KAMARAJ COLLEGE OF ENGINEERING & TECHNOLOGY

(An Autonomous Institution - AFFILIATED TO ANNA UNIVERSITY, CHENNAI)

S.P.G.Chidambara Nadar - C.Nagammal Campus

S.P.G.C. Nagar, K.Vellakulam – 625 701 (Near VIRUDHUNAGAR).

DEPARTMENT OF ARTIFICIAL INTELLIGENCE AND DATA SCIENCE

Syllabus

Course Code	Course Name	L	T	P	C
Value Added Course	**Immersive Game Design and Development Using Unity and Blender**	**15**	**0**	**30**	**2**

Course Objectives

- To provide foundational understanding of Augmented Reality, Virtual Reality, and Extended Reality technologies.
- To familiarize students with Unity 3D development environment for immersive application design.
- To develop programming skills using C# for controlling 3D objects and user interaction.
- To enable students to design and deploy AR/VR applications for real-world use cases.
- To build industry readiness and innovation mindset in immersive technology domains.

UNIT 1: INTRODUCTION TO AR, VR & XR (9)

Introduction to AR, VR, and XR – Differences between AR vs VR vs MR – Applications in education, medical, gaming, architecture, and industry training – Overview of AR/VR devices – Mobile-based AR and VR headsets – Career opportunities in AR/VR – Installing Unity Hub and Unity Editor – Unity interface basics – Creating first 3D scene and adding simple 3D objects.

UNIT 2: UNITY & 3D ENVIRONMENT DEVELOPMENT (9)

Game objects and components – Transform operations (position, rotation, scale) – Coordinate systems (X, Y, Z) – Differences between 2D and 3D environments – Creating a virtual environment – Applying materials, colors, and textures – Camera setup and lighting – Object manipulation in the scene – Designing a simple VR room or ground scene.

UNIT 3: C# SCRIPTING FOR AR/VR INTERACTION (9)

Introduction to C# programming in Unity – Variables, functions, Start() and Update() methods – Event-driven programming – Writing scripts to rotate and move 3D objects – Changing object colors on interaction – Attaching scripts to game objects – Debugging and testing scripts – Developing a rotating 3D object mini project.

UNIT 4: AUGMENTED REALITY APPLICATION DEVELOPMENT (9)

Working principle of AR – Marker-based and markerless AR – Camera tracking and AR SDK overview – Installing AR packages in Unity – Creating image targets – Attaching 3D models to real-world images – Testing AR applications on mobile devices – Mini project: AR visiting card or AR model on image.

UNIT 5: VIRTUAL REALITY DEVELOPMENT & DEPLOYMENT (9)

VR environment concepts – First-person camera and head tracking – Interaction and object selection in VR – Creating immersive VR scenes – VR walkthrough and training environments – Building APK files for Android deployment – Testing and optimizing VR apps – Final mini project: VR classroom, virtual tour, or training environment – Career guidance and portfolio building.

Course Outcomes

At the end of the course, students will be able to:
CO1: Explain the concepts and differences between AR, VR, and XR technologies.
CO2: Develop basic 3D environments using Unity and manipulate virtual objects.
CO3: Apply C# scripting to control object behavior and interactions in Unity.
CO4: Design and implement AR applications using marker-based and markerless SDKs.
CO5: Create immersive VR scenes and deploy AR/VR applications on mobile platforms.

CO-PO Mapping and SDG Mapping

CO - PO Mapping

CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PSO1	PSO2
CO1	H	M	L	L	M	-	-	-	-	L	-	M	M
CO2	M	H	M	M	H	-	-	-	L	L	L	H	M
CO3	M	H	H	M	H	-	-	-	L	L	L	H	M
CO4	M	H	H	H	H	-	-	-	M	L	L	H	H
CO5	M	M	H	H	H	-	-	-	H	M	M	H	H

SDG Mapping

CO's	SDG mapping with CO's	
CO1	SDG 04 - Quality Education	-
CO2	SDG 04 - Quality Education	SDG 09 - Industry, Innovation, and Infrastructure
CO3	SDG 04 - Quality Education	SDG 09 - Industry, Innovation, and Infrastructure
CO4	SDG 04 - Quality Education	SDG 09 - Industry, Innovation, and Infrastructure
CO5	SDG 04 - Quality Education	SDG 09 - Industry, Innovation, and Infrastructure