

DISCIPLINE SPECIFIC ELECTIVE COURSE -4 (DSE-4)
VI.5.6. Virtual Reality

CREDIT DISTRIBUTION, ELIGIBILITY AND PRE-REQUISITES OF THE COURSE

Course title & Code	Credits	Credit distribution of the course			Eligibility criteria	Pre-requisite of the course (if any)
		Lecture	Tutorial	Practical/ Practice		
Virtual Reality#, DSE 4, VI. 5.6	4	0	0	4	Class XII pass with Maths	C ⁺⁺

#This course will also be available to the students in semester IV

Learning Objectives

The objective of this course is to provide a detailed understanding of the concepts of Virtual Reality and its applications

Learning outcomes

At the end of the course, the students will be able to:

- Understand geometric modelling and Virtual environment.
- Be able to do 2D and 3D geometrical modelling
- Develop Virtual Reality applications.

Practicals - Hours)

(120

The course will be conducted completely on a hands-on mode and project-based learning. The basic concepts will be explained and each concept will be augmented by small tasks in UNITY.

Animations and physical simulations will be introduced to the students through an appropriate Virtual environment. Following tasks will be covered in the lab:

- Introduction to the Virtual environment
- Introducing frame of reference and modelling transformations
- Animation in virtual environment – projectile motion, flight/ car simulation, Ferris wheel, pendulums, etc.
- Visualising Human Anatomy/ geographical regions/ environment/ monuments in the VR environment
- Modelling a store/ classroom/ office/ mall in VR

Essential/recommended/ suggested readings

- Virtual Reality Systems, John Vince, Pearson Education India, 2002.
<https://all3dp.com/2/blender-3d-printing-tutorial/>
- Understanding Virtual Reality: Interface, Application and Design, William R Sherman and Alan B Craig, Morgan Kaufmann, 2018
- Virtual Reality, Samuel Greengard, MIT Press, 2019.
- Virtual and Augmented Reality, Paul Mealy, Wiley, 2018.

DISCIPLINE SPECIFIC ELECTIVE COURSE -4 (DSE-4)
VI.5.7. Complex Systems

CREDIT DISTRIBUTION, ELIGIBILITY AND PRE-REQUISITES OF THE COURSE

Course title & Code	Credits	Credit distribution of the course			Eligibility criteria	Pre-requisite of the course (if any)
		Lecture	Tutorial	Practical/ Practice		
Complex Systems, DSE 4, VI. 5.7	4	0	0	4	12th Pass with Maths	Programming languages, data Structure, Algorithm design and analysis, Computer Networks, Discrete Mathematics

Learning Objectives

The objective of this course is to provide a practical and detailed understanding of the complex systems which can be found in various fields and disciplines, like sociology, political systems, biology, and economics etc.

Learning outcomes

At the end of the course, the students will be able to:

- to understand the basics of complex systems and their importance.
- to recognise complex systems related to societal, environmental, engineering and scientific problems and to learn their basic features;
- to introduce a problem-solving approaches for complex systems.
- to get hands-on experience in studying and solving complex systems problems.

**Syllabus
Practicals-
Hours)**

(120