اعتماد
NCAAA

T4

2020

Course Specifications

Course Title:	Computer Graphics
Course Code:	501472-3
Program:	Bachelor in Computer Science
Department:	Department of Computer Science
College:	College of Computers and Information Technology
Institution:	Taif University

Table of Contents

A. Course Identification

1. Credit hours: 3 hours	

2. Course type

a. University ☐ College ☐ Department ☒ Others ☐

b. Required ☒ Elective ☐

3. Level/year at which this course is offered: 11/4

4. Pre-requisites for this course (if any)**: 501324-3**

5. Co-requisites for this course (if any)**:**
None

6. Mode of Instruction (mark all that apply)

No	Mode of Instruction	Contact Hours	Percentage
1	**Traditional classroom**	4hrs (lectures)	100%
2	**Blended**		
3	**E-learning**		
4	**Distance learning**		
5	**Other**		

7. Contact Hours (based on academic semester)

No	Activity	Contact Hours
1	**Lecture**	40
2	**Laboratory/Studio**	
3	**Tutorial**	
4	**Others** (specify)	
	Total	40

B. Course Objectives and Learning Outcomes

1. Course Description

Introduce techniques for constructing 2-D and 3-D Graphics using OpenGL. The topics include the rendering pipeline, primitive drawings, geometric transformations, clipping, lighting and illumination, color models texture mapping, and ray-tracing animation

2. Course Main Objective

By the end of this course, the students should be able to:
- Outline the foundations of computer graphics hardware systems, math basis, light and color.
- Know how to implement graphics primitives such as windows, points, line and circle using graphics programming library such as OpenGL library.
- Understand the full graphics pipeline and implement it in OpenGL

3. Course Learning Outcomes

	CLOs	Aligned PLOs
1	**Knowledge and Understanding**	
1.1	Outline the foundations of computer graphics hardware systems, math basis, light, color, modeling, and transformation	K1
1.2	Outline basic transformations types in computer graphics	K1
2	**Skills :**	
2.1	Model 2D and 3D transformations such as translation, scaling, shearing, rotation, and affine transformations.	S1
2.2	Implement texture mapping and clipping and a full graphics pipeline.	S2
3	**Values:**	
3.1		
3.2		
3.3		
3...		

C. Course Content

No	List of Topics	Contact Hours
1	Overview of computer graphics concepts	Theory=2
2	CRT, spots and lights, raster and random scan displays, color models	Theory=2
3	Color CRT monitors, color models, flat CRT and Video controller systems Raster and vector graphics	Theory=4
4	OpenGl program and structures	Theory=4
5	Windows, points, coordinate system	Theory=4
6	line drawing: DDA algorithm, Brasenham's algorithm	Theory=4
7	Circle and midpoint circle algorithms, Brasenham's algorithm	Theory=4
8	Primitive objects and fill colors in OpenGL	Theory=4
9	2D/3D transformation such as translation, scaling, shearing, rotation, and affine transformations.	Theory=4
10	2D/3D deformation such as shearing, tapering, twisting, bending	Theory=4
11	Model view matrix: viewing in 3D orthographic projection and perspective projection	Theory=4
Total		40

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	Outline the foundations of computer graphics hardware systems, math basis, light, color, modeling, and transformation	Lectures	**Direct Assessment Tool** Quizzes / Homework/Project/ Exams **Indirect Assessment Tool**

Code	Course Learning Outcomes	Teaching Strategies	Assessment Methods
			Course Exit Survey
1.2	Outline basic transformations types in computer graphics	Lectures	**Direct Assessment Tool** Quizzes / Homework/Project/ Exams **Indirect Assessment Tool** Course Exit Survey
2.0	**Skills**		
2.1	Model 2D and 3D transformations such as translation, scaling, shearing, rotation, and affine transformations	Lectures E-learning Videos	**Direct Assessment Tool** Quizzes / Homework/Project/ Exams **Indirect Assessment Tool** Course Exit Survey
2.2	Implement texture mapping and clipping and a full graphics pipeline.	Lectures Videos Project	**Direct Assessment Tool** Quizzes / Homework/Project/ Exams **Indirect Assessment Tool** Course Exit Survey
…			
3.0	**Values**		
3.1			
3.2			
…			

2. Assessment Tasks for Students

#	Assessment task*	Week Due	Percentage of Total Assessment Score
1	Homework	Week 3, 7	%10
2	Project	Week 9	%25
3	Quizzes	Week 7	%5
4	Mid-Term	Week 5	%20
5	Final Examination	Week 10	%40

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

E. Student Academic Counseling and Support

Arrangements for availability of faculty and teaching staff for individual student consultations and academic advice :
- 4 hours per week in pre-determined office hours
- Consultation by appointment (as needed)
- Through emails
- Through BlackBoard Learn

F. Learning Resources and Facilities

1.Learning Resources

Required Textbooks	Computer Graphics with OpenGL by Donald D. Hearn, M. Pauline Baker ISBN-13: 978-0136053583
Essential References Materials	• Computer Graphics Through OpenGL: From Theory to Experiments 2nd Edition ISBN-13: 978-1482258394 OpenGL: A primer by Edward Angel
Electronic Materials	• http://www-inst.eecs.berkeley.edu/~cs184/sp12/slides.html http://www.cs.cmu.edu/afs/cs/academic/class/15462-f10/www/
Other Learning Materials	

2. Facilities Required

Item	Resources
Accommodation (Classrooms, laboratories, demonstration rooms/labs, etc.)	• Classroom with 25 chairs Lab with 15 PCs and required software tools installed (C++ editor with OpenGL support)
Technology Resources (AV, data show, Smart Board, software, etc.)	• Video projector / data show White board
Other Resources (Specify, e.g. if specific laboratory equipment is required, list requirements or attach a list)	

G. Course Quality Evaluation

Evaluation Areas/Issues	Evaluators	Evaluation Methods
Effectiveness of Teaching	Students	Students surveys and Students course evaluation
Improvement of Teaching	Course Coordinator	Deficiencies based on the student Evaluation, faculty input, course file, and program assessment
Verifying Standards of Student Achievement	Curriculum Committee	• Review CAF (Course assessment file) • Alumni surveys. Periodic exchange and remarking of tests or a sample of assignments with staff at another

Evaluation Areas/Issues	Evaluators	Evaluation Methods

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	CS council
Reference No.	Meeting #12
Date	23-10-1443