UNC512: AUGMENTED AND VIRTUAL REALITY

L	T	P	Cr
2	0	2	3.0

Course Objective:
To understand the basic concepts of Augmented and Virtual Reality. The student must be able to apply the various concepts of Augmented and Virtual Reality in other application areas.

Syllabus

Introduction of Virtual Reality: Fundamental concept and components of Virtual Reality, primary features and present development on Virtual Reality

Multiple Modals of Input and Output Interface in Virtual Reality: Input -- Tracker, Sensor, Digital Glove, Movement Capture, Video-based Input, 3D Menus & 3DScanner etc. Output -- Visual /Auditory / Haptic Devices

Visual Computation in Virtual Reality: Fundamentals of computer graphics, software and hardware technology on stereoscopic display, advanced techniques in CG: Management of large scale environments & real time rendering

Environment Modeling in Virtual Reality: Geometric Modeling, Behavior Simulation, Physically Based Simulation.

Interactive Techniques in Virtual Reality: Body Track, Hand Gesture, 3D Menus, Object Grasp.

Introduction of Augmented Reality (AR): System structure of Augmented Reality, key technology in AR.

Development Tools and Frameworks in Virtual Reality: Frameworks of software development tools in VR, X3D Standard, Vega, MultiGen, Virtools etc. Application of VR in Digital Entertainment: VR technology in film & TV production, VR technology in physical exercises and games, demonstration of digital entertainment by VR.

Laboratory Work:
To implement various techniques studied during course.

Course Learning Objectives (CLO)
The students will be able to:

1. Analyze the components of AR and VR systems, its current and upcoming trends, types, platforms, and devices.
2. Compare technologies in the context of AR and VR systems design.
3. Implement various techniques and algorithms used to solve complex computing problems in AR and VR systems.
4. Develop interactive augmented reality applications for PC and Mobile based devices using a variety of input devices.
5. Demonstrate the knowledge of the research literature in augmented reality for both

compositing and interactive applications.

Text Books

1. Doug A. B., Kruijff E., LaViola J. J. and Poupyrev I. , 3D User Interfaces: Theory and Practice , Addison-Wesley (2005,2011p) 2nd ed.
2. Parisi T., Learning Virtual Reality, O'Reilly (2016) 1st ed. 3.Schmalstieg D. and Hollerer T., AugmentedAnd Virtual Reality, Addison-Wesley (2016).

Reference Books

1. Whyte J., Virtual Reality and the Built Environment, Architectural Press (2002).
2. Aukstakalnis S., Practical Augmented Reality: A Guide to the Technologies, Applications, and Human Factors for AR and VR, Addison-Wesley (2016).