



# A Basic course in Digital Game Development using Unity

# **General Information**

Course registration fee: €195/student €175 Dates: March: 4; 5; 11; 12; 18; 25; 26 April: 1; 2; 8 Venue: Computer Lab, Institute of Digital Games, University of Malta

A Basic Course in Digital Game Development using Unity is being organised by Malta University Consulting Ltd in collaboration with the Institute of Digital Games, University of Malta.

## Who should attend

Everybody who wants to learn how to make digital games using Unity, one of the leading game engines on the market. The participants will also learn programming from first principles, so programming knowledge is not a prerequisite for this course.

#### **Learning outcomes**

- Knowledge of the workflow required to build games, both in 2D and 3D
- Basics of programming
- Proficiency in using the Unity game engine
- Using images, 3D models, and audio as assets for a game
- Creating animations in Unity

#### **Benefits to you**

This course will give you a head start in the booming digital games industry. It is a first step for those who would like to work in this industry. You will learn to use Unity, which is one of the most popular game engines available, and which can publish games on multiple platforms, such as mobile devices (Android, iOS, Windows, Blackberry), and computers (Windows, Mac, Linux).

## **Course delivery**

The first part of the course is intended to demonstrate the basic concepts of game development, and also to familiarise the participants with the Unity interface. It will also, through the use of hands-on exercises, show the basic principles and tools of this game engine.

The second part of the course focuses more on programming, starting with the most fundamental syntax rules, and moving on to explain how to write the scripts required to create game mechanics in the Unity engine.

In both parts of the course, the basic theories will first be covered by the tutor, and then the participants will work hands-on with practical examples and projects.

**Course Tutor:** Mr Marvin Zammit has recently opened a local digital game development studio that produces indie games for the international market, following his interest in the subject and attendance to a number of software programming courses in this field. He is a visiting lecturer at the Faculty of Engineering of the University of Malta, lecturing modules on electronics, and holds a Bachelors and Masters degree in Physics from the same University. He has also lectured Information and Technology and Systems modules at STC Training. Previously, he spent 13 years working at Methode Electronics Malta Ltd as Product Development Principal of the Electronics Division.

# Part 1: Familiarisation with Unity

# Session 1

- Games categorisation, game mechanics and planning
- Introduction to the Unity game engine
- Starting a new project 2D vs 3D
- The interface
  - Toolbar
  - The Scene View
  - The Project View
  - The Hierarchy View
  - The Inspector
  - The Game View
  - Customisation
- Assets
- Scenes
- Game Objects
- Components and Scripts
- Prefabs and instances
- Parent-Child relationships

## Session 2

- Cameras
- Materials, Textures, and Shaders
- Rigid Bodies and the Physics Engine
- Collision detection
- Layers and tags
- Terrain
  - Creating Terrain
  - Detailing Terrain
  - Texturing Terrain
  - Creating your own terrain
- Lighting
- Render Settings

#### **Session 3**

- Importing Graphics and Models
- Audio
  - Listeners and sources
  - 2D and 3D sounds
  - Music and sound effects
  - Importing audio file
- Animation
  - Mecanim vs Legacy systems
  - Animation States and Controllers (Mecanim)
  - Animation events
- The GUI overlay
- Deploying games on multiple platforms

# Part 2: General Concepts of Programming for Unity

#### **Session 4**

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- Object Oriented Languages and Classes
  - Creating Scripts in Unity
- Basics
  - Basic Data Types
  - Operators
  - Variables
  - Constants
  - Typecasts
- Conditionals, Branching and Looping
  - If Else Statements
  - Switch Statements
  - While and Do While Loops
  - For Loops
  - Break and Continue

# Session 5

- Basics of Structures and Classes
  - Classes and Structures
  - Values and references
  - Members and Methods
  - Constructors, Destructors (and how they relate to Unity)
  - Scope
  - Inheritance
  - Access Levels
  - Static Members
  - Properties

## Session 6

- Advanced Topics
  - a. Basic Polymorphism
  - b. Virtual functions and Overrides
  - c. Objects
  - d. Arrays
  - e. Strings

## Session 7

- The MonoBehaviour class structure
- The update functions
- Initialisation functions
- Variables and the Inspector View
- Capturing Input

#### **Session 8**

- Accessing Components
- Communicating with other GameObjects
- Positions, rotations, velocities and forces
- Instantiating GameObjects

# Session 9

- Animation
- Collisions and triggers
- Audio

# Session 10

- Coroutines
- Programming the GUI