



Course Specification

— (Bachelor)

Course Title: **Computer Graphics**

Course Code: **CS1751**

Program: **Computer Science**

Department: **Computer Science and Engineering**

College: **Computer Science and information technology**

Institution: **Al-Baha University**

Version: **TP-153**

Last Revision Date: **8/10/2023**



Table of Contents

A. General information about the course:	3
B. Course Learning Outcomes (CLOs), Teaching Strategies and Assessment Methods	4
C. Course Content	5
D. Students Assessment Activities	6
E. Learning Resources and Facilities	6
F. Assessment of Course Quality	7
G. Specification Approval	8



A. General information about the course:

1. Course Identification

1. Credit hours: (3 H)

2. Course type

A. University College Department Track Others

B. Required Elective

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

4. Course general Description:

Lecture:

This course introduces fundamental concepts of Computer Graphics. The course provides an overview of computer graphics hardware, algorithms, and software. Overview of graphics 2D and 3D object representation, geometric transformations, 2D and 3D viewing, illumination models, color modes, and color applications. The course emphasizes the basic principles needed to design, use and understand computer graphics system.

Lab:

The fundamentals of computer graphics are covered in this lab. Both 2D and 3D graphics will be discussed. Raster scan graphics will be broadly analyzed, including line and circle drawing, polygon filling, anti-aliasing techniques, clipping, hidden-line and hidden surface methods, as well as ray tracing and rendering. Additionally, 2D and 3D transformations for the representation of graphic systems are also included. Lab class implementation will be carried out using Java programming.

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

Data Structure (CS1256)

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

None

7. Course Main Objective(s):



The main purpose for this course is to teach students how to:

- Recognize fundamental principles of computer graphics
- Describe the structure of modern computer graphics systems
- Develop key algorithms for modeling and rendering graphical shapes
- Develop computer graphics-based applications
- Work both independently and collaboratively.
- Communicate concepts and techniques in oral presentations

2. Teaching mode (mark all that apply)

No	Mode of Instruction	Contact Hours	Percentage
1	Traditional classroom	44	100%
2	E-learning		
3	Hybrid <ul style="list-style-type: none"> • Traditional classroom • E-learning 		
4	Distance learning		

3. Contact Hours (based on the academic semester)

No	Activity	Contact Hours
1.	Lectures	22
2.	Laboratory/Studio	22
3.	Field	-
4.	Tutorial	-
5.	Others (specify)	-
Total		44

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

Code	Course Learning Outcomes	Code of CLOs aligned with program	Teaching Strategies	Assessment Methods
1.0	Knowledge and understanding			



Code	Course Learning Outcomes	Code of CLOs aligned with program	Teaching Strategies	Assessment Methods
1.1	Recognize fundamental principles of computer graphics	K1	<ul style="list-style-type: none"> E-learning Concept mapping 	<ul style="list-style-type: none"> Homework Midterm exams Final Exam
1.2	Describe basic techniques for operating with two- and three-dimensional objects	K2	<ul style="list-style-type: none"> E-learning Concept mapping 	<ul style="list-style-type: none"> Homework Midterm exams Final Exam
2.0	Skills			
2.1	Develop key algorithms for modeling and rendering graphical shapes	S1	<ul style="list-style-type: none"> E-learning Inductive Teaching 	<ul style="list-style-type: none"> Homework Midterm exams Final Exam
2.2	Develop computer graphics-based applications	S2	<ul style="list-style-type: none"> E-learning Problem-solving or problem-based learning (Case study) 	<ul style="list-style-type: none"> Quizzes Midterm exams Lab Exam Final Exam
3.0	Values, autonomy, and responsibility			
3.1	Work both independently and collaboratively.	V1	<ul style="list-style-type: none"> E-learning Brainstorming (Small groups) 	<ul style="list-style-type: none"> Course project presentation and report
3.2	Communicate concepts and techniques in oral presentations	V1	<ul style="list-style-type: none"> E-learning Discussion (Oral presentation) 	<ul style="list-style-type: none"> Course project presentation and report

C. Course Content

No	List of Topics	Contact Hours
1.	Introduction to computer graphics	2
2.	Computer graphics hardware and software	2
3.	Input and output for graphics software	3
4.	Light and color	3
5.	Two and three Dimensional Views	4
6.	2D Geometric transformations	4
7.	3D Geometric transformations	4
Total		22



No	List of Topics (Lab)	Contact Hours
1.	Introduction to Java graphics library	2
2.	Graphical user interface issues	2
3.	Color modelling and fonts	3
4.	Implementing of various primitive shapes drawing	4
5.	Concepts of 2D & 3D object representation	3
6.	2D Geometric transformations and rotation	4
7.	3D Geometric transformations and rotation	4
Total		22

D. Students Assessment Activities

No	Assessment Activities *	Assessment timing (in week no)	Percentage of Total Assessment Score
1.	Homework	Every two Weeks	10%
2.	Midterm	6	20%
3.	Quiz	10	10%
4.	Lab reports and discussions (rubric)	Every two Weeks	10%
5.	Lab exam evaluation form (rubric)	12	10%
6.	Final Exam	13	40%
Total			100%

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

E. Learning Resources and Facilities

1. References and Learning Resources

Essential References	- Steve Marschner and Peter Shirley, "Fundamentals of Computer Graphics", CRC Press, Fifth edition, 2022.
Supportive References	- Leen Ammeraal and Kang Zhang, "Computer Graphics for Java Programmers", Springer International Publishing, Third edition, 2017. - Computer Science Curriculum 2013 – http://cs2013.org - ACM (Association for Computer Machinery) Curricula Recommendations - http://www.acm.org/education/curricula-recommendations
Electronic Materials	• ACM (Association for Computer Machinery) web site - http://www.acm.org/ • IEEE Computer Society web site - http://www.computer.org/portal/web/guest/home • Access to the Saudi Digital Library (SDL).





	Using the learning management system of the university – Rafid System (https://lms.bu.edu.sa/).
Other Learning Materials	None

2. Required Facilities and equipment

Items	Resources
facilities (Classrooms, laboratories, exhibition rooms, simulation rooms, etc.)	<ul style="list-style-type: none"> • A classroom or lecture hall with whiteboard for 25 students. • A digital circuit's laboratory.
Technology equipment (projector, smart board, software)	<ul style="list-style-type: none"> • A digital image projection system with connection to desktop computer and laptop computer. • High speed Internet connection. • An instructor computer station. • MATLAB with digital image processing toolbox
Other equipment (depending on the nature of the specialty)	None

F. Assessment of Course Quality

Assessment Areas/Issues	Assessor	Assessment Methods
Effectiveness of teaching	<ul style="list-style-type: none"> • Students • Faculty • Peer Reviewers • Program Leader • Course Coordinator 	<ul style="list-style-type: none"> • Surveys (indirect). • Direct feedback from students (interview between Program leader and students). • Course evaluation by Peer Reviewers (indirect). • Class visit by Program Leader • Comprehensive Course report (where we can find information about teaching difficulties and action plan, ...)
Effectiveness of Students assessment	<ul style="list-style-type: none"> • Students • Faculty • Peer Reviewers • Course Coordinator • Exam Evaluation Committee • Course Coordinator 	<ul style="list-style-type: none"> • Surveys (indirect). • Direct feedback from students (interview between Program leader and students). • Assessment results (direct) • Course evaluation by Peer Reviewers (indirect). • Comprehensive Course report (where we can find information about assessment difficulties and action plan, ...) • Exam evaluation by the Exam Evaluation Committee (indirect)





Assessment Areas/Issues	Assessor	Assessment Methods
Quality of learning resources	<ul style="list-style-type: none"> • Students • Faculty • Peer Reviewers • Course Coordinator 	<ul style="list-style-type: none"> • Surveys (indirect) • Course evaluation by Peer Reviewers (indirect). • Comprehensive Course report (where we can find information about difficulties and challenges about learning resources as well as consequences and action plan, ...)
The extent to which CLOs have been achieved	<ul style="list-style-type: none"> • Faculty • Program Leader • Course Coordinator 	<ul style="list-style-type: none"> • Student Results (direct) • Comprehensive Course report (where we can find the CLO assessment results)
Other	None	None

Assessors (Students, Faculty, Program Leaders, Peer Reviewer, Others (specify))

Assessment Methods (Direct, Indirect)

G. Specification Approval

COUNCIL /COMMITTEE	CURRICULUM COMMITTEE MEETING
REFERENCE NO.	
DATE	8/10/2023

