TECHNOCATION FREELANCING TRAINING INSTITUTE & SOFTWARE HOUSE

Professional Game Development Course Outline

Module 1: Introduction to Game Development

- Overview of Game Development Industry
- Types of Games (2D, 3D, Mobile, Console, AR/VR)
- Understanding Game Engines (Unity, Unreal Engine, Godot)
- Game Development vs. Game Design
- Setting Up the Development Environment

Module 2: Game Programming Fundamentals

- Programming Languages for Game Development (C#, C++, Python)
- Object-Oriented Programming (OOP) Concepts in Game Development
- Game Loops, Update Cycles & Performance Optimization
- Handling Input (Keyboard, Mouse, Game Controllers)

Module 3: Game Physics & Mechanics

- Introduction to Game Physics (Gravity, Collisions, Rigidbodies)
- Using Physics Engines (Unity Physics, Unreal Physics, Box2D)
- Implementing Character Movement & Animation
- AI Pathfinding with NavMesh & A* Algorithm
- Advanced Physics (Ragdoll, Cloth, Destruction Effects)

Module 4: Game UI & HUD Design

- Designing In-Game Menus & HUDs
- Health Bars, Scoreboards & Timers
- UI Animation & Transitions
- Mobile & Console-Friendly UI Design

Module 5: 2D & 3D Game Development

- Creating 2D Games with Sprites, Tilemaps & Parallax Scrolling
- 3D Game Development (Meshes, Materials, Textures, Lighting)
- Animation Techniques (Skeletal Animation, Keyframe Animation)
- Implementing First-Person & Third-Person Camera Controls

Module 6: Audio & Sound Effects

- Working with Background Music & Sound Effects
- Using Audio Engines (FMOD, Wwise)
- Spatial Audio & 3D Sound Implementation
- Voice Acting & Dialogue Systems

Module 7: Multiplayer & Networking in Games

- Introduction to Multiplayer Game Development
- Using Photon, Mirror & Unreal Netcode for Online Games
- Implementing Peer-to-Peer & Dedicated Server Networking
- Real-Time Synchronization & Lag Compensation

Module 8: Artificial Intelligence (AI) in Games

- NPC Pathfinding & Behavior Trees
- Enemy AI & Attack Patterns
- Implementing AI for Strategy & Racing Games
- Machine Learning in Games

Module 9: Game Optimization & Debugging

- Reducing Load Times & Improving FPS
- Memory Management & Performance Tuning
- Profiling & Debugging Tools in Unity/Unreal Engine
- Level of Detail (LOD) & Occlusion Culling

Module 10: Augmented & Virtual Reality (AR/VR) Games

- Introduction to AR/VR Development
- Setting Up AR Games with ARCore & ARKit
- Developing VR Games for Oculus, HTC Vive & PlayStation VR
- Interaction & Physics in AR/VR

Module 11: Monetization & Game Publishing

- Monetization Strategies (Ads, In-App Purchases, DLCs)
- Publishing on Steam, Google Play Store, Apple App Store
- Marketing & Community Building for Games
- Game Licensing & Intellectual Property Rights

Module 12: Capstone Project & Certification Preparation

- Developing a Complete Game from Concept to Release
- Best Practices for Game Design & Development
- Preparing for Unity, Unreal Engine, or Game Development Certifications
- Career Paths in Game Development (Indie Developer, AAA Studio, Freelancing)