology of social interaction and the practical skills to implement it in Unity3D will be discussed. VR/AR applications in the fields of medicine, education, design and entertainment will be discussed. Hands-on experience will be provided through series of tutorial sessions that aims to provide basic skills on how to use different tools to develop student's own simple interface application.

Course Outcomes. After the completion of this course, the student will be able to:

1. **Describe** the fundamentals of VR, AR, MR, hardware and software requirements **[A]**
2. **Describe** basics of 3D graphics, creation of objects and laying them out to create an environment **[C]**
3. **Explore** the concepts and technologies of VR interaction with physical world **[A]**
4. **Design** and development of VR, AR and MR environment **[E]**
5. **Evaluate** and test VR and AR applications **[E]**
6. **Ascertain** the impact and acceptance of VR and AR applications on the society **[F]**

Assessment Policy (PC)	**Assignments**	15%	**Quiz**	---	**Capstone Project**	40 %
	Midterm	15%	**Final**	30%		

Textbook	1. Vasanth Mohan, Steve Lukas and Erin Pangilinan, "Creating Augmented and Virtual Realities: Theory", O'Reilly Media, 1st Edition, 2019. ISBN-13: 978-1492044192. 2. Samuel Greengard, "Virtual Reality", MIT Press, 2019. ISBN-10: 0262537524
References	1. Jonathan Linowes and K. Babilinski, "Augmented Reality for Developers: Build practical augmented reality applications", Packt Publishing, 2017. ISBN-13: 978-1787286436 2. Ange Anderson, "Virtual Reality, Augmented Reality and Artificial Intelligence in Special Education", Routledge; 1st Edition (March 19, 2019). ISBN-10: 0367145324.