CCBP TECH 4.0

VR & AR Developer

XR technologies are on the verge of disrupting our lifestyles. In this program, you'll learn how to create realistic augmented and virtual worlds by mastering C# scripting and advanced features in Unity. You'll also learn the industry's best practices to build 2D and 3D applications, and highly engaging games.

Introduction to AR, VR & Game Development

Start creating your own AR, VR applications and games using tools like construct2, A-Frame and Spark AR Studio. Get comfortable with gentle codeless introductions and quickly learn to create apps and games from scratch.

Building Games

- Setting up gameobject
- Adding Hero, obstacle and goal
- Adding moving enemies
- Adding platforms
- Designing levels
- Controlling player with mouse
- Adding shooter gameobject
- Adding shooting mechanics for the player
- Having score computing system
- Adding background and scrolling effect
- Creating winning screen
- Making it Multiplayer
- Computing and showing the score for both the players

AR with Spark AR Studio

- Creating filters and masks
- Adding effects like VHS, dust, scratches
- Creating an immersive particle effect
- Working with textures and materials
- Animating 3D objects in real world
- Face Tracking Effect and Iris Tracking
- Responding to Facial Movement
- Face Gestures

Create apps for WebVR with A-Frame

- Going through A-Frame examples
- Start with scene and transform the objects
- Importing and displaying 3D models
- Adding Textures
- Using animations
- Interaction with the objects
- Teleportation
- Using and modifying the controls
- Playing video and audio
- Controlling entities with Javascript
- Testing WebVR scenes

Course Project
Rabbit Coder

Build Rabbit Coder, an augmented reality puzzle game where you need to help the rabbit get to the carrot using Spark AR.

C# Scripting Fundamentals in Unity

Computer programming is fun in general and programming games is even better! Master the foundations of C# scripting in Unity and script your first game development project.

Basics of C#

- Data types, Variables and Constants
- Conventions and Syntax
- Conditional Statements & Operators
  - If, else
  - Switch Statements
  - Ternary Operator
- Loops
- Arrays, Lists and Dictionaries
- Functions
- Scope and Access Modifiers

Classes and Namespaces

- Static Class
- Partial Class
- Nested Class
- Inheritance

About MonoBehaviour

- Awake and Start
- Update and FixedUpdate
- Enabling and Disabling Components
- Destroy

Gameobject and Transform

- Activating GameObject
- Translate and Rotate
- GetComponent
- Instantiate

Reading Inputs

- GetButton and GetKey
- GetAxis
- Mouse and Pointer Functionalities

Vector Maths

- Vector Arithmetic
- Dot and Cross Products
- Computing Normal vector
- Projecting one vector onto the other

Adding Movement

- Linear Interpolation
- DeltaTime
- Invoke
- Enumerations
- Quaternions

Advanced C# Scripting

Hone your coding skills to create realistic game worlds and behaviours with advanced scripting in C#. Understand complex C# constructs and advanced features that are used to build real-world applications.

More about Classes and Methods

- Creating Properties
- Method Overloading
- Overriding
- Interfaces
- Extension Methods
- Coroutines
- Abstract Classes
- Delegates and Events
- Statics
- Generics
- Member Hiding
- Object Pools
- Attributes
- LINQ
- Lambda Expressions
- Asynchronous Programming with Async / Await

Data Structures

- Linked Lists
- Stacks, Queues
- Trees

Design Patterns for App Developers

- Singleton
- Game Loop and Update Method
- Observer, Mediator, Template

Selected topics in C#

- Exception handling
- Text Files Streaming Assets
- Playerprefs
- Editor Scripting
- Scriptable Objects
- C# Job System
- Entity Component System

Fundamentals of 3D Application Development

Start your journey into 3D Application Development. By the end of this course, you'll get a strong grasp of the fundamentals needed to build functional 3D applications and games using the Unity 3D engine.

Working in 3D Space

- Unity Editor Basics
  - Creating a 3D unity project
  - Walkaround of Unity Windows
  - Using Tools
- Gameobjects and Assets
  - Creating and Positioning gameobjects
  - Importing Assets into a Project
- Prefabs
  - Configure Prefabs for use throughout a scene
  - Nested Prefabs
  - Prefab Variants

Setting Up the Scene

- Camera Setup
- About Skybox
- Adjusting Lighting
  - Light Sources

Preparing Assets for Implementation

- Creating and Using Materials
- Importing and Using Textures
  - Types of Shaders
  - Texture size best practices
- Adding Textures
- Meshes and Mesh Renderers

Play Music In Your App

- Audio Listener
- Audio Source

Customizing the UI

- Unity UI Components
  - Canvas and Panel
  - Button and Toggle
  - Sprites and Image
  - TextMesh Pro and Input Field
  - Slider and Scroll View
- Design UI for Multiple Resolutions
  - Layouts
  - Content Size Fitters

Learn Unity's Physics System

- Rigidbody
- Understanding Collisions
- Colliders and Triggers
- Velocity, Force
- Torque
- Raycast

Controlling Animation

- Animator Setup
  - Controller
  - State Machine
  - Scripting
- Animation Clips

Navigation and Pathfinding

- Navigation System in Unity
- Navmesh Agents
- Building and Baking Navmesh

Building to devices

- Build Settings
- Project Settings
  - Audio
  - Editor
  - Graphics
  - Physics
  - Quality
  - Time
- Different platforms
  - Android, iOS
  - Windows, Mac, Linux

Course Project
The Saviour

Build a 3D Game where the player's mission is to safeguard the citizens from alien invasion while protecting himself. You'll need to use simple game mechanics, health and damage, spawners and user interface.

Mastering 3D Application Development

Take your 3D application development skills to the next level by understanding how to use advanced features like lighting, animations, cinematics, and multiplayer etc available within the Unity engine.

Cameras and Effects

- Field of View
- Occlusion Culling
- Adding Effects
  - Particle Systems
  - Writing Custom Shaders
  - Post Processing
  - Render Pipelines
- More about Lighting
  - Shadows
  - LightMapping
  - Reflection and Light Probes
  - Realtime Global Illumination
- Using More than one Camera
- Visual Effects Components
  - Lens Flare
  - Line Renderer
  - Trail Renderer
  - Billboard Renderer
  - Projector
- About ColorSpace
  - Linear
  - Gamma workflow and Textures

Advanced Audio

- Audio Mixer
- Audio Spatializer
- Audio Filters
- Ambisonic Audio

Importing settings

- Importing Animations
- Importing Models

Advanced Physics System

- Joints
- Physics Material
- Character Controllers
- Multi-scene Physics

Adding Constraints

- Using Parent
- About LookAt, Aim etc

Creating Environments

- Creating and editing Terrains
- Trees and Tree Editor

Adding 3D art and Animations

- Editing Animation Clips - Adding events and curves
- Humanoid and Non Humanoid Animations
- Avatar
- Rig
- Animator Controller Layers
- Avatar Mask
- Blend Trees
- Inverse Kinematics

Using Navmesh and PathFinding

- Off-Mesh links
- Obstacles
- Navmesh Area
- Coupling Animation and Navigation

Multiplayer Games and Apps

- Multiplayer Overview
- Setting up a multiplayer project
- Using the Network Manager
- Multiplayer APIs

Powering Cameras with Cinemachine

- Using Virtual Cameras
- Cinemachine Brain
- 2D graphics
- Cinemachine Impulse

Create Cinematic content using Timeline

- Using the Timeline window to record basic animation
- Timeline Preview and Timeline Selector
- Timeline Inspector
  - Setting Timeline Properties
  - Setting Track Properties
  - Setting Clip Properties
- Timeline Playback Controls
- Track List and Track Headers

Performance and Optimization

- About Profiler
- Using Frame Debugger
- Diagnosing and Fixing Performance Problems
- Optimising Physics Performance
- Optimising Graphics Performance
- Optimising Unity UI
- Memory Optimisation
- Reducing file size of build

Course Project
Counter Strike

Build 3D games like Counter Strike, where two teams compete in game modes to complete objectives, such as securing a location to plant or defuse a bomb and rescuing or guarding hostages.

Building 2D Apps with Unity

Make your dream 2D games and applications using Unity engine by mastering features like sprites and 2D Physics and animations.

Unity for 2D

- Editor basics for 2D
- 2D Sorting

Using Sprites

- Sprite Renderer
- Sprite Editor
- Sorting groups
- Slicing Sprites
- Sprite Mask
- Sprite Atlas
- Tilemaps
- Sprite sheet animations

Learn How to Use 2D Physics

- Rigidbody 2D
- Colliders 2D
- Physics Material 2D
- Joints 2D
- Effectors 2D

More about 2D apps

- Types of 2D games
- 2D Skeletal Animations
- Mobile and Touch Input
- Optimising Mobile Applications

Course Project

Flappy Bird and Super Mario

Build childhood games like Flappy Bird and Super Mario. You'll need to deal with game characters, physics, enemies, power-ups and backgrounds.

Creating Virtual Reality Applications

Do you want to create your dream world and make others immerse in it? By the end of this course, you'll become a professional VR developer by learning how to build immersive VR experiences with the latest hardware including Oculus Quest and Vive Cosmos.

Mobile VR App Development

- Headset tracking
- Controller tracking
- Retrieving performance information
- Controller Input and Output
- Transforming Coordinates
- Unity XR APIs
- Using Google Cardboard
- Interaction in Mobile VR
- Locomotion in Mobile VR

Building for different VR Platforms like Oculus Rift, Oculus Quest, HTC Vive etc

- Unity VR Interaction Toolkit
- Importing Integration SDKs and Package
- Setting up Device
  - Defining Play Area for Tracking
  - User Orientation
  - Positional and Rotational Tracking
  - Head Tracking
  - Controllers And Custom Hands
- Moving around in VR - Teleportation
- Interacting with Objects in VR
- UI Interaction in VR
- How to build, deploy and run?
- Optimizing VR app based on hardware support

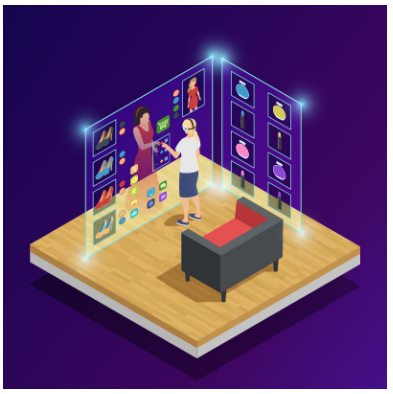
360 Video and VR

- 3-DoF and 6-DoF
- Equirectangular Projection
- Cubemaps
- VR Cameras
- Spatial Audio

Course Project
Escape Room

Build Escape Room, a VR prototyping environment and navigation with VR controller, where the player needs to escape the room by sequence of magical actions. You will need to use physics, visual effects in VR etc.

Creating Augmented Reality Applications



Want to learn how to blend the real with the virtual? Learn how to build the best Augmented Reality experiences with hands-on training using AR development platforms including ARCore, ARKit, Vuforia.

Introduction to AR

- What is AR?
- Applications and Domains

AR Basics

- Tracking in AR
  - Outside-in tracking
  - Inside-out tracking
  - Motion tracking
- Feature points
- Plane-finding
- Estimation of Light
- Interface issues
- Power and size constraints in AR
- Limitations of Computer Vision
- Image recognition
  - 2D Image Recognition and Tracking
  - 3D Object Recognition and Tracking
- Occlusion and shading constraints

ARCore

- Surface detection
- Creating planes
- User interaction: pose and hit-testing
- Anchor points
- Occlusion
- Matching virtual light to real light
- Multi-plane detection
- Spatial mapping
- Processing needs in mobile AR
- Create 3D assets for AR with tools like Google Poly and Unity
- SLAM (Simultaneous Localization and Mapping)

AR development plugins in Unity

- ARKit
- Magic Leap XR Plug-in on Magic Leap
- Windows XR Plug-in on HoloLens
- Vuforia
- Wikitude SDK

Augmented Reality with Geolocation

- Mobile GPS
- Compass functions

Course Project
Mini Pokemon Go

Build an app like Pokemon Go using Augmented reality, where the player needs to walk right up to a virtual pokemon in real world, and catch it by throwing poke ball.

Contact us

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