Lok Jagruti Kendra University
University with a Difference

Diploma in Gaming & Animation

LJ Polytechnic

Course Code: 025110603

Game Design & Development

Programme / Branch Name			Diploma in Gaming & Animation			
Course Name	Game Design & Development				**Course Code**	025110603
Course Type	HSSC	BSC	ESC	PCC	OEC	PEC

Legends: HSSC: Humanities and Social Sciences Courses BSC: Basic Science Courses
ESC: Engineering Science Courses PCC: Program Core Courses
OEC: Open Elective Courses PEC: Program Elective Courses

1. Teaching and Evaluation Scheme

Teaching Hours / Week / Credits				**Evaluation Scheme**			
L	**T**	**P**	**Total Credit**	**CCE**	**SEE (Th)**	**SEE (Pr)**	**TOTAL**
0	0	10	5	50	-	50	100

Legends:
L: Lectures T: Tutorial P: Practical
CCE: Continuous & Comprehensive Evaluation
SEE (Th): Semester End Evaluation (Theory)
SEE (Pr): Semester End Evaluation (Practical)

2. Prerequisites

- ✓ Knowledge of Scripting Language for Game Development.
- ✓ Problem Solving Capabilities.

3. Rationale

Game development has become a significant and growing industry over the past few decades, and its impact can be seen in various aspects of the world. The importance of game development and its impact in the world can be summarized as entertainment, education, military & defense, healthcare as well as social impact. The industry continues to grow and evolve. The major backbone of any game development is applying scripting and game engine fundamentals in a game engine. Hence, game engine fundamentals are an essential part in the journey of game development. This course is designed for developing these skills. The course contains all the fundamentals from basic to advanced needed for game development in game engine. Upon successfully going through the briefed outline of course, learner will be able to develop a game.

4. Objectives

- ✓ The concepts, case studies, principles, and relevant soft skills associated with this course are to be implemented so that the learner is able to,
  - Understand fundamentals of game engine and its working.
  - Apply scripting fundamentals in terms of game development.
  - Integrate all modules / components of a game and test it.

5. Contents

Unit No.	Unit Name	Topics	Learning Outcomes	% Weightage	Hours
1	**Introduction to Game Engine**	1.1. Introduction of Various Game Engines 1.2. Installation & Setup of Game Engine 1.3. Walkthrough of Game Engine Environment 1.4. Navigating Interface 1.5. Game Objects & Types of Light 1.6. Save Scene & Game Mode 1.7. Project Folder Structure	• Basics, types and history of various game engines • Installation of various tools for game development • Walkthrough of Game Engine IDE • Understanding of various game engines	20	28
2	**Scripts & Basic Programming in Engine**	2.1. Creating Scripts & Basic Programming 2.2. Creating Movement Script 2.3. Modify Components from Script 2.4. Guide to Errors & Scripting Reference	• Knowledge of programming fundamentals and its application in game development	20	28
3	**UI in Games**	3.1. UI Basics 3.2. UI Button Inputs 3.3. Taking Continuous Button Inputs 3.4. Physics & Collision Detection	• In-depth knowledge of UI components, inputs, object physics and collision detection in game	20	28
4	**PreFabs & Sounds**	4.1. Introduction to Prefabs 4.2. Introduction to Sounds 4.3. Applying Sounds and Background Scores to Game	• Knowledge of PreFabs and Sounds in game development	20	28
5	**Integration and Game Testing**	5.1. Integrating All Concepts 5.2. Testing a Game	• Hands on experience of game integration and testing	20	28
				Total Hours	**140**

6. List of Practicals / Exercises

The practical/exercises should be properly designed and implemented in an attempt to develop different types of skills so that students can acquire the competencies/programme outcomes. Following is the list of practical exercises for guidance.

Sr. No.	Practical / Exercises	Key Competency	Hours
1	Install, setup and troubleshoot game engine for scripting.	Installation and troubleshooting of IDE & add-ons	4
2	Create a game folder with appropriate structure. Apply various concepts of navigating interface, game objects & types of light, saving a scene.	Knowledge of creating game folder and applying gaming fundamentals	10
3	In a game folder created in above practical, create various scripts by applying basic programming. Also, create a movement script that helps the object to move.	Hands-on experience on various scripts that help in object transformation	14
4	Create scripts that moves, scales, rotates, and transforms the object as per user instruction.	Hands-on experience on various scripts that helps in object transformations and reflections	14
5	In a game folder we have created, modify components from script for various purposes and go through guide for error solving reference.	Knowledge of how generated scripts can be altered for various purposes	14
6	Create a script the covers basic fundaments of game UI. Also, these scripts will have UI button inputs and continuous button inputs.	Knowledge of creating game scripts with UI and button inputs	14
7	Create a script the illustrates the concept of game object physics and collision detection.	Hands-on experience on various scripts that help in object physics and collision detection	14
8	Illustration of concept of PreFabs and its application in game engine.	Knowledge of how PreFabs are implemented in game engine	14
9	Illustration of concept of sounds and its application in game engine.	Knowledge of how sounds are implemented in game engine	14
10	Combine all the concepts implemented in all the practical to produce a simple game.	Knowledge of how a game scripts and components should be integrated in game engine	14
11	Test the produced game and make necessary changes if required.	Hands-on experience on various testing techniques that can be applied to a game	14
		Total Hours	**140**

7. Textbooks

1) C# - The Complete Reference, by Herbert Schildt, Latest Release, McGraw Hill Education.
2) Mastering Game Design with Unity 2021: Immersive Workflows, Visual Scripting, Physics Engine, Game Objects, Player Progression, Publishing, and a Lot More, by Scott Tykoski, Latest Release, BPB Publications.
3) Unity Game Development Cookbook: Essentials for Every Game (Greyscale Indian Edition), by Paris Buttfield-Addison & Jon Manning & Tim Nugent, Latest Release, Shroff/O'Reilly Publishers & Distributors.

8. Reference Books

1) Learning C# by Developing Games with Unity 2021: Kickstart your C# programming and Unity journey by building 3D games from scratch, by Harrison Ferrone, Latest Release, Packt Publishing Limited.
2) Learning C# by Developing Games with Unity 3D Beginner's Guide, by Terry Norton, Latest Release, Packt Publishing Limited.
3) Game Programming with Unity and C#: A Complete Beginner’s Guide, by Casey Hardman, Latest Release, Apress.
4) Hands-On Unity 2020 Game Development: Build, customize, and optimize professional games using Unity 2020 and C#, by Nicolas Alejandro Borromeo, Latest Release, Packt Publishing Limited.

9. Open Sources (Website, Video, Movie)

1) https://learn.unity.com/
2) https://docs.unity3d.com/Manual/index.html
3) https://in.coursera.org/learn/introduction-programming-unity
4) https://www.youtube.com/watch?v=gB1F9G0JXOo
5) https://www.udemy.com/course/the-ultimate-guide-to-game-development-with-unity/
6) https://www.youtube.com/playlist?list=PLSYBX91r-B-QoFxBATZJyle3aXvPtCmLe
7) https://www.udemy.com/course/unitycourse/