



Department of Computer Science and Engineering

Lesson Plan

Course Title: Computer Graphics & Image Processing Laboratory

Course Code: CSE 456

Level/Term: 4/1

Section: A

Credit: 1

Contact Hours: 19.5

Prerequisite: Structured Programming

Session: FALL 2023

Instructor: Salman Farsi, Lecturer

Lab schedule: Section-A: Wednesday: 2:30 PM - 3:45 PM

Section B: Wednesday: 12.15 PM – 1.30 PM

Section C: Monday: 9.45 AM – 11 AM

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Rationale:

In Computer Graphics & Image Processing Laboratory course, the students will learn various computer graphics algorithms. In this program, the students will have to implement the mostly used computer graphics algorithms like line drawing, polygon clipping, line clipping etc. For the image processing part, students will learn about different color models and conversion among them. In this part, binary image manipulation will be performed.

Course Objective

The program will prepare our students to be successful in computer vision and graphics field with solid fundamental knowledge of basic algorithms.

1. Contribute effectively in the research area of computer graphics and image processing.
2. Students will learn about the practical use of various computer graphics and image processing algorithms.

Students will be able to implement new algorithms to overcome the existing problems.

Course Outcomes (COs):

Upon successful completion of this course, students will be able to

CO1	Implement (C3) various scan conversion algorithms using available graphical tools.
CO2	Execute (C3) various graphical transformation methods.
CO3	Implement (C3) various image processing techniques.
CO4	Demonstrate (C3) the skills of computer graphics and image processing to develop a mini project.

CO5	Report (A3) lab activities and experimental results or findings.
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Mapping of Course Outcomes to Program Outcomes:

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1	✓				✓							
CO2	✓				✓							
CO3	✓				✓							
CO4	✓	✓	✓		✓							
CO5										✓		

Course Description:

SL No.	Course Contents	COs
1.	Scan Conversion Algorithm: Digital Differential Analyzer Algorithm, Bresenham Line Drawing Algorithm, Midpoint Circle Drawing Algorithm.	CO1, CO5
2.	Transformation: Geometric transformation, translation, rotation, window to viewport mapping.	CO2, CO5
3.	Image Processing: Color model, Binary image analysis, Image restoration techniques.	CO3, CO5
4.	Mini Project Development: Unity, OpenGL or any other platforms/tools.	CO4, CO5

Text Books, Reference Books and Other Resources:

1. Computer Graphics (Second Edition): Zhigang Xiang
2. Digital Image Processing: Rafael C. Gonzalez, Richard E. Woods
3. Computer Graphics: Principles and Practice: James D Foley, Andries Van Dam

Mapping Course Outcomes with the Teaching-Learning and Assessment Strategy:

COs	Corresponding POs	Bloom's taxonomy domain/level (C: Cognitive, P: Psychomotor A: Affective)	Delivery Methods and Activities	Assessment Tools
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CO1	PO1, PO5	C3	Lecture, Slide	Performance, Assignment
CO2	PO1, PO5	C3	Lecture, Slide	Performance, Assignment
CO3	PO1, PO5	C3	Lecture, Slide	Performance, Assignment
CO4	PO1, PO2, PO3, PO5	C3	Lecture, Slide	Performance, Assignment
CO5	PO10	A3	Demonstration	Report

Weekly Lesson Plan

Week no.	Topic	Teaching Strategy	Course Outcome	Assessment Strategy
1	Introduction to computer graphics and image processing tools	Lecture		
2	Implementation of DDA Line drawing Algorithm	Lecture & lab experiment	CO1	
3	Implementation of Bresenham Line drawing Algorithm	Lecture & lab experiment	CO1	
4	Scan converting by using mid-point circle drawing algorithm	Lecture & lab experiment	CO1	Performance test-1
5	Color model Transformation	Lecture & lab experiment	CO2	
6	Window to viewport mapping	Lecture & lab experiment	CO2	Performance test-2
7	Binary Image Analysis	Lecture & lab experiment	CO3	
8	Image compression and restoration technique	Lecture & lab experiment	CO3	Performance test-3
9	Unity/opengl project selection and group forming	Lecture & lab experiment	CO4	
10	Demo Mini project development – part 1	Lecture & lab experiment	CO4	

11	Demo Mini project development – part 2	Lecture & lab experiment	CO4	
12	Demo Mini project development – part 3	Lecture & lab experiment	CO4	Performance test-4
13	One New Project Development		CO4	Report and viva