KOMAR UNIVERSITY OF SCIENCE AND TECHNOLOGY

COURSE NAME			
Course Title	Computer Graphics		
Course Code	CPE2315	**No. of Credits**	
Department	Computer Science	**College**	Science
Pre-requisites Course Code	Object Oriented Programming	**Co-requisites Course Code**	Digital Image Processing
Course Coordinator(s)	Miran Hikmat Mohammed		
Email	Miran.hikmat@komar.edu.iq	**IP No.**	
Other Course Teacher(s)/Tutor(s)			
Class Hours	Mon (14.00 – 15.30) B-B06 and Wed (14.00 – 15.30) B-B06		
Office Hours			
Course Type	Department course		
Offer in Academic Year	Fall 2023		

COURSE DESCRIPTION

The course covers the fundamentals of computer graphics. It gives the essential theoretical framework and shows how computer science can be applied to graphics. Through programming projects, students can further strengthen their programming skills in computer graphics. Also, the course covers both fundamental and advanced subjects, including graphics representations and transformations, the viewing pipeline, visibility, lighting, and texturing, as well as ray tracing and global illumination.

COURSE OBJECTIVES

- Introduce students to the fundamental algorithms and data structures utilized in today's interactive graphics systems.
- Student will learn about programming and architecture of high-resolution graphics computers.
- Student will introduce to mathematical origins through modern application domains such as scientific visualization, virtual reality.
- Student will work on practical experience by using programming languages such as Graphics 2D and OpenGL will be included in the course.
- learn basic use and application of vectors and raster image.

COURSE LEARNING OUTCOMES (CLOs)

- Designing the 2D and 3D shapes on computer using programming languages [ABET A, B, E, K].
- Distinguish between2D and 3D, and how to implement different properties, such as color, shading, size and position [ABET A, B, E, J, K].
- Understand how to Animate objects on X and Y axis as 2D and 3D [ABET A, B, E, K].
- Display competency in a number of computer graphics techniques and applications [ABET A, B, C, F, G, J,K].
- Integrate Academic and Technical Skills ABET A - K].
- Practice Problem Solving and Critical Thinking Skills [ABET A, B, C, D, F,G, I, J ,k].

GUIDELINES ON GRADING POLICY

Grades	Letter	GPA	Grades	Letter	GPA
95 -100%	A	4.0	65-69%	C	2.0
90-94%	A–	3.7	60-64%	C–	1.7
85-89%	B+	3.3	55-59%	D+	1.3
80-84%	B	3.0	50-54%	D	1.0
75-79%	B–	2.7	0-49%	F	0.0
70-74%	C+	2.3			
W	Withdrawal		I	Incomplete	

Note: Passing Grade is: 65%

COURSE CONTENT

Course topics include:

- ıntroduction and Overview of Graphics systems
- Miscellaneous Math
- Linear algebra
- Raster Graphics
- Light and Color
- Attribute of Raster Graphics
- Drawing of Raster Graphics
- Two-Dimensional Geometric
- 3D Model Representation
- Three-Dimensional Geometric and Modeling Transformations I
- Three-Dimensional Geometric and Modeling Transformations II
- Computer Animation

COURSE TEACHING AND LEARNING ACTIVITIES

QA suggests to use the followings (depends on the course) for applying Student-Centered Approach:

- Problem or Project based Learning.
- Interactive class discussion
- Lectures
- Lab assignment
- Quizzes
- Class activity and participation
- Practical test

COURSE ASSESSMENT TOOLS (Kindly select the Assessment Tools according to the categories issued in the Vice-President Order (F22-201-47) and the nature of the course in a way that serves the Student-Centered Approach) Consult with the chairmen of your department.

Assessment Tool	Description	Weight
Quiz	3 Quizzes as scheduled by the department 4,8 and 10	**20%**
Class Activity and participation	Active students during the semester VS non-active one.	**5%**
Lab Assignment	One practical test 10% and two lab assignment 5% each.	**15%**
Final Project + Presentation	One project consists of two parts: The proposal of the project presented by (week 7, 5%). The final due date for the project and presentation will be in (week 12, 15%).	**25%**
Final Exam	Theoretical Exam	**40%**

Assessment Tools	Course Learning Outcomes (CLOs)	Weight (%)
Quiz	**1,2,3,4,5, and 6**	**Equally**
Class Activity	**1,2,3,4,5, and 6**	**Equally**
Final Project	**1,2,3,4,5, and 6**	**Equally**
Assignment	**1,2,3,4,5, and 6**	**Equally**
Final Exam	**1,2,3,4,5, and 6**	**Equally**

Textbooks:

Marschner, S., Shirley, P., Ashikhmin, M., Gleicher, M., Hoffman, N., Johnson, G., Munzner, T., Reinhard, E., Thompson, W., Willemsen, P. and Wyvill, B., n.d. Fundamentals of computer graphics.

References:

1. Eck, D., n.d. Introduction to Computer Graphics.
2. Hearn, D., 1997. Computer graphics. Harlow: Pearson education.

COURSE POLICY *(including plagiarism, academic honesty, attendance etc)*

Attendance Policy:
Students are expected to attend each class for the entire semester. Students are responsible for the material presented in lectures. Only students with official KUST absences, family crises, and illness are excused from class. Three occasions of lateness count as one absence. The student who misses 10% of the classes will be considered as failed.

Make-up Policy:
Since all examinations are announced in advance, ZERO grades will be given to any missed examination unless a student has an acceptable reason, such as illness, for not being able to take the examination during all those days when the examination was announced.

Academic Dishonesty:
Any type of dishonesty (Plagiarism, copying another's test or homework, etc) will not be tolerated. Students found guilty of any type of academic dishonesty are subject to failure in this course, plus further punishment by the Vice-president's order on cheating.

GUIDELINES FOR SUCCESS

1. Read and strive to understand (e.g. re-read, ponder) the materials assigned.
2. Illustrate interest and dedication to the course activities and deliverables.
3. Participate and respond to the instructor feedback sessions.
4. Be able to work independently and in a group.
5. Try not to miss the classes.

Course Schedule (Fall 2023)

Week	Beginning Dates	Topics (Chapters)	Assessment Tool
1	September 9th 2023	*Introduction and Overview of Graphics systems:* • Hardware and Software • Painting and Drawing • Two-Dimensional Graphics • Three-Dimensional Graphics • Application Domains and areas of Computer Graphics • Designing and Coding Graphics Programs	
2	September 16th 2023	*Miscellaneous Math:* • Sets and Mappings • Solving Quadratic Equations • Trigonometry • Vectors	
3	September 23rd 2023	*Linear Algebra:* • Curves and Surfaces • Linear Interpolation • Triangles • Computing with Matrices and Determinants	
4	September 30th 2023	*Raster Graphics:* • Raster Devices • Pixel and Color and Images • Geometry	Quiz-1
5	October 7th 2023	*Light and Color:* • Radiometry • Transport Equation • Photometry • Colorimetry • Color Spaces • Chromatic Adaptation • Color Appearance	Project Presentation -1
6	October 14th 2023	*Attribute of Raster Graphics:* • Points and Lines • Line Function • Line and Curve Attributes • Properties of Circles • Properties of Ellipses • Curve Functions • Pixel Addressing and Object Geometry • Screen Grid Coordinates	Assignment -1
7	October 21st 2023	*Drawing of Raster Graphics:* • Line Drawing	Project Presentation -2

		• Generating Circle • Generating Ellipse • Fill Styles • Filling Boundary • Filling Area	
8	October 28th 2023	*Two-Dimensional Geometric Transformations:* • Scaling • Rotation • Inverse Transformations • Frames • Viewing Transformations	Quiz-2
9	November 4th 2023	*3D Model Representation:* • Digitalization • Modeling • Polygon Meshes	Practical Test
10	November 11th 2023	*Surfaces representations:* • Quadric Surfaces • Implicit Surfaces • Parametric Surfaces • Spline Representations • Constructive Solid Geometry (CSG)	Quiz -3
11	November 18th 2023	*Three-Dimensional Geometric and Modeling Transformations I:* • Translation • Rotation • Scaling	
12	November 25th 2023	*Three-Dimensional Geometric and Modeling Transformations II:* • Three-Dimensional Transformation Functions • Modeling and Coordinate • Transformations	Assignment -2
13	December 2nd 2023	**Review Week: There will be an assessment in this week**	Final Project
14	December 9th 2023	**FINAL EXAMINATION**	