

**NIRMA UNIVERSITY**

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| <b>Institute:</b>            | Institute of Technology  |
| <b>Name of Programme:</b>    | BTech CSE, Integrated BTech (CSE)-MBA,<br>BTech CSE (Artificial Intelligence & Machine Learning) |
| <b>Course Code:</b>          | XXXX   |
| <b>Course Title:</b>         | Introduction to Game Development   |
| <b>Course Type:</b>          | Department Elective-I  |
| <b>Year of Introduction:</b> | 2024-25  |

| L | T | Practical Component |    |   |   | C |
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**Course Learning Outcomes (CLO):**

At the end of the course, the students will be able to –

1. infer the design principles of the gaming application (BL2)
2. make use of audio and visual effects in game development (BL3)
3. recommend architectural design using the game development process (BL6)
4. develop games using various game engines. (BL6)

| Unit     | Contents  | Teaching Hours (Total 45) |
|----------|---|---------------------------|
| Unit-I   | <b>Introduction to gaming:</b> Introduction and History of Games. Game Development Methodologies. Introduction to Game Design Process, Deconstructing Classic games. Understanding the rules of the classic games.  | 06                        |
| Unit-II  | <b>Basics of Game Designing:</b> 2D environment - Form and Shape, Anatomy and Proportions, Perspective, Breaking Down Color, Lighting and Shading. 2D background - Form and Shape - Anatomy and Proportions Perspective - Breaking Down Color - Lighting and Shading - 2D Character Design Primitives – Textures - creating face – expressions – anatomy - body parts – cartoon making. Introduction to Unity Game Engine, Intro to Tools & navigation, Terrain system in Unity, Camera control in Unity, Scene Navigation, Project setting / Player setting, Game publishing using Unity | 09                        |
| Unit-III | <b>UI and UX:</b> 2D Platformer builds with assets. Intro to C# programming in Unity Constants and variables, Integers, Floats and Strings, Arrays and Lists, Arithmetical operators, using if statements, writing while statements, writing for statements, & all Other Basic C# Concepts in Unity   | 10                        |
| Unit-IV  | <b>Effects: Lighting &amp; Shading in Unity:</b> Material & texturing in Unity, Physics Lighting and Rendering in Unity. Audio in Unity: Working with Audio Source, Working with Audio Listener   | 10                        |
| Unit-V   | <b>3D Designing:</b> Developing 3D Game using Unity Engine Exporting Assets from 3D Software, Different Types of cameras in Unity, Character Navigation, 3rd Person Camera movement, Creating Enemy characters runtime, Animation control in Unity, Graphic User Interface in Unity, Assigning Properties & Methods for player, Build Simple Artificial Intelligence for enemy character  | 10                        |

**Game Deployment:** Usage of appropriate APIs, Containers, and cloud platforms for the deployment of developed games.

**Self-Study:**

The self-study contents will be declared at the commencement of the semester. Around 10% of the questions will be asked from self-study contents

**Suggested Readings/ References:**

1. Hocking, Joseph, Unity in action: multiplatform game development in C, Simon and Schuster.
2. Aversa, Davide, Unity Artificial Intelligence Programming: Add powerful, believable, and fun AI entities in your game with the power of Unity, Packt Publishing Ltd,
3. Tynan Sylvester Jaffal Y, Designing Games, A Guide to Engineering Experiences: O'Reilly
4. Steve Rabin, Introduction to Game Development, Boston, MA, Charles River Media

**Laboratory Work:**

Laboratory work will be based on the above syllabus with a minimum of 10 experiments to be incorporated. The students in a suitable group size will design and perform one experiment as a part of Laboratory work.

| <b>Sr. No.</b> | <b>List of Experiments/Exercises</b>   | <b>Hours</b> |
|----------------|--|--------------|
| 1              | Installation and Setting up Unity 3D & Creating Your First Project   | 02           |
| 2              | With Unity: Creating – Sprites, Modifying Sprites, Transform, and Object Parenting. Unity: Understanding & Implementation of Collisions, Rigid bodies & Custom collision boundaries. | 02           |
| 3              | Introduction to Audio using Unity – Audio components & Playing a Sound   | 04           |
| 4-5            | Starting with Unity UI- User Interfaces<br>a. Screen Space Overlay<br>b. Screen Space – Camera<br>c. World Space   | 06           |
| 6-7            | Unity Insertion of elements in UI<br>a. The Button<br>b. Text Element<br>c. The Slider   | 06           |
| 8-9            | Creating AR Content with Vuforia.  | 06           |
| 10             | Create a simple rolling ball game in Unity   | 04           |