



# Course Specification

## (Postgraduate Programs)

**Course Title:** CS 725(0911725)

**Course Code:** Game Modeling and Development

**Program:** Master of Science in Computer Science

**Department:** Computer Science

**College:** Computer Sciences and Information technology

**Institution:** King Faisal University

**Version:** Course Specification Version Number

**Last Revision Date:** Pick Revision Date.

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## A. General information about the course:

### 1. Course Identification:

1. Credit hours: 3( 3-0-6 )

#### 2. Course type

- A. ☐ University ☐ College ☐ Department ☐ Track
- B. ☐ Required ☒ Elective

3. Level/year at which this course is offered: Level 2, 3 or 4

#### 4. Course General Description:

This course understands the fundamentals of game design and development followed by creating 2D and 3D models for games. The course also delves into implementing animations and physics in games and use game engines like Unity or Unreal Engine. The course also introduces Programming game mechanics using C# (Unity) or Blueprints/C++ (Unreal). Followed by developing and testing a complete game project.

#### 5. Pre-requirements for this course (if any):

Advanced Algorithms (CS 611)  
Advanced Software Engineering (CS 614)

#### 6. Pre-requirements for this course (if any):

None

#### 7. Course Main Objective(s):

This course provides students with the necessary skills to design, model, and develop video games using industry-standard tools and technologies. It covers 3D modeling, animation, game engines, programming, and game mechanics. Students will work on hands-on projects to develop fully functional games

### 2. Teaching Mode: (mark all that apply)

No	Mode of Instruction	Contact Hours	Percentage
1	Traditional classroom		
2	E-learning		
3	Hybrid <ul style="list-style-type: none"> <li>Traditional classroom</li> <li>E-learning</li> </ul>	45	100%
4	Distance learning		



### 3. Contact Hours: (based on the academic semester)

No	Activity	Contact Hours
1.	Lectures	45
2.	Laboratory/Studio	
3.	Field	
4.	Tutorial	
5.	Others (specify).....	
	Total	45

### B. Course Learning Outcomes (CLOs), Teaching Strategies and Assessment Methods:

Code	Course Learning Outcomes	Code of PLOs aligned with the program	Teaching Strategies	Assessment Methods
1.0	Knowledge and understanding			
1.1	Understand the fundamentals of <b>game design principles</b> , including mechanics, dynamics, and aesthetics..	K3	Lectures	Assignment Quiz
1.2	Understand different <b>game monetization models</b> (e.g., in-app purchases, ads, premium).	K3	Lectures	Mid Term Final Exam
...				
2.0	Skills			
2.1	Design and develop <b>3D models</b> (characters, environments, and props) using tools like <b>Blender, Maya, or 3ds Max</b> .	S2,S3	Lectures	Midterm Final Exam Quiz Project
2.2	Implement <b>skeletal animation, keyframe animation, and motion</b>	S2, S3	Lectures	Midterm Final Exam Quiz



Code	Course Learning Outcomes	Code of PLOs aligned with the program	Teaching Strategies	Assessment Methods
	<b>capture</b> in game development.			Project
2.3				
<b>3.0</b>	<b>Values, autonomy, and responsibility</b>			
3.1	Develop games using industry-standard engines such as <b>Unity and Unreal Engine</b> .	V1, V2	Project	Project presentation
3.2				
...				

### C. Course Content:

No	List of Topics	Contact Hours
1.	Introduction to Game Development: History of video games- Game genres and trends -Game development pipeline	3
2.	Game Design Principles- Game mechanics and dynamics-Level design and world-building-Storytelling and narrative design	3
3	2D Graphics: Photoshop, Illustrator, Sprite sheets; 3D Modelling: Blender, Maya, 3ds Max; Textures & Materials: UV mapping, Substance Painter	3
4	Introduction to Unity and Unreal Engine-Scene management and environment setup- Physics and lighting systems	3
5	Programming for Games- C# for Unity / C++ for Unreal- Object-oriented programming concepts-AI and pathfinding	6
6	Animation and Rigging- Character rigging-Skeletal and keyframe animation- Motion capture and physics-based animation	6
7	Game Physics and Mechanics- Collision detection-Rigid body dynamics- Particle effects	6
8	Sound design for Games-Background music and sound effects- Audio engines and implementation	3
9	Multiplayer and Networking - Basics of multiplayer game development Networking protocols- Synchronization in online games	3
10	UI/UX for Games- Designing intuitive interfaces-HUDs and menus- User experience testing	6





12	Game Testing and Optimisation-Bug tracking and debugging- Performance optimization- Publishing and monetization	3
<b>Total</b>		<b>45</b>

## D. Students Assessment Activities:

No	Assessment Activities *	Assessment timing (in week no)	Percentage of Total Assessment Score
1.	Quiz	Week-5	10
2.	Mid Term	Week-12	25
4	Project	Week-15	25
5	Final exam	End Semester	40

\*Assessment Activities (i.e., Written test, oral test, oral presentation, group project, essay, etc.)

## E. Learning Resources and Facilities:

### 1. References and Learning Resources:

<b>Essential References</b>	Steve Rabi, "Introduction to Game Development", Charles River Media, 2009  Jeremy Gibosn, "Introduction to Game Design, Prototyping and Development:From Concept to playable Game with Unit and C, Addison-Wesley, 2014.
<b>Supportive References</b>	Alireza, T, "Game Development and Simualton with unreal Technology", Second Edition, CRC Press, 2018
<b>Electronic Materials</b>	
<b>Other Learning Materials</b>	

### 2. Educational and Research Facilities and Equipment Required:

Items	Resources
<b>facilities</b> (Classrooms, laboratories, exhibition rooms, simulation rooms, etc.)	Sufficient seats (typically 20) as per student registration required in the lecture
<b>Technology equipment</b> (Projector, smart board, software)	Sufficient computer terminals with required setup having the necessary software installed



Items	Resources
	and configured for the students to complete assignments and projects. Data show is needed to demonstrate in the class
<b>Other equipment</b> (Depending on the nature of the specialty)	Not Required

#### F. Assessment of Course Quality:

Assessment Areas/Issues	Assessor	Assessment Methods
Effectiveness of teaching	Students	Indirect Assessment through Teaching Evaluation
Effectiveness of students' assessment	Faculty	Indirect assessment through Course Evaluation Survey
Quality of learning resources	Students	Indirect Assessment through Learning Resources Survey
The extent to which CLOs have been achieved	Faculty	Direct assessment through Rubrics analyses
Other		

**Assessor** (Students, Faculty, Program Leaders, Peer Reviewer, Others (specify))

**Assessment Methods** (Direct, Indirect)

#### G. Specification Approval Data:

<b>COUNCIL /COMMITTEE</b>	
<b>REFERENCE NO.</b>	
<b>DATE</b>	