CA5T5C   **VIRTUAL REALITY**   **Credits : 4**

Lecture Hours : 4 periods / week   Internal assessment : 30 Marks

Semester and Examination: 70 Marks
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Course Description:

This course deals with 3D Computer graphics, Geometric modeling from 2D to 3D and 3D space curves. It deals with Generic Virtual Reality Systems. Finally it deals with animating virtual environment and simulation of environment.

Course Objective:

- Student will learn the appropriate features of Virtual Reality.
- Student will understand the Geometric modeling from 2D to 3D and 3d space curves.
- Student will understand the Generic Virtual Reality systems.
- Student able to learn animating virtual reality**.**
- Student able to learn Physical Simulation.
- Able to learn Human Factors.

Unit I:

3D Computer graphics: The virtual world space, positioning the virtual observer, the perspective projection, Human vision, Stereo perspective projection, 3D clipping, colour theory, simple 3D modelling, illumination models, shading algorithms, radiosity, hidden surface removal, realism, stereographic images

Unit II:

Geometric modelling: From 2D to 3D, 3D space curves, 3D boundary representation,

Unit III:

Geometrical Transformations: Frames of reference, Modelling transformations, instances, picking flying, Scaling the VE, Collision detection

Unit IV:

A generic VR Systems: The virtual Environment, The computer environment, VR Technology, Modes of Interaction, VR systems

Unit V:

Animating the Virtual Environment: Dynamics of numbers, the animation of objects, shape and object inbetweening, free-form deformation, particle systems

Unit VI:

Physical Simulation: Objects falling in a gravitational field, rotating wheels, Elastic collisions, Projectiles, simple pendulums, springs, flight dynamics of an aircraft

Unit VII:

Human factors The eye, The ear, the somatic senses, Equilibrium **Virtual Reality Hardware:** Sensor hardware, Head-coupled displays, Acoustic hardware, Integrated VR Systems

Unit VIII:

Virtual Reality Software Modelling Virtual worlds, Physical simulation, VR tool kits **Virtual Reality Applications** Engineering, Entertainment, science, Education, training Future Virtual Environment, Modes of Interaction.

Learning Resources

Text Books:

1. John Vince, "Virtual Reality Systems ", Pearson Education Asia, 2002

Reference Books:

1. Adams, "Visualizations of Virtual Reality", Tata McGraw Hill, 2000.
2. William R. Sherman, Alan B. Craig, "Understanding Virtual Reality: Interface, Application, and Design",Morgan Kaufmann, 1st Edition,2002.
3. Grigore C. Burdea, Philippe Coiffet , "Virtual Reality Technology" , WileyInterscience,1st Edition,1994.