

Year: B. Tech IV (Semester VII)

Subject Name: Game Development using AR /VR

Subject Code: BTEA19724

Type of course: Honors (Group: Virtual and Augmented Reality)

Prerequisite: XR-II, Unity

Rationale: This course will help students learn the basic principles of virtual reality applications and get them to know how games differ from desktop apps. It will help students build various types of VR experiences and use Unity to develop VR applications.

Teaching and Examination Scheme:

Teaching Scheme				Theory Marks			Practical Marks		Total
L	T	P	C	TEE	CA1	CA2	TEP	CA3	
4	0	2	5	60	25	15	30	20	150

CA1: Continuous Assessment (assignments/projects/open book tests/closed book tests CA2: Sincerity in attending classes/class tests/ timely submissions of assignments/self-learning attitude/solving advanced problems TEE: Term End Examination TEP: Term End Practical Exam (Performance and viva on practical skills learned in course) CA3: Regular submission of Lab work/Quality of work submitted/Active participation in lab sessions/viva on practical skills learned in course

Contents:

Sr. No.	Topic	Hrs
1	What is virtual reality?, Types of head-mounted displays, The difference between virtual reality and augmented reality, Applications versus games, How virtual reality works, Types of VR experiences, Technical skills that are important to VR. Study about VR device interaction and working with OS(Windows/Linux) and IDE's (Unity)	2
2	Haptic Modality in Virtual Reality: Haptic Representation in Virtual Reality, Haptic Rendering in Virtual Reality, Haptic Interfaces, Haptic Displays	4
3	High-Level Concepts of Content Creation, Environmental Design, Affecting Behavior, Transitioning to VR Content Creation, Content Creation: Design Guidelines 3. Human-Centered Interaction, VR Interaction Concepts, Input Devices, Interaction Patterns and Techniques, Interaction: Design Guidelines Case study of a developed VR game in Unity with the above-mentioned	10

	features	
4	Philosophy of Iterative Design, The Define Stage, The Make Stage, The Learn Stage, Iterative Design: Design Guidelines Study of Iterative design of any VR game.	6
5	Overview, Building Your Project and Character, Getting Animated, The Town View, Working with Unity's UI System, NPCs and Interactions, The World Map, Encountering Enemies, and Running Away Animation in Unreal Engine vs Unity Engine	10
6	Getting Ready to Fight, The Battle Begins, Shopping for Items, Sound and Music, Putting a Bow on It, Deployment and Beyond Case study on considering Windows mixed reality for game development in Unity	10
7	Motion Sickness, Eye Strain, Seizures, and Aftereffects, Hardware Challenges, Latency, Measuring Sickness, Summary of Factors That Contribute to Adverse Effects, Examples of Reducing Adverse Effects, Adverse Health Effects: Design Guidelines	3

Suggested Specification table with Marks (Theory): (For B.Tech only)

Distribution of Theory Marks					
R Level	U Level	A Level	N Level	E Level	C Level
10	20	15	5	5	5

Legends: R: Remembrance; U: Understanding; A: Application, N: Analyze and E: Evaluate C: Create and above Levels (Revised Bloom's Taxonomy)

Note: This specification table shall be treated as a general guideline for students and teachers. The actual distribution of marks in the question paper may vary slightly from the above table.

Reference Books:

Sr No	Title of book /article	Author(s)	Publisher and details like ISBN	Year of publication	Publication Edition
1	The VR Book: Human-Centered Design for Virtual Reality	Jason Jerald	Association for Computing Machinery and Morgan & Claypool	Aug. 5 2016	

			Publishers ISBN- B01JV1LAZW		
2	Mastering Unity 2D Game Development	AshleyGo dbold, Simon Jackson	Packt Publishing ISBN: 9781786463456	October 2016	Second Edition
3	Unity Virtual Reality Projects: Explore the world of virtual reality by building immersive and fun VR projects using Unity 3D	Jonathan Linowes	Packt Publications, ISBN 978- 1783988556	2015	Paperbackl, 1st Edition,

Course Outcomes:

Sr. No.	CO statement	Marks % weightage
CO-1	Learn about the technology of VR and differentiate between VR and AR systems.	20
CO-2	Understand the concepts of content creation, interaction, and iterative design.	20
CO-3	Create 3D scenes with Unity and experiment with various user interface (UI) techniques that are used in VR applications	20
CO-4	Create a 2D game in Unity.	20
CO-5	Understand the effect of VR systems on the health of individuals.	20

FOR LAB SESSIONS:

Practical list:

Sr. No	Topic
1	Study about VR device interaction and working with OS(Windows/Linux) and IDE's (Unity/Unreal)
2	Study of Iterative design of any VR game.
3	Study of character building using Unity

4	Study of sound effects and music, fighting game, Simple battle system using Unity
5	Creating NPC Dialogue System using Unity
6	Animation in Unreal Engine vs Unity Engine
7	Create a project: 1. Virtual Pet. Drag the food or the toy to the pet and watch the sprites interact. 2. Greeting Card. Enter your name and age to get a personalized greeting. 3. Sky Dancer. Collect the coins. Avoid the clouds.
8	Develop a 2D Game using Sprite

Tools / Major hardware required: