4/4 B.Tech. SECOND SEMESTER
VIRTUAL REALITY

CS8T3B **Credits: 4**

Elective – IV

Lecture: 4 periods/week **Internal assessment: 30 marks**
Tutorial: 1 period /week **Semester end examination: 70 marks**

Course Context and Overview: This course introduces the fundamental concepts of Virtual Reality. With this foundation students can take up engineering career in industry or research.

Prerequisites: C LANGUAGE, I/O ANALOG AND DIGITAL INTERFACING, AND PERIPHERALS

Learning Outcomes:

Ability to:

1. Commercial virtual reality technology & its five basic components
2. Various input & output devices, interfaces using virtualization concepts
3. About the effect of human factors in methods & performance study using virtual reality
4. 3D technology in Java, Sprites with virtual reality programming as pacts.

UNIT – I

Introduction: the three I's of the Virtual reality, commercial VR Technology and the five classic components of a VR System. (1.1,1.3 and 1.5 of the Text Book (1)).

UNIT - II

Input Devices: (Trackers, Navigation, and Gesture Interfaces): Three-dimensional position trackers, navigation and manipulation, interfaces and gesture interfaces (2.1,2.2 and 2.3 of the Text Book(1))

UNIT – III

Output Devices: Graphics displays, sound displays & haptic feedback (3.1,3.2,&3.3 of Text book(1)).

UNIT –IV

Modeling: Geometric modeling, kinematics modeling, physical modeling, behavior modeling model management (5.1, 5.2,5.3,5.4 and 5.5 of Text Book(1)).

UNIT – V

Human Factors: Methodology and terminology, user performance studies, VR health and safety issues. (7.1,7.2 and 7.3 of Text Book(1)).

UNIT –VI

Applications: Medical applications, military applications, robotics applications(8.1,8.3 and 9.2 of Text Book(1))

UNIT – VII

VR Programming – I Introducing Java 3D, loading and manipulating external models, using a lathe to make shapes (Chapters 14,16 and 17 of Text Book (2)).

UNIT –VIII

VR Programming – II: 3D sprites, animated 3D sprites, particle systems, (Chapters 18, 19 and 21 of Text Book (2)).

Learning Resources

Text Books:

1. Virtual Reality Technology, Second Edition, Gregory C. Burdea and Phillippe Coiffet, John Wiley & Sons, Inc.,
2. Killer Game Programming in Java, Andrew Davison, Oreilly – SPD, 2005.

References:

1. Understanding Virtual Reality, Interface, Application and Design, William R. Sherman, Alman Craig, Elsevier(Morgan Kaufmann).
2. 3D Modelling and surfacing, Bill Fleming, Elsevier(Morgan Kauffman).
3. 3D Game Engine Design, David H. Eberly, Elsevier.
4. Virtual Reality Systems, John Vince, Pearson Edcuation.