



**National Institute of Technology Meghalaya**  
An Institute of National Importance

**CURRICULUM**

Programme	<b>Bachelor of Technology in Computer Science and Engineering</b>	Year of Regulation	<b>2019-20</b>
Department	<b>Computer Science and Engineering</b>	Semester	<b>VI</b>

Course Code	Course Name	Credit Structure				Marks Distribution			
		L	T	P	C	INT	MID	END	Total
<b>CS316</b>	<b>Augmented and Virtual Reality</b>	<b>3</b>	<b>0</b>	<b>0</b>	<b>3</b>	<b>50</b>	<b>50</b>	<b>100</b>	<b>200</b>

Course Objectives	To understand the basic concepts of augmented and virtual reality	Course Outcomes	CO1	Able to <b>analyse</b> the components of Virtual Reality
	To apply the various concepts of virtual reality.		CO2	Able to <b>assess</b> and compare technologies of Virtual Reality
	To explore the application area of augmented and virtual reality		CO3	Able to <b>design</b> application of Virtual Reality

No.	COs	Mapping with Program Outcomes (POs)												Mapping with PSOs		
		PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
1	CO1	1	0	0	0	0	0	0	0	0	0	0	0	1	1	0
2	CO2	1	1	2	1	0	0	0	1	0	0	1	1	1	1	1
3	CO3	1	1	1	1	0	1	0	0	0	0	0	1	1	1	1

**SYLLABUS**

No.	Content	Hours	COs
I	<b>Introduction</b> The historical development of Virtual Reality, Fundamental concept and components of Virtual Reality, Primary features and present development on Virtual Reality, Virtual environment, Requirements of Virtual Reality	<b>08</b>	<b>CO1</b>
II	<b>3D User Interface Input/output Hardware</b> Input Device Characteristics, Desktop Input Devices, Tracking Devices, 3D Mice, Special-Purpose Input Devices, Direct Human Input, Choosing Input Devices for 3D Interfaces, Visual Displays, Auditory Displays, Haptic Displays, Choosing Output Devices for 3D User Interfaces	<b>10</b>	<b>CO1</b>
III	<b>3D Interaction Techniques</b> Representation of the Virtual World and Rendering Systems- Visual Representation, Aural Representation, Haptic Representation, Manipulating a Virtual World, Navigating in a Virtual World, Wayfinding - Theoretical Foundations, User-Centered Wayfinding Support, Environment-Centered Wayfinding Support, Design Guidelines	<b>10</b>	<b>CO2</b>
IV	<b>Applications</b> What makes an application a good candidate for Virtual Reality, Business and manufacturing, Science, Medical, Education, Public Safety and Military, Entertainment	<b>08</b>	<b>CO3</b>
<b>Total Hours</b>		<b>36</b>	

**Essential Readings**

- Doug A Bowman, Ernest Kuijff, Joseph J LaViola, Jr and Ivan Poupyrev, "3D User Interfaces, Theory and Practice", 1<sup>st</sup> Edition, AddisonWesley, USA, 2005.
- William R Sherman and Alan B Craig, "Understanding Virtual Reality: Interface, Application and Design", 1<sup>st</sup> Edition, Morgan Kaufmann Publishers, San Francisco, CA, 2002.
- Alan B Craig, William R Sherman and Jeffrey D Will, "Developing Virtual Reality Applications: Foundations of Effective Design", 2<sup>nd</sup> Edition Morgan Kaufmann, 2009.

**Supplementary Readings**

- Burdea, Grigore C and Philippe Coiffet, "Virtual Reality Technology", 1<sup>st</sup> Edition, Wiley Interscience, India, 2003.
- John Vince, "Virtual Reality Systems", 1<sup>st</sup> Edition, Addison Wesley, 1995.
- Oliver Bimber, Ramesh Raskar, "Spatial Augmented Reality Merging Real and Virtual Worlds", 1<sup>st</sup> Edition, CRC Press, 2005.