GUJARAT TECHNOLOGICAL UNIVERSITY

Bachelor of Engineering

Subject Code: 3174905

Subject Name: Game Development

WEF Academic Year :	2025-26
Semester :	VII
Category of the Course :	Professional Elective - VI

Prerequisite :	**-**
Rationale :	The students will become familiar with the ideas of basics of 2D and 3D graphics for game development, stages of game development, basics of a game engine, gaming development environment and tool kits. Students can learn and develop simple games using Pygame environment.

Course Scheme :

Teaching Scheme			Total Credits	Assessment Pattern and Marks				Total Marks
				Theory		Practical		
L	T	PR	C	ESE (E)	PA(M)	ESE (V)	PA (I)	
3	0	2	4	70	30	30	20	150

Course Content:

Sr. No.	Course Content	No. of Hours	% of Weightage
1	**3D GRAPHICS FOR GAME DESIGN** Genres of Games, Basics of 2D and 3D Graphics for Game Avatar, Game Components – 2D and 3D Transformations – Projections – Color Models – Illumination and Shader Models – Animation -Controller Based Animation.	7	15%
2	**GAME DESIGN PRINCIPLES** Character Development, Storyboard Development for Gaming – Script Design – Script Narration, Game Balancing, Core Mechanics, Principles of Level Design – Proposals – Writing for Preproduction, Production and Post – Production.	9	20%
3	**GAME ENGINE DESIGN** Rendering Concept – Software Rendering – Hardware Rendering – Spatial Sorting Algorithms -Algorithms for Game Engine- Collision Detection – Game Logic – Game AI – Pathfinding.	9	20%
4	**OVERVIEW OF GAMING PLATFORMS AND FRAMEWORKS 6**	7	15%

	Pygame Game development – Unity – Unity Scripts –Mobile Gaming, Game Studio, Unity Single player and Multi-Player games		
5	**GAME DEVELOPMENT USING PYGAME** Developing 2D and 3D interactive games using Pygame – Avatar Creation – 2D and 3D Graphics Programming – Incorporating music and sound – Asset Creations – Game Physics algorithms Development – Device Handling in Pygame – Overview of Isometric and Tile Based arcade Games – Puzzle Games.	10	30%
	Total	**42**	**100**

Reference Book:

1. Sanjay Madhav, Game Programming Algorithms and Techniques: A Platform Agnostic Approach, Addison Wesley,2013.
2. Will McGugan, Beginning Game Development with Python and Pygame: From Novice to Professional, Apress,2007.
3. Paul Craven, Python Arcade games, Apress Publishers,2016.
4. David H. Eberly, 3D Game Engine Design: A Practical Approach to Real-Time Computer Graphics, Second Edition, CRC Press,2006.
5. Jung Hyun Han, 3D Graphics for Game Programming, Chapman and Hall/CRC, 2011.

Course Outcome:

After Completion of the Course, Student will able to:

No	Course Outcomes	RBT Level*
01	Explain the concepts and principles of 2D and 3D computer graphics relevant to game development.	UN
02	Design comprehensive game design documents including character development, storyboards, and game mechanics.	CR
03	Implement core components of a game engine including rendering, collision detection.	AP;
04	Analyze various game development platforms and frameworks such as Unity and Pygame.	AN
05	Develop a 2D/3D interactive game using Python and Pygame, incorporating graphics, sound, and basic physics.	CR

*RM: Remember, UN: Understand, AP: Apply, AN: Analyze, EL: Evaluate, CR: Create

Suggested Course Practical List:

1. Installation of a game engine, e.g., Unity, Unreal Engine, familiarization of the GUI. Conceptualize the theme for a 2D game.
2. Character design, sprites, movement and character control
3. Level design: design of the world in the form of tiles along with interactive and collectible objects.
4. Design of interaction between the player and the world, optionally using the physics engine.
5. Developing a 2D interactive using Pygame.
6. Developing a Puzzle game.
7. Design of menus and user interaction in mobile platforms.
8. Developing a 3D Game using Unreal
9. Developing a Multiplayer game using unity.

MOOCs Courses link:
https://nptel.ac.in

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