

## **GAME DEVELOPMENT:**

<b>COURSE OBJECTIVE:</b>	<ul style="list-style-type: none"><li>• Develop Immersive Games:</li><li>• Gain Proficiency in 2D and 3D Game Development Fundamentals:</li><li>• Explore Metaverse Integration</li><li>• Experiment with Advanced Technologies</li><li>• Create Innovative, Cross-Platform Experiences</li></ul>
<b>Course OUTCOME:</b>	<ul style="list-style-type: none"><li>• Apply foundational knowledge and skills in game development principles and practices.</li><li>• Develop and optimize 2D games using Unity, including scripting and asset creation.</li><li>• Create and refine 3D games in Unity, focusing on advanced scripting and 3D asset integration.</li><li>• Implement the core concepts and tools of Unreal Engine for game development.</li><li>• Design and build interconnected digital landscapes, incorporating metaverse elements and advanced technologies such as VR, AR.</li></ul>

**Course Duration:** 45 Hours

### **Course Content:**

#### **Unit 1 - Introduction to Game Development**

Overview of game development process and industry landscape - Introduction to Unity and setting up development environment -Basics of game design principles and mechanics - Quick dive into scripting with C# for Unity

#### **Unit 2 - 2D Game Development with Unity**

Creating sprites and animations - Implementing 2D physics and collision detection - Scripting game logic in C# - Designing user interfaces and integrating sound effects

### Unit 3 - 3D Game Development with Unity

Transitioning to 3D environments - Working with 3D models, textures, and lighting  
- Advanced scripting techniques for 3D interactions - Optimization for performance and mobile platforms

### Unit 4 - Unreal Engine Fundamentals

Introduction to Unreal Engine interface and workflow -Blueprint visual scripting for rapid prototyping - Building 3D environments and landscapes - Introduction to materials, particles, and animations - Translate real-world environments into digital 3D landscapes using Unreal Engine, with a focus on creating immersive metaverse-compatible experiences.

### Unit 5 - Crafting the 3D Universe with Metaverse Integration

Explore virtual reality applications and tools for metaverse development, experimenting with spatial computing and augmented reality overlays - Collaborate on the design of interconnected metaverse environments, considering factors such as scalability, cross-platform compatibility, and user accessibility.

#### Test Projects:

#### Use Cases:

MODULE-WISE USECASES		
Module name	Use case	Objective and implementation
Introduction to Game Development	Retro Arcade Revival	<ul style="list-style-type: none"><li>• <b>Objective:</b> To develop a mini-game prototype inspired by classic arcade games, demonstrating the basic game design principles and mechanics learned during the course.</li><li>• <b>Implementation:</b> Students will work in small teams to design and develop a mini-game prototype using Unity. They will implement simple game mechanics, such as player movement, collision detection, and scoring systems, while adhering to principles of user experience design. Each team will present their prototype, showcasing their skills in Unity basics and C# scripting for game development.</li></ul>
2D Game Development with Unity	Infinite Escape	<ul style="list-style-type: none"><li>• <b>Objective:</b> To create an endless runner game that incorporates 2D physics, dynamic obstacles, and</li></ul>

		<p>procedural level generation, showcasing proficiency in 2D game development with Unity.</p> <ul style="list-style-type: none"> <li>• <b>Implementation:</b> Students will work individually to design and develop an endless runner game using Unity. They will create sprite-based characters and obstacles, implement physics-based movement and collision detection, and script game mechanics such as score tracking and power-ups. Additionally, students will focus on designing intuitive user interfaces and integrating sound effects to enhance the gaming experience.</li> </ul>
Game Development with Unity	Virtual Combat Zone	<ul style="list-style-type: none"> <li>• <b>Objective:</b> To develop a first-person shooter (FPS) game with immersive 3D environments, realistic gun mechanics, and challenging enemy AI, showcasing proficiency in 3D game development with Unity.</li> <li>• <b>Implementation:</b> Students will work in teams to design and develop a FPS game using Unity. They will create 3D models for weapons, environments, and characters, applying textures and lighting to enhance realism. Students will script player controls, weapon mechanics, and enemy behaviors using advanced C# scripting techniques. Additionally, they will focus on optimizing the game for performance and ensuring compatibility with mobile platforms.</li> </ul>
Unreal Engine Fundamentals	Open-World Exploration Game Development	<ul style="list-style-type: none"> <li>• <b>Objective:</b> To create an open-world exploration game with vast landscapes, dynamic weather systems, and interactive NPCs, showcasing proficiency in Unreal Engine fundamentals.</li> <li>• <b>Implementation:</b> Students will individually develop an open-world exploration game using Unreal Engine. They will design expansive landscapes, populate them with detailed 3D assets, and implement dynamic weather and day-night cycles. Using Blueprint visual scripting, students will create interactive NPCs with dialogue systems and quest mechanics. Additionally, they will experiment with materials, particles, and animations to enhance the visual fidelity of the game.</li> </ul>
Crafting the 3D Universe with	Immersive Metaverse Oasis	<ul style="list-style-type: none"> <li>• <b>Objective:</b> To create a virtual reality (VR) experience set in a metaverse-compatible</li> </ul>

Metaverse Integration		<p>environment, demonstrating integration of real-world elements.</p> <ul style="list-style-type: none"><li>● <b>Implementation:</b> Students will collaborate to develop a VR experience using Unreal Engine, focusing on creating immersive environments that seamlessly blend real-world elements with digital assets. They will experiment with spatial computing and augmented reality overlays to enhance user immersion.</li></ul>
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