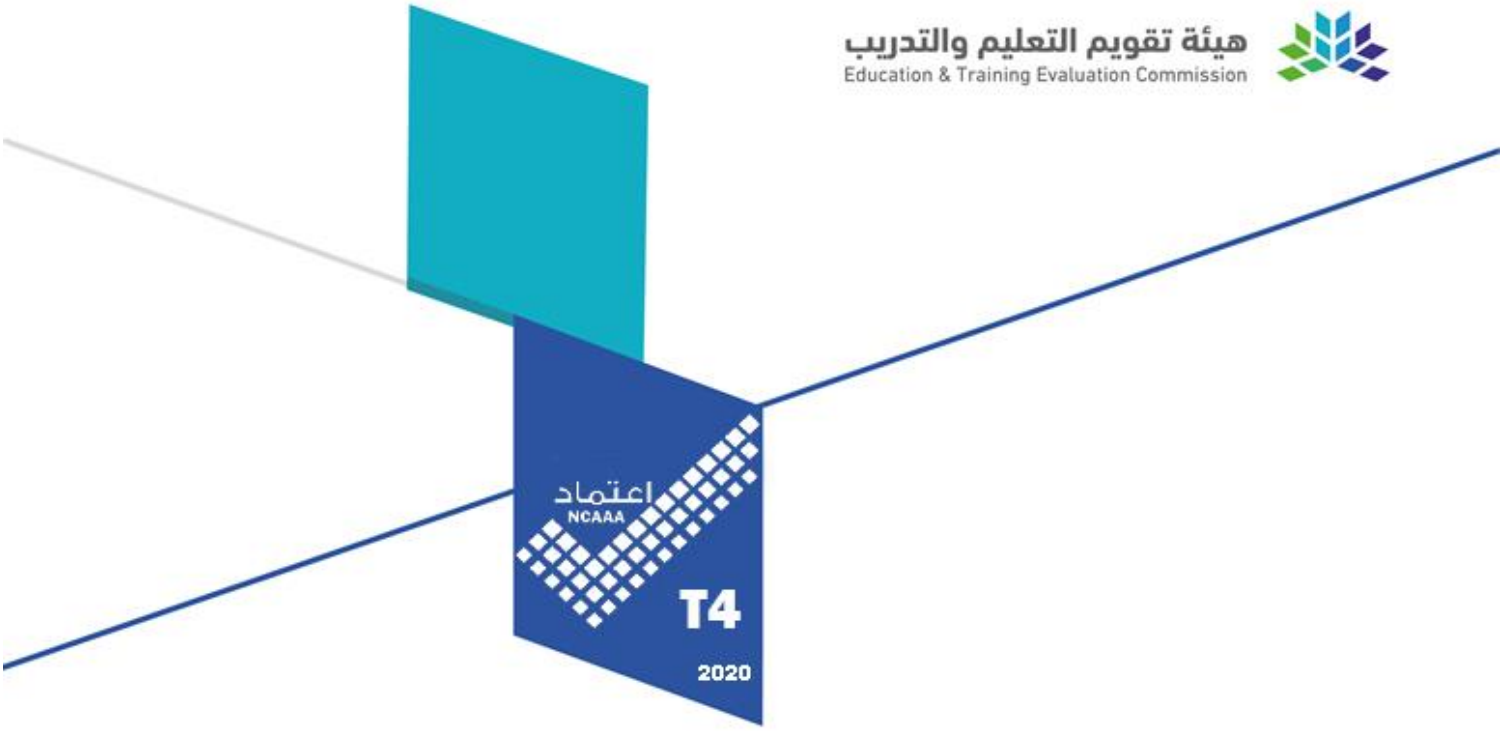
هيئة تقويم التعليم والتدريب
Education & Training Evaluation Commission



Course Specifications

Course Title:	Computer Graphics
Course Code:	(CSI-425)
Program:	Computer Science and Information
Department:	Computer Science and Information
College:	College of Science at AzZulfi
Institution:	Majmaah University

Table of Contents

A. Course Identification

1. Credit hours:
2. Course type **a.** University ☑ College ☑ Department ☑ Others ☐ **b.** Required ☑ Elective ☐
3. Level/year at which this course is offered:
4. Pre-requisites for this course (if any)**:** • Linear Algebra & Differential Equations (MATH 310)
5. Co-requisites for this course (if any)**:** **No**

6. Mode of Instruction (mark all that apply)

No	Mode of Instruction	Contact Hours	Percentage
1	**Traditional classroom**	☑	80 %
2	**Blended**	☑	5%
3	**E-learning**	☑	5%
4	**Distance learning**		
5	**Other**	☑	10%

7. Contact Hours (based on academic semester)

No	Activity	Contact Hours
1	**Lecture**	60
2	**Laboratory/Studio**	15
3	**Tutorial**	30
4	**Others** (specify)	
	Total	

B. Course Objectives and Learning Outcomes

1. Course Description

The core of this module is to introduce students to the main concepts of computer graphics. It starts with an overview of interactive computer graphics, two-dimensional system and mapping, then it presents the most important drawing algorithm, two-dimensional transformation; Clipping, filling and an introduction to 3- D graphics.

2. Course Main Objective

The main objective of this course is to:

1. Introduce the students with the concepts and principles of computer graphics.
2. Give a thorough description of computer graphics hardware and software systems
3. Understand the theory and application of Transformation and Viewing.
4. Understand the graphics pipeline: Modeling, Viewing and Rendering.
5. Design and implement a simple project using OpenGL

3. Course Learning Outcomes

	CLOs	Aligned PLOs
1	**Knowledge and Understanding**	
1.1	Acquire knowledge of the history and evolution of computer graphics, both hardware and software	
1.2	Understand the 2D graphics and algorithms including: line drawing, polygon filling, clipping, and transformations. They will be able to implement these concepts.	
1.3	Understand the concepts and techniques used in 3D computer graphics, including viewing transformations, hierarchical modeling, color, lighting and texture mapping	
1...		
2	**Skills :**	
2.1	Use matrix algebra in computer graphics application and draw the basic primitives (e.g., point, line, polygons) using OpenGL.	
2.2	Apply the 2D transformations and 3D transformations, and Explain how simple line and polygon clipping algorithms work.	
2.3	Implement simple animations using OpenGL.	
2...		
3	**Values:**	
3.1	Learn how to search for information through library and internet, and Present a short report in a written form and orally using appropriate scientific language.	
3.2	Function effectively on teams to accomplish a common goal, and ccommunicate with teacher, ask questions, solve problems, and use computers	
3.3		
3...		

C. Course Content

No	List of Topics	Contact Hours
1	A Survey of Computer Graphics Applications: CAD/CAM, Art, Entertainment, Education, Training, Visualization, GUI, Image Processing	4
2	Overview of Computer Graphics & Systems Graphics: Primitives and Packages, The Graphical Pipeline, CRT, Raster-Scan and Random-Scan displays, Color CRT Monitor	8
3	Colors and Grayscales: Beam-Penetration method Shadow-mask method.	8
4	Output Primitives and Attributes: Points, Lines, Circles, Ellipses. Examples - Open GL	4
5	2D and 3D Modeling Types of Modeling, Types of Geometric Models	8
6	2D Transformations and Viewing: Translation, Scaling, Rotation,Shearing ,reflection, Examples - Open GL	8
7	3D Transformation and Viewing: 3D Representation, Translation, Scaling, Rotation, Examples - Open GL	4
8	2D Viewing and 3D Viewing: Windows and Viewports, Window-ToViewport Coordinate Transformation, Point clipping, line clipping,	8

	Cohen-Sutherland Line Clipping, 3d Rendering Pipeline ,Examples - Open GL.	
9	projection :Parallel and Perspective Projection, Orthographic Parallel Projection, Oblique Parallel Projection, Oblique Projection, Cavalier Projections,Cabinet Projections, Examples - Open GL	8
Total		

D. Teaching and Assessment

1. Alignment of Course Learning Outcomes with Teaching Strategies and Assessment Methods

Code	Course Learning Outcomes	Teaching Strategies	Assessment Methods
1.0	**Knowledge and Understanding**		
1.1	Acquire knowledge of the history and evolution of computer graphics, both hardware and software	Lectures. Lab demonstrations. Case studies. Individual presentations.	Written Exam Homework assignments Lab assignments Class Activities Quizzes
1.2	Understand the 2D graphics and algorithms including: line drawing, polygon filling, clipping, and transformations. They will be able to implement these concepts.		
…	Understand the concepts and techniques used in 3D computer graphics, including viewing transformations, hierarchical modeling, color, lighting and texture mapping		
2.0	**Skills**		
2.1	Use matrix algebra in computer graphics application and draw the basic primitives (e.g., point, line, polygons) using OpenGL.	Lectures. Lab demonstrations. Case studies. Individual presentations. Brainstorming.	Written Exam Homework Assignments Lab Assignments Class Activities Quizzes
2.2	Apply the 2D transformations and 3D transformations, and explain how simple line and polygon clipping algorithms work.		
…	Implement simple animations using OpenGL.		
3.0	**Values**		
3.1	Learn how to search for information through library and internet, and present a short report in a written form and orally using appropriate scientific language.	Small group discussions. Whole group discussions. Brainstorming. Presentations.	Written Exam Homework assignments Lab assignments Class Activities Quizzes
3.2	Function effectively on teams to accomplish a common goal, and ccommunicate with teacher, ask questions, solve problems, and use computers		
…			

2. Assessment Tasks for Students

#	Assessment task*	Week Due	Percentage of Total Assessment Score
1	First written mid-term exam	6	15%
2	Second written mid-term exam	12	15%
3	Presentation, class activities, and group discussion	Every week	5%
4	Homework assignments	After every chapter	5%
5	Practical exam	15	20%
6	Final written exam	16	40%
7	Total		100%

***Assessment task** (i.e., written test, oral test, oral presentation, group project, essay, etc.)

E. Student Academic Counseling and Support

Office Hour: Monday 8-10

Contact Email: h.brahim@mu.edu.sa

F. Learning Resources and Facilities

1.Learning Resources

Required Textbooks	Computer Graphics with Open GL (4th Edition) Hardcover – November 19, 2010 by Donald D. Hearn , M. Pauline Baker , Warren Carithers .ISBN-13: 978- 0136053583
Essential References Materials	OpenGL Programming Guide: The Official Guide to Learning OpenGL, Versions 3.0 and 3.1 (7th Edition)2013
Electronic Materials	Determines as the course is going on.
Other Learning Materials	Videos and presentations are available with the instructor.

2. Facilities Required

Item	Resources
Accommodation (Classrooms, laboratories, demonstration rooms/labs, etc.)	Classrooms and Labs available at College of science in Zulfi.
Technology Resources (AV, data show, Smart Board, software, etc.)	Smart Board.
Other Resources (Specify, e.g. if specific laboratory equipment is required, list requirements or attach a list)	No

G. Course Quality Evaluation

Evaluation Areas/Issues	Evaluators	Evaluation Methods
• Analysis of students' results. • Observation during work. • Students' evaluations. • Colleagues' evaluations . • Evaluation questionnaire filled by the students. • Interview a sample of students enrolled in the course to take their opinions.		

Evaluation areas (e.g., Effectiveness of teaching and assessment, Extent of achievement of course learning outcomes, Quality of learning resources, etc.)
Evaluators (Students, Faculty, Program Leaders, Peer Reviewer, Others (specify)
Assessment Methods (Direct, Indirect)

H. Specification Approval Data

Council / Committee	
Reference No.	
Date