King Fahd University of Petroleum & Minerals
Department of Mathematics

1. Course Information	
Course Number and Title:	MATH-584-01 (Computer Graphics: Animation & Simulation)
Credits:	3
Instructor(s)-in-charge:	Prof Dr Usman Qamar
Course type:	Lecture
Required or Elective:	Elective
Course pre-requisites	-
Term	252
Month and Year	Spring 2026

2. Course Schedule	
Lecture:	1 hour 15 mins each week, meets twice weekly
Lab:	-

3. Course Assessments		
Exam:	1 Mid Term and 1 Final	
Home work:	6 Assignments	
Lab	0	
Design reports:	1 Design report	
Quizzes	0 Quizzes	
	Assignments:	10%
	Quiz:	-
	Project/CEP	20%
	Mid Term:	30%
	Final Exam:	40%
	Total	100%

4. Course book and Related Course Material

Reference	1. Blender Manual 2. Class Notes 3. Unity/Unreal engine documentation

5. Catalog Descriptions

The purpose of this course is to give good understanding of graphics standards & APIs, Graphics I/O Devices and elements of pictures. The course will enable students to create valid and complete 3D meshes for use in visualization, games design, and 3D printing. The students will complete a game development / AR project which will enable them to independently start publishing low complexity games / AR applications for various platforms.

6. Course Objectives

a) The students will have good understanding of graphics standards & APIs, Graphics I/O Devices and elements of pictures.
b) The student will know how to create valid and complete 3D meshes for use in visualization, games design, and 3D printing.
c) The student will understand how to effectively use different materials, textures and texture mapping.
d) The student will know how to rig different models and use it for animation.
e) The students will complete a game development / AR project which will enable them to independently start publishing low complexity games / AR applications for various platforms

7. Topics covered in the Course	
Introduction to computer graphics, computer graphics in different areas of life, graphics standards & APIs.	2 Hrs
Basic block Modelling	2 Hrs
Modelling natural objects	2 Hrs
Particle systems	2 Hrs
Material & Shaders	2 Hrs
Surface Texturing	2 Hrs
Lighting	2 Hrs
Rendering	2 Hrs
Rigging	2 Hrs
Animation	2 Hrs
Basic elements of a game	2 Hrs
Level design	2 Hrs
Characters and their animations	2 Hrs
UI elements	2 Hrs
Developing Game using game engines.	2 Hrs

8. Assignments	
Lab 01	Learning Blender 3D: Making Models
Lab 02	Materials and Shaders
Lab 03	Rigging in Blender
Lab 04	Animations in Blender
Lab 05	Unity- Object movement with keys
Lab 06	Unity -Creating a 3D Game