

CSE434:GAME DEVELOPMENT IN 3D

L:3 T:0 P:2 Credits:4

Course Outcomes: Through this course students should be able to

CO1 :: apply 3D modelling and procedural environment generation concepts for game development

CO2 :: develop games with different themes and levels by adding control functions and AI-driven behaviors

CO3 :: write interactive gameplay using advanced Unity scripting and design patterns

CO4 :: analyze various game components, materials, and lighting using Shader Graph and URP/HDRP workflows

CO5 :: evaluate and design user interface elements for immersive and interactive game experiences (VR/AR)

CO6 :: construct and develop storytelling-based game designs using Cinemachine, Timeline, and AI-generated assets

Unit I

Working in Unity 3D : Working in 3D Space, Adding Behaviors, Working in Unity Particles(Materials, Lightening, Audio and Camera Positioning), Shader Graph-based Lighting, Cinemachine for Camera Control

Unit II

Player Controls and Positioning : Game Manager Physics, Gameplay components, Objects in 3 D game kit, Advanced Input System, Event Handling, Animation Rigging

Unit III

3D concepts for game play : Controller, Procedural Terrain Generation and AI-driven Game Elements

Unit IV

Programming : Scripting language, Game Architecture Patterns (State, Singleton, Observer), Scriptable Objects

Unit V

Gameplay components : Game creation in 3D, Adding Enemy to the game, AI Behavior Trees, Timeline-based Cutscenes, Immersive Storytelling

Unit VI

Working with Navmesh : Basics of Navmesh, Path finding using Navmesh, Multiplayer Game Development using Photon/Unity Netcode, Optimization Techniques

List of Practicals / Experiments:

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- Working with Unity Interface
- Create a Game scene in unity 3D
- Use terrain to create game scene with effects
- Add 3DPhysics to Game scene
- Use Prefab to game scene
- Add first person and third person controller to game scene.
- Use of scripting language in game scene with AI concept
- Create Procedural Terrain and AI-driven NPCs using ML-Agents
- Develop a Cinematic Scene using Timeline and Cinemachine
- Build a Simple Multiplayer Scene using Photon/Unity Netcode

References:

1. BUILDING A GAME WITH UNITY AND BLENDER by LEE ZHI ENG, PACKT PUBLISHING

References:

2. UNITY GAME OPTIMIZATION by DR. DAVIDE AVERSA, PACKT PUBLISHING