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

6. Models, Materials, and Textures

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

7. 3D Terrain

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

8. Environments

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

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

10. Game 1: Amazing Racer

• Design
  o The Concept
  o The Rules
  o The Requirements
• Creating the Game World
  o Sculpting the World
  o Adding the Environment
  o The Character Controller
• Gamification
  o Adding Game Control Objects
  o Adding Scripts
  o 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
  o Colliders
  o Physics Materials
• Triggers
• Raycasting

14. Prefabs

• Prefab Basics
  o Prefab Terminology
  o Prefab Structure
• Working with Prefabs
  o 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.