MIXED REALITY (AR & VR) WITH UNITY 3D (Microsoft HoloLens)

1. **INTRODUCTION TO Mixed Reality (AR & VR)**

   - What is Virtual Reality (VR)
   - What is Augmented reality(AR)
   - What is Mixed Reality
   - Modern VR/AR experiences
   - History

2. **OVERVIEW**

   - Hardware
   - Software
   - Interaction fundamental

3. **Types of Holographic Apps**

   - Enhanced environment apps
   - Virtual environment apps
   - Blended environment apps

4. **Introduction to Unity 3D**

   - Getting to Know the Unity Editor
     - The Project Dialog
     - The Unity Interface
     - The Project View
     - The Hierarchy View
     - The Inspector View
     - The Scene View
     - The Game View
     - Honorable Mention: The Toolbar

   - Navigating the Unity Scene View
     - The Hand Tool
     - Flythrough Mode

5. **Game Objects**

   - Dimensions and Coordinate Systems
     - Putting the D in 3D
     - Using Coordinate Systems
     - World Versus Local Coordinates

- Game Objects

- Transforms
    - Translation
    - Rotation
    - Scaling
    - Hazards of Transformations
    - Transforms and Nested Objects

6. Models, Materials, and Textures

- The Basics of Models
    - Built-In 3D Objects
    - Importing Models
    - Models and the Asset Store
- Textures, Shaders, and Materials
    - Textures
    - Shaders
    - Materials
    - Shaders Revisited

7. 3D Terrain

- Terrain Generation
    - Adding Terrain to Your Project
    - Heightmap Sculpting
    - Unity Terrain Sculpting Tools
- Terrain Textures
    - Importing Terrain Assets
    - Texturing Terrain

8. Environments

- Generating Trees and Grass
    - Painting Trees
    - Painting Grass
    - Terrain Settings
- Environment Effects
    - Skyboxes
    - Fog
    - Lens Flares
    - Water
- Character Controllers
    - Adding a Character Controller
    - Fixing Your World

9. Lights and Cameras

- Lights
    - Point Lights
    - Spotlights
    - Directional Lights
    - Creating Lights Out of Objects
    - Halos
    - Cookies
- Cameras
    - Anatomy of a Camera
    - Multiple Cameras
    - Split Screen and Picture in Picture
- Layers
    - Working with Layers
    - Using Layers

10. Game 1: Amazing Racer

- Design
    - The Concept
    - The Rules
    - The Requirements
- Creating the Game World
    - Sculpting the World
    - Adding the Environment
    - The Character Controller
- Gamification
    - Adding Game Control Objects
    - Adding Scripts
    - Connecting the Scripts Together
- Playtesting

11. Scripting—Part 1

- Scripts
- Creating Scripts
- Attaching a Script
- Anatomy of a Basic Script
- The Using Section
- The Class Declaration Section
- The Class Contents
- Variables
- Creating Variables
- Variable Scope
- Public and Private
- Operators
- Arithmetic Operators
- Assignment Operators

- Equality Operators
- Logical Operators
- Conditionals
- The if Statement
- The if / else Statement
- The if / else if Statement
- Iteration
- The while Loop
- The for Loop

12. Scripting—Part 2

- Methods
- Anatomy of a Method
- Writing Methods
- Using Methods
- Input
- Input Basics
- Input Scripting
- Specific Key Input
- Mouse Input
- Accessing Local Components
- Using GetComponent
- The Transform
- Accessing Other Objects
- Finding Other Objects
- Modifying Object Components

13. Collision

- Rigidbodies
- Collision
    - Colliders
    - Physics Materials
- Triggers
- Raycasting

14. Prefabs

- Prefab Basics
    - Prefab Terminology
    - Prefab Structure
- Working with Prefabs
    - Adding a Prefab Instance to a Scene

    - Inheritance
    - Instantiating Prefabs Through Code

15. User Interfaces

- Basic UI Principles
- The Canvas
    - The Rect Transform
    - Anchors
    - Additional Canvas Components
- UI Elements
    - Images
    - Text
    - Buttons
- Canvas Render Modes
    - Screen-Space Overlay
    - Screen-Space Camera
    - World Space

16. Particle Systems

- Particles
    - Unity Particle Systems
    - Particle System Controls
- Particle System Modules
    - Default Module
    - Emission Module
    - Shape Module
    - Velocity over Lifetime Module
    - Limit Velocity over Lifetime Module
    - Collision Module
    - Sub Emitter Module
    - Texture Sheet Module
    - Renderer Module
- The Curve Editor

17. Animations

- Animation Basics
    - The Rig
    - The Animation
- Animation Types
    - Creating the Animation
- Animation Tools
    - Animation Window
    - Creating a New Animation
    - Record Mode
    - The Curves Editor

18. Animators

- Animator Basics
    - Rigging Revisited
    - Importing a Model
- Configuring Your Assets
    - Rig Preparation
    - Animation Preparation
- Creating an Animator
    - The Animator View
    - The Idle Animation
    - Parameters
    - States and Blend Trees
    - Transitions
- Scripting Animators

19. Audio

- Audio Basics
    - Parts of Audio
    - 2D and 3D Audio
- Audio Sources
    - Importing Audio Clips
    - Testing Audio in the Scene View
    - 3D Audio
    - 2D Audio
- Audio Scripting
    - Starting and Stopping Audio
    - Changing Audio Clips

20. Game Coin Collection

- Design
    - The Concept
    - The Rules
    - The Requirements
- The Arena
    - Creating the Arena
    - Texturing
    - Finish the Arena
- Game Entities
    - The Player
    - Coins
    - The Colored Coins
- The Control Objects
    - The Goals
    - The Game Controller
- Improving the Game

21. Publish and Deploy

- Managing Scenes
  - Establishing Scene Order
  - Switching Scenes
- Persisting Data and Objects
  - Keeping Objects
  - Saving Data
- Unity Player Settings
  - Cross-Platform Settings
  - Per-Platform Settings
- Building Your Game
  - Build Settings

22. Unity Integration with MR (Microsoft HoloLens)

- Introduction to Microsoft HoloLens with Emulator
- Working with Microsoft HoloLens SDK
- Understanding Holograms Gaze, Gesture and voice control
- Creating Spatial Mapping using Hololens
- Implement a user interface in Mixed Reality
- Build and Share Projects from Unity3D

Note – This course does not cover Scripting in unity with C# or JavaScript's – This course uses pre built Scripts / Examples for additional functionalities.