COURSE NAME: B.Sc. in Gaming

COURSE STRUCTURE

1ST YEAR

Sl No	Code	Paper	Contact Periods per week			Total Contact Hours	Credits
			L	T	P		
SEMESTER I							
Theory							
1	BGD – 101	Introduction to Game Design and Production	0	3	0	3	3
2	BGD – 102	Game Production Basics	0	3	0	3	3
3	BGD – 103	2D Game Production Advanced	0	3	0	3	3
Practical							
1	BGD – 191	2D Game Production Details	0	0	3	3	3
2	BGD – 192	Logic and Physics & Making UI & UX	0	0	3	3	3
3	BGD – 193	Introduction to C# code in game	0	0	4	4	4
Total						**19**	**19**
SEMESTER II							
Theory							
1	BGD – 201	Making FPS Game & AI	0	3	0	3	3
2	BGD – 202	Database in Game	0	3	0	3	3
Practical							
1	BGD – 291	Making Game Codes	0	0	3	3	3
2	BGD – 292	AI in Game	0	0	3	3	3
3	BGD – 293	3D Character Development Introduction	0	0	3	3	3
4	BGD – 294	Internship & Lab Making Casual 2D Game	-	-	4	4	4
Total						**19**	**19**

2NDYEAR

Sl No	Code	Paper	L	T	P	Total Contact Hours	Credits
			Contact Periods per week			**Total Contact Hours**	**Credits**
			L	**T**	**P**		
		SEMESTER III					
		Theory					
1	BGD – 301	3D Animation	3	0	0	3	3
2	BGD – 302	Game Design and Physics in Game Design	3	0	0	3	3
		Practical					
1	BGD – 391	3D Character Development & Rigging	0	0	3	3	3
2	BGD – 392	Defining Game with Animation	0	0	3	3	3
3	BGD – 393	Advanced AI, Sound & Game Design	0	0	3	3	3
4	BGD – 394	HTML 5 Game	0	0	3	3	3
5	BGD – 395	Internship & Lab Making	0	0	3	3	3
		Total				**21**	**21**
		SEMESTER IV					
		Theory					
1	BGD – 401	Introduction to 3D Play Station Game Programming	-	3	-	3	3
2	BGD – 402	Networking in Game Development	-	3	-	3	3
3	BGD – 403	Introduction to Helper Systems	-	2	1	3	3
4	BGD – 404	Hardware in Game Programming	-	2	1	3	3
5	BGD – 405	Project and Team in Game Development	-	2	1	3	3
		Practical					
1	BGD – 491	Introduction to RPG Game	-	1	2	3	3
2	BGD – 492	Internship & Lab Making	-	-	3	3	3
		Total				**21**	**21**

3RDYEAR

Sl No	Code	Paper	Contact Periods per week			Total Contact Hours	Credits
			L	T	P		
SEMESTER V							
Theory							
1	BGD – 501	Android Game Development	-	4	-	4	4
2	BGD – 502	Software Development Kit	-	4	-	4	4
Practical							
1	BGD – 591	iOS Game Development	-	1	3	4	4
2	BGD – 592	Apple Game Development Framework	-	1	3	4	4
3	BGD – 593	Internship & Lab Making	-	-	4	4	4
		Total				**20**	**20**
SEMESTER VI							
Theory							
1	BGD – 601	Introduction to Virtual Reality	-	3	1	4	4
2	BGD – 602	Introduction to Augmented Reality	-	3	1	4	4
3	BGD – 603	Business and Legal Issues for Video Game Developers	-	3	1	4	4
Practical							
4	BGD – 691	AR Game Development	-	1	3	4	4
5	BGD – 692	XR Game Development	-	-	4	4	4
		Total				**20**	**20**

Detailed Syllabus

SEMESTER-I

Paper: Introduction to Game Design and Production
Code: BGD – 101
Contacts Hours / Week: 3T
Credits: 3

Units	Course Content
Unit 1	What is game development, Different type of game and use cases (FPS, RPG, Racing, Fighting, Casual, Money spinner, Casino, Massively Multiplayer Online (MMO) These games are played over a LAN (local area network) or via the Internet. Simulations. Adventure. Real-Time Strategy (RTS) .Puzzle. Action. Stealth Shooter. Combat) Revert Settings, Launching Your First Project, Importing a Project, Switching Between Projects, Customizing The UI
Unit 2	How to do Navigation, Manipulating Objects (Taking different type of objects, How to create invisible object that hides objects behind it, How to position Game Objects, How to place Light Probes)

Suggested Readings:

1. https://www.udemy.com/unitycourse
2. Fundamentals of Game Design, 3e Paperback – 2015 by Adams (Author)
3. Drawing Basics and Video Game Art: Classic to Cutting-Edge Art Techniques for Winning Video Game Design by Chris Solarski

Paper: Game Production Basics
Code: BGD – 102
Contacts Hours / Week: 3T
Credits: 3

Units	Course Content
Unit 1	Unity production basics: Lighting, materials, effects, etc. What are game levels, why do you need to design game levels, different game levels for different type of games.
Unit 2	Working with 2D (How to make 2D characters, characters from different countries and style, Asian character vs Western character) Making sprites, Working with vector graphics

Suggested Readings:

1. https://www.udemy.com/unitycourse
2. Fundamentals of Game Design, 3e Paperback – 2015 by Adams (Author)
3. https://www.youtube.com/watch?v=EitYC95uew4
4. https://www.gamedev.net/articles/visual-arts/the-total-eginner%E2%80%99s-guide-to-better-2d-game-art-r2959/

Paper: 2D Game Production Advanced
Code: BGD – 103
Contacts Hours / Week: 3T
Credits: 3

Units	Course Content
Unit 1	2D game design pipeline (The market. The audience. The platforms where to publish the game. The competitor, Define te story. Create timelines. Storyboards. Create a paper prototype of your game. Level Design. Game play mechanics. Costs of the game (making and maintenance).Create a game design document.) .
Unit 2	Vector Math in game development (How does game physics work? What is physics simulation? Do you need physics for game design? How does video game code work? What is an engine in a game? what can a vector be useful, How is a vector defined in the game engine, Scalar vector, Use vector to represent a point in space, Orientation of vectors-- Left-hand system vs right-hand system, Multiplications by a scalar, Addition and subtraction, Normal vector, Normalized vector, Cross product, LINEAR INTERPOLATION (LERP)) Use vectors to describe objects and interactions in the game world.(Model space, World coordinate, View space, Coordinate space hierarchy) Play testing, balancing and level design

Suggested Readings:

1. https://www.gamedesigning.org/learn/game-physics/
2. Fundamentals of Game Design, 3e Paperback – 2015 by Adams (Author)
3. https://assetstore.unity.com/packages/templates/2d-platformer-controller-69772
4. https://www.gamedev.net/articles/visual-arts/the-total-beginner%E2%80%99s-guide-to-better-2d-game-art-r2959/
5. https://ostindiegames.wordpress.com/2015/01/16/2d-art-pipeline/

Paper: 2D Game Production Details
Code: BGD – 191
Contacts Hours / Week: 3P
Credits: 3

Units	Course Content
Unit 1	How to make 2D environment (Form and Shape, Anatomy and Proportions, Perspective, Breaking Down Color,Lighting and Shading) Unity 3D Level Design (Primitives, Textures, Creating Trees, Adding Lights , Adjusting Lighting, Particles, Game Controller, Building A Game C# in game development)
Unit 2	How to make 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)

Suggested Readings:

1. https://www.udemy.com/unitycourse
2. Fundamentals of Game Design, 3e Paperback – 2015 by Adams (Author)
3. https://www.youtube.com/watch?v=EitYC95uew4
4. https://www.gamedev.net/articles/visual-arts/the-total-beginner%E2%80%99s-guide-to-better-2d-game-art-r2959/

Paper: Logic and Physics in Game Production & Making UI & UX
Code: BGD – 192
Contacts Hours / Week: 3P
Credits: 3

Units	Course Content
Unit 1	Game physics (How does game physics work? What is physics simulation? Do you need physics for game design? How does video game code work? What is an engine in a game?) Game mechanics - rules and challenges, 2D Platformer Controller. Concept Art, Coloring, Animation.
Unit 2	UI – different UI patterns, Introduction, What Are UI and UX?What Does a Good UI Do? - case study. Games With Poor UIs- bad and good case. Success rates and compilation. Oblivion- case study. Far Cry 3 - case study. Mortal Kombat X- Case Study, Fight of the legends - case study. 2D Platformer – Build with assets.

Suggested Readings:

1. https://gamedevelopertips.com/vector-in-game-development/
2. https://gamedevelopment.tutsplus.com/tutorials/game-ui-by-example-a-crash-course-in-the-good-and-the-bad--gamedev-3943
3. https://assetstore.unity.com/packages/templates/2d-platformer-controller-69772
4. https://www.gamedev.net/articles/visual-arts/the-total-beginner%E2%80%99s-guide-to-better-2d-game-art-r2959/

Paper: Introduction to C# Code in Game
Code: BGD – 193
Contacts Hours / Week: 4P
Credits: 4

Units	Course Content
Unit 1	Collision Detection (Colliders, Colliders as Triggers, Rigidbodies, Adding Physics Forces, Adding Physics Torque, Physics Materials, Physics Joints, Detecting Collisions with On Collision Enter, Raycasting)
Unit 2	C# code on 2D platform game (How Does Unity 3D Use C#? Working with C# script files, What Does C# Look Like? Toolbar, Hierarchy Panel, Scene and Game View, Inspector Panel , Project and Console Panel, Writing C#, Separator Tokens, Operator Tokens, Other Operator Tokens, Literals, Transitive and Non-,Transitive Operations) 2D Platformer, Written part - Analysis, Critic and Description, Class Initialization, New , Constructors

Suggested Readings:

1. https://gamedevelopertips.com/vector-in-game-development/
2. https://learn.unity.com/tutorial/3d-physics
3. http://www.allitebooks.in/learning-c-programming-unity-3d/

Paper: Making FPS Game & AI
Code: BGD – 201
Contacts Hours / Week: 3T
Credits: 3

Units	Course Content
Unit 1	What is FPS First person shooting game structure (Multiple Args, Using Args. Adding Lighting, Spawn Points, and the End Zone, Designing the First Room, Designing the Second Room)
Unit 2	All about AI in game. AI for saving labor cost, Content generation for characters, AI invents new games, Enhancing Gaming Experience with AI, Develop a smart and human-like NPCs to better interact with gamers; Predict human players' behaviors that lead to improved game testing and game design; Classify their behaviors to enable the personalization of the game; Discovery frequent patterns or sequences of actions to determine how a player behaves in a game. Prototyping and Pitching

Suggested Readings:

1. https://www.youtube.com/watch?v=Sqb-Ue7wpsI
2. https://www.youtube.com/watch?v=0fGB2H1AGP8
1. https://www.amazon.in/Neural-Networks-Keras-Cookbook-leveraging/dp/1789346649/ref=sr_1_1?keywords=artificial+intelligence+for+game+development&qid=1559290714&s=books&sr=1-1
3.

Paper: Database in Game
Code: BGD – 202
Contacts Hours / Week: 3T
Credits: 3

Units	Course Content
Unit 1	All about DB in game. Content generation for objects, database invents new games, Enhancing Gaming Experience with DB and tore data Predict human players' behaviors that lead to improved game testing and game design; Classify their behaviors to enable the personalization of the game and save in server.
Unit 2	How To Perfect Your Game's Core Storing system (Enter a new room, Kill all the enemies, Get rewards, Build upon a strong theme)

Suggested Readings:

1. https://www.reddit.com/r/gamedev/comments/28td8c/how_are_databases_used_in_games/

Paper: Making Game Codes
Code: BGD – 291
Contacts Hours / Week: 3P
Credits: 3

Units	Course Content
Unit 1	Fixed-Sized Arrays. Using the While Loop with Arrays, Setting Array Values, Getting Array Values. Zombie Data. Multidimensional Arrays. How to make A Puzzle Board. Timers
Unit 2	Working with platform runner games (Push Gitignore Pull Contributors) Platform runner game mechanics & tools (Single screen movement, Classification of early platformers, Scrolling movement, Second-generation side-scrollers, The third dimension, True 3D)

Suggested Readings:

1. http://file.allitebooks.com/20160708/Learning%20C-%20Programming%20with%20Unity%203D.pdf
2. https://gameanalytics.com/blog/how-to-perfect-your-games-core-loop.html
3. http://www.allitebooks.in/learning-c-programming-unity-3d/

Paper: AI in Game
Code: BGD – 292
Contacts Hours / Week: 3P
Credits: 3

Units	Course Content
Unit 1	Collision Detection (Push Gitignore Pull Contributors), C# code on FPS Physics and logic on FPS(Single screen movement, Classification of early platformers, Scrolling movement, Second-generation side-scrollers, The third dimension, True 3D)
Unit 2	How To Perfect Your Game's Core Loop (Enter a new room, Kill all the enemies, Get rewards, Build upon a strong theme)

Suggested Readings:

2. https://www.amazon.in/Artificial-Intelligence-Games-Ian-Millington/dp/0123747317/ref=sr_1_2?keywords=artificial+intelligence+for+game+development&qid=1559290714&s=books&sr=1-2
3. https://www.amazon.in/Unity-Artificial-Intelligence-Programming-believable/dp/1789533910/ref=sr_1_4?keywords=artificial+intelligence+for+game+development&qid=1559290714&s=books&sr=1-4

Paper: 3D Character Development Introduction
Code: BGD – 293
Contacts Hours / Week: 3P
Credits: 3

Units	Course Content
Unit 1	Working with 3D, games Rigidbody, physics, User input and UI, Balancing games, analyzing games, the MDA framework Low poly character modelling.
Unit 2	Setting Up the Image Reference, Camera and the Light , Background Images, Starting to Model the Face, Blocking the Nose and Lips, Adding the Subdivision Modifier

Suggested Readings:

2. https://cgi.tutsplus.com/tutorials/female-character-modeling-in-blender-part-1--cms-19723
3. https://www.youtube.com/watch?v=uGg04oAm4C8
4. https://www.youtube.com/watch?v=sHN1_GBwqcw
5. https://www.youtube.com/watch?v=spi4lGxnMZg

Internship & Lab Making Casual 2D Game
Code: BGD – 294
Contacts Hours / Week: 3P
Credits: 3

Students are required to make a Casual 2D Game.

SEMESTER-III

Paper: 3D Animation
Code: BGD – 301
Contacts Hours / Week: 3L
Credits: 3

Units	Course Content
Unit 1	Working with 3D Animation. Fundamentals of movement and timing, Apply, manipulate and combine media to create advanced 3D animated performances, Animation Cycles and Body Mechanics, 3D Naturalistic Character Animation. Walk style, Run, Jump, Action.
Unit 2	Indian animation development, Asian animation development, Western style of animation, Drawing in Motion, Advanced Character Rigging, Advanced Animation Techniques, Advanced Character Animation

Suggested Readings:

1. https://www.youtube.com/watch?v=m9N_sIBRWvY
2. 3D Animation for the Raw Beginner Using Maya (Chapman & Hall/CRC Computer Graphics, Geometric Modeling, and Animation by Roger King
3. https://www.youtube.com/watch?v=H4AuZzRLves
4. https://www.lynda.com/3D-Animation-training-tutorials/1-0.html

Paper: Game Design and Physics in Game Design
Code: BGD – 302
Contacts Hours / Week: 3L
Credits: 3

Units	Course Content
Unit 1	Game Design wrap-up, Intermediate Game Production Topics, Useful code libraries, Data Structures Global Illumination. 2D Game Jam
Unit 2	Physics Programming , Multiplayer/Network Programming Overview, Tools Programming Overview More on 3D level texture & lights

Suggested Readings:

1. Hands-On Game Development without Coding: Create 2D and 3D games with Visual Scripting in Unity Kindle Edition by Lucas Bertolini (Author)
1. Game Programming in C++: Creating 3D Games, First Edition by Sanjay Madhav
2. Getting Started with Unity 2018: A Beginner's Guide to 2D and 3D game development with Unity, 3rd Edition Paperback – Import, 22 Mar 2018 by Dr. Edward Lavieri (Author)
3. https://gamedevelopment.tutsplus.com/tutorials/a-beginners-guide-to-designing-video-game-levels--cms-25662

Paper: 3D Character Development & Rigging
Code: BGD – 391
Contacts Hours / Week: 3P
Credits: 3

Units	Course Content
Unit 1	Working with 3D, Low poly character modelling. Male body vs Female body, cartoon making process. Animal making, Alien body, physics of making characters.
Unit 2	Indian character development, Russian character development, sculpting in software, depth of character making, how rigging works. Need of rigging, working with rigged body, human rigging, animal rigging, alien rigging

Suggested Readings:

1. https://www.youtube.com/watch?v=cOokoFED7QE
2. https://www.youtube.com/watch?v=_TaYF-lt6vA
3. https://www.youtube.com/watch?v=487VwwL95hE

Paper: Defining Game with Animation
Code: BGD – 392
Contacts Hours / Week: 3P
Credits: 3

Units	Course Content
Unit 1	CubeShip Game, Working with Animations, UI Development, Unity Editor Intermediate Topics. Raycasting
Unit 2	Start on Game Design, Game Programming, Objects in a 3D animation exist in an X, Y & Z world , Animation vs Video Game Design, Different Types of Animation in game.

Suggested Readings:

1. Hands-On Game Development without Coding: Create 2D and 3D games with Visual Scripting in Unity Kindle Edition by Lucas Bertolini (Author)
2. Getting Started with Unity 2018: A Beginner's Guide to 2D and 3D game development with Unity, 3rd Edition Paperback – Import, 22 Mar 2018 by Dr. Edward Lavieri (Author)
3. The Animator's Survival Kit: A Manual of Methods, Principles and Formulas for Classical, Computer, Games, Stop Motion and Internet Animators Paperback – 8 Dec 2009 by Richard Williams
4. https://www.raywenderlich.com/2505-unity-4-3-2d-tutorial-animations

Paper: Advanced AI, Sound & Game Design
Code: BGD – 393
Contacts Hours / Week: 3P
Credits: 3

Units	Course Content
Unit 1	Debugging, Editor extensions I/O. Intro to 3D AI. AI Path Planning Agent/Decision Architectures Camera Programming (Camera System Overview, Camera Fundamentals, Camera Types, Cinematic Cameras, Camera Design Principles, Prevent the camera passing through (or close to) game objects or physical environmental features, Game Genre Cameras, Camera Design Process, Player Control) Audio Programming – Sound, Optimise sounds, sound making, music loops, 10 secs music vs 3 secs music. Audio program with engine and objects
Unit 2	3D Game Design Level Design & Tutorials (Understanding Constraints, General Constraints, Critical Constraints, Game's Macro Design Require, Bubble Diagrams, Rough Maps, Connect the Areas Together, Finishing the Design) . Last major game design, 3D Models, texture & lights.

Suggested Readings:

2. Game Programming in C++: Creating 3D Games, First Edition by Sanjay Madhav
3. Fundamentals of Real-Time Camera Design Mark Haigh-Hutchinson

Paper: HTML 5 Game
Code: BGD – 394
Contacts Hours / Week: 3P
Credits: 3

Units	Course Content
Unit 1	Procedural programming in game development, what are browser, future of web based games, why HTML 5 games. HTML 5 and CSS 3 programming. Creating the canvas, Game loop, Creating the player, Keyboard controls.
Unit 2	Physics Programming , Player movement, Adding more game objects Projectiles, Enemies, Loading and drawing images, Collision detection, Sound.

Suggested Readings:

1. https://www.html5rocks.com/en/tutorials/canvas/notearsgame/
2. https://www.youtube.com/watch?v=5JqdjwYn8pw
3. https://www.youtube.com/watch?v=3EMxBkqC4z0

Internship & Lab Making
Code: BGD – 395
Contacts Hours / Week: 3P
Credits: 3

Students are required to make one full project from their given curriculum.

Paper: Introduction to 3D Play Station Game Programming
Code: BGD – 401
Contacts Hours / Week: 3T
Credits: 3

Units	Course Content
Unit 1	Procedural programming in game development, what are 3D playstation , future of PS based games, Engine programming. Game loop, Creating the player, controller programming.
Unit 2	Applications Algorithms & Trees 3D character code & texture, PlayStation Mobile, Playstation 3 SDK, Playstation 3 Devkits, API Documentation , Running programs, APP HOME

Suggested Readings:

1. https://research.ncl.ac.uk/game/mastersdegree/workshops/ps3introduction/Tutorial0.pdf

Paper: Networking in Game Development
Code: BGD – 402
Contacts Hours / Week: 3T
Credits: 3

Units	Course Content
Unit 1	Networking intro & JSON, Creating non-Unity C#. applications Web server basics, Deploying web servers Creating a RESTful, Connecting games to services Databases along with Multiplayer gaming.
Unit 2	Peer-to-peer networking, Client-server networking, Networking protocols – UDP and TCP, game client, game server code, game socket programming.

Suggested Readings:

1. https://www.youtube.com/watch?v=4yzsVLhN4FQ
2. https://www.youtube.com/watch?v=1RphLzpQiJY
3. Multiplayer Game Programming: Architecting Networked Games, by Sanjay Madhav, Josh Glazer Publisher: Addison-Wesley Professional

Paper: Introduction to Helper Systems
Code: BGD – 403
Contacts Hours / Week: 2T+1P
Credits: 3

Units	Course Content
Unit 1	Common Helper Functionality - Localization • Test/Tuning Support • Tracking User Statistics • Recording Play Sessions
Unit 2	Advanced Features • Event System Optimization • Custom Memory Allocation • Resource Management (Block Loading, Instancing) Streaming Technology • Save/Load
Suggested Readings:	

Paper: Hardware in Game Programming
Code: BGD – 404
Contacts Hours / Week: 2T+1P
Credits: 3

Units	Course Content
Unit 1	Know your CPU – game CPU & GPU, need of graphics cards, load balance, hardware for high-end games. Memory as a bottleneck Multiprocessor systems Trend: Higher percentage of silicon on the CPU dedicated to cache rather than branch Prediction, GPUs – parts features Other auxiliary processors – physics, sound, network
Unit 2	Advanced Features User Interface, Systems Design, Requirements of a user interface, Basic Implementation. Considerations of streaming, Style and type of streaming.

Suggested Readings:

1. https://www.pcgamer.com/game-development-pc/
2. http://index-of.co.uk/Algorithms/Core%20Techniques%20and%20Algorithms%20in%20Game%20Programming.pdf

Paper: Project and Team in Game Development
Code: BGD – 405
Contacts Hours / Week: 2T+1P
Credits: 3

Units	Course Content
Unit 1	"Team Structures" "Stages of Development" (particularly: how to make a project plan)- Planning the agile way, Avoid multitasking.
Unit 2	Iterative Development, Backlog, Notifications, Data Customization, Activity Logs, Production Formula.

Suggested Readings:

1. https://www.pcgamer.com/game-development-pc/
2. http://index-of.co.uk/Algorithms/Core%20Techniques%20and%20Algorithms%20in%20Game%20Programming.pdf

Paper: Introduction to RPG Game
Code: BGD – 491
Contacts Hours / Week: 1T+2P
Credits: 3

Units	Course Content
Unit 1	Scene graph, Particles, Overview of Shaders, Intro to 3D RPG games, type of RPG games. Character design, object design, environment design, level design, UI treatment.
Unit 2	Character movement, animation for RPG, making library controls for RPG, character animation and bones for RPG. Game client for RPG, RPG server code.

Suggested Readings:

1. Multiplayer Game Programming: Architecting Networked Games, by Sanjay Madhav, Josh Glazer Publisher: Addison-Wesley Professional

Internship & Lab Making (Making of Full Length FPS 3D Game)
Code: BGD – 492
Contacts Hours / Week: 3P
Credits: 3

Students are required to make a full-length FPS 3D Game.

Paper: Android Game Development
Code: BGD - 501
Contacts Hours / Week: 4T
Credits: 4

Units	Course Content
Unit 1	Controlling smartphone , Smartphone structuresm, Building for Android with controls and movement How to build 3D game apps using Android SDK, NDK, and OpenGL ES Which Android SDK and NDK APIs are most useful for 3D game development How to get a 3D Math Review for game development How to build 3D graphics using OpenGL ES
Unit 2	Motion Patterns: How to create various motion patterns ,How to set up a game environment, including gravity grid, sounds, and heads-up display, How to create the characters, including the player and its enemies or targets, How to develop a rich menu system with high score table Building a Game Engine, Building Game Levels with Collision, Virtual Cameras, Using the Android Development Environment

Suggested Readings:

1. Beginning Android 3D Game Development - Robert Chin
2. http://blaqueyard.com/download/Beginning%20Android%20C++%20Game%20Development.pdf

Paper: Software Development Kit
Code: BGD - 502
Contacts Hours / Week: 4T
Credits: 4

Units	Course Content
Unit 1	What is SDK, How SDK works Errors & Debugs Building the UI & attach with main game play with the SDK. SDK integration for ads
Unit 2	How a game makes money – Publishers point, How to attract users, Branding strategy. There are 300 plus local ap stores, how to tag them while publish

Suggested Readings:

1. https://developers.google.com/admob/unity/start
2. https://www.youtube.com/watch?v=BwVYUR0UUhk

Paper: iOS Game Development
Code: BGD - 591
Contacts Hours / Week: 1T+3P
Credits: 4

Units	Course Content
Unit 1	Controlling iOS , iOS structure, Building for iOS with controls and movement How to build 3D game apps using iOS SDK, XCode, and OpenGL ES Which iOS SDK and APIs are most useful for 3D game development iOS Game Development Platform Introduction iOS Game Development History Comparing with Other Platform Tools, Technologies and Capabilities Xcode
Unit 2	Motion Patterns: How to create various motion patterns ,How to set up a game environment, including gravity grid, sounds, and heads-up display, How to create the characters, including the player and its enemies or targets, How to develop a rich menu system with high score table Building a Game Engine, Building Game Levels with Collision, Virtual Cameras, Using the Android Development Environment

Suggested Readings:

1. http://1.droppdf.com/files/ejGQp/game-development-with-swift.pdf
2. http://ptgmedia.pearsoncmg.com/images/9780132928625/samplepages/0132928620.pdf

Paper: Apple Game Development Framework
Code: BGD – 592
Contacts Hours / Week: 1T+3P
Credits: 4

Units	Course Content
Unit 1	Xcode. Elements of Sprite Kit, Scene ,Nodes ,Actions , Features of Sprite Kit , Particle Emitter Editor , Texture atlas generator, Shaders , Lighting and Shadows , Simulating Physics , The Game Loop
Unit 2	INTRODUCTION TO LAPLAND Game Description, Art and Sound, Scenes in Sprite Kit, Working with Sprites , Physics in Sprite Kit, Animation and Texture, Controlling the Game , Gameplay Kit.
Suggested Readings:	

Internship & Lab Making (Making of Full Length Android and iOS Game)
Code: BGD - 593
Contacts Hours / Week: 4P
Credits: 4

Students are required to make a full-length Android and iOS Game.

Paper: Introduction to Virtual Reality
Code: BGD – 601
Contacts Hours / Week: 3T+1P
Credits: 4

Units	Course Content
Unit 1	Introduction to VR , What are various type of Virtual Reality systems. How to develop in VR game system. Equipment for VR apps and movies. Camera systems, 3D game and VR game.
Unit 2	Tools for VR & Engine working sectors. In-class work-session for final project

Suggested Readings:

1. https://developer.oculus.com/documentation/mobilesdk/latest/
2. Emerging Trends in Virtual Reality for Gaming: an assessment of best practices from research and development in the gaming industry Dr. Jason Nolan, Daniel Harley (RE/Lab, Ryerson University) Anthony Walsh, Eric McQuiggan (Phantom Compass Inc.)
3. http://ict.usc.edu/pubs/Virtual%20Reality%20and%20Interactive%20Digital%20Game%20Technology-%20New%20Tools%20to%20Address%20Obesity%20and%20Diabetes.pdf

Paper: Introduction to Augmented Reality
Code: BGD – 602
Contacts Hours / Week: 3T+1P
Credits: 4

Units	Course Content
Unit 1	Introduction to AR , What are various type of Augmented Reality systems. How to develop in AR game system. Equipment for AR apps .
Unit 2	How you can plan for making AR based games, Basic game structures, Making of casual AR game

Suggested Readings:

1. Game Development For An Augmented Reality System By Thomas Wright Advisor Michael G. Branton
2. Research Article: KioskAR: An Augmented Reality Game as a New Business Model to Present Artworks Yoones A. Sekhavat

Paper: Business and Legal Issues for Video Game Developers
Code: BGD – 603
Contacts Hours / Week: 3T+1P
Credits: 4

Units	Course Content
Unit 1	Console Manufacturers ,Digital Distributors ,Mobile, Console and PC publishers ,Mobile publishers The Changing Landscape of the Video Game Industry , End of Life Economics , Future Consoles Rise of Digital Distribution, Rise of Mobile Gaming , Rise of Free-to-Play and other Monetization Schemes , Legal Challenges Created by Innovation.
Unit 2	The Role of the Publisher - Funding ,Quality Assurance (QA) and Submission , Retail Distribution, Marketing

Suggested Readings:

1. Mastering The Game - By David Greenspan With Contributions From S. Gregory Boyd, Jas Purewal And Matthew Datum
2. https://www.crcpress.com/rsc/downloads/SB3_Practices_of_Game_Design__Indie_Game_Marketing_FreeBook.pdf

Paper: AR Game Development
Code: BGD – 691
Contacts Hours / Week: 1T+3P
Credits: 4

Units	Course Content
Unit 1	3D game and AR game. Location-Based versus Marker-Based AR. AR View, Usability. Load detection. AR 3D pipeline and Debug
Unit 2	AR Design for Social Interaction.

Suggested Readings:

1. Game Development For An Augmented Reality System By Thomas Wright Advisor Michael G. Branton
2. Research Article: KioskAR: An Augmented Reality Game as a New Business Model to Present Artworks Yoones A. Sekhavat

Paper: XR Game Development
Code: BGD – 692
Contacts Hours / Week: 4P
Credits: 4

Units	Course Content
Unit 1	Final project on VR and AR casual game. XR 3D game introduction, XR 3D pipeline. Different languages for VR and AR which makes Mixed reality games.
Unit 2	XR Design for Social Interaction.

Suggested Readings:

1. Game Development For An Augmented Reality System By Thomas Wright Advisor Michael G. Branton
2. Research Article: KioskAR: An Augmented Reality Game as a New Business Model to Present Artworks Yoones A. Sekhavat