Course Code	CSE570
Course Name	Virtual Reality
Credits	4
Course Offered to	UG/PG
Course Description	rendering, geometric modelling, display optics, sensors and tracking, vestibular systems and interface design. Advanced areas of VR including telepresence, procedural modelling of large virtual worlds, and designing multi-model interactions and interfaces for VR will also be discussed. This will be a project-based course using game engine based VR development.

Pre-requisites

Pre-requisite (Mandatory)	Pre-requisite (Desirable)	Pre-requisite(other)
	CSE333/533 Computer Graphics	

*Please insert more rows if required

Post Conditions

CO1	CO2	CO3	CO4
Apply the learned concepts to design moderate to large VR based systems	Understand rendering in VR and challenges	Be able to use geometric modelling algorithms to design virtual worlds	Be able to design user interactions in VR

Weekly Lecture Plan

Week Number	Lecture Topic	COs Met	Assignment/Labs/Tutorial
1	Introduction, Historical perspective	CO1, CO2, CO3, CO3	
2	Graphics pipeline, Real-time rendering in VR	CO2	
3	Transformations, viewing and projection	CO2, CO3	
4	Geometric modelling	CO3	
5	Light and optics, lens systems and imaging, lens aberrations	CO2	
6	Stereoscopy, depth and motion perception	CO1, CO2	
7	Human perception: visual, audio, vestibular, and tactile	CO1, CO4	
8	Introduction to Augmented Reality (AR)	CO4	
9	Multi-user interaction	CO4	
10	Tracking systems	CO1, CO4	
11	Procedural modelling and creation of large virtual worlds	CO1, CO3	
12	Telepresence and interaction	CO1, CO2, CO4	
13	User interfaces, social interaction and evaluation of VR systems	CO1, CO4	

Weekly Lab Plan

Week Number	Laboratory Exercise	COs Met	Platform (Hardware/Software)

*Please insert more rows if required

Assessment Plan

Type of Evaluation	% Contribution in Grade
Assignment	20
Quiz	10
Laboratory	10
Project	40
End-sem	20

*Please insert more row for other type of Evaluation

Resource Material

Type	Title
Textbook	LaValle "Virtual Reality", Cambridge University Press, 2016
Reference	edition, 2009.
Reference	Doug A. Bowman, Ernst Kruijff, Joseph J. LaViola, and Ivan Poupyrev, 3D User Interfaces, Addison-Wesley, 2005.
Reference	K. S. Hale and K. M. Stanney, Handbook on Virtual Environments, 2nd edition, CRC Press, 2015.