

DEPARTMENT OF COMPUTER SCIENCE & ENGINEERING

COURSE MODULE OF THE SUBJECT TAUGHT FOR THE SESSION 2025-2026

(ODD SEMESTER)

Course Syllabi with CO's

Academic Year: 2025 – 2026														
Department: Computer Science and Engineering														
Course Code	Course Title	Core/Elective	Prerequisite	Contact Hours			Total Hrs/ Sessions							
				L	T	P								
BCS515A	COMPUTER GRAPHICS	Elective	-	3	-	-	40							
Objectives	<p>This course will enable students to:</p> <ul style="list-style-type: none">• Understand the basic principles of Graphical Systems.• Understand hardware, software and OpenGL Graphics Primitives.• Illustrate interactive computer graphic using the OpenGL.• Design and implementation of algorithms for 2D graphics Primitives and attributes.• Demonstrate Geometric transformations, viewing on both 2D and 3D objects.• Infer the representation of lines, surfaces, Color and Illumination models													
Topics Covered as Per Syllabus														
Module 1:														
Graphics Systems and Models: Applications of Computer Graphics, A Graphics System, Images: Physical and Synthetic, Imaging Systems, The Synthetic-Camera Model, The Programmer's Interface, Graphics Architectures, Programmable Pipelines, Performance Characteristics.														
Text book 1: Chapter 1														
Module 2:														
Input and Interaction: Interaction, Input devices, Clients and Servers, Display Lists, Display Lists and Modeling, Programming Event Driven Input, Menus.														
Text book 1: Chapter 3 – 3.1 to 3.7														
Module 3:														
Geometric Objects and Transformations: Frames in OpenGL, Modeling a Colored Cube, Affine Transformations, Rotation, Translation and Scaling, Transformation in Homogeneous Coordinates,														

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Concatenation of Transformations.

Text book 1: Chapter 4 – 4.4 to 4.9

Module 4:

Viewing: Classical and Computer Viewing, Viewing with a Computer.

Lighting and Shading: Light and Matter, Light Sources, The Phong Lighting Model, Polygonal Shading.

Text book 1: Chapter 5 – 5.1, 5.2 and Chapter 6 – 6.1, 6.2, 6.3 and 6.5

Module 5:

From Vertices to Fragments: Basic Implementation Strategies, Four major tasks, Clipping, Line-segment clipping, Cohen-Sutherland Clipping, Liang-Barsky Clipping.

Implementation Algorithms for Graphics Primitives and Attributes: Line-Drawing Algorithms, DDA Algorithm, Bresenham's Line Algorithm, Parallel Line Algorithms, Setting Frame-Buffer Values Circle-Generating Algorithms, Midpoint Circle Algorithm.

Text book 1: Chapter 7 – 7.1 to 7.4

Text Book 2: Chapter 5 – 5.1 to 5.4

List of Text Books

1. Edward Angel: Interactive Computer Graphics A Top-Down Approach with OpenGL, 5th Edition, Pearson Education, 2008.
2. Donald Hearn & Pauline Baker: Computer Graphics with OpenGL Version, 4th Edition, Pearson Education, 2011.

Course Outcomes	<p>The student will be able to:</p> <ol style="list-style-type: none">1. Explain the fundamentals of computer graphics systems.2. Develop event driven graphical applications by interfacing hardware devices.3. Apply the Geometrical Transformations on geometrical objects.4. Apply the concepts of viewing, lighting and shading on graphical objects.5. Demonstrate algorithms for 2D graphical primitives.
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The Correlation of Course Outcomes (CO's) and Program Outcomes (PO's)

Course Code:		Program Outcomes											Total
List of Course Outcomes	PO-1	PO-2	PO-3	PO-4	PO-5	PO-6	PO-7	PO-8	PO-9	PO-10	PO-11		
CO-1	3	2	2	-	-	-	-	-	-	-	-	7	
CO-2	3	3	2	-	-	-	-	-	-	-	-	8	
CO-3	3	3	2	-	-	-	-	-	-	-	-	8	
CO-4	3	3	2	-	-	-	-	-	-	-	-	8	
CO-5	3	3	3	-	-	-	-	-	-	-	-	9	
Total	15	14	11	-	-	-	-	-	-	-	-	40	

Note: 3 = Strong Contribution 2 = Average Contribution 1= Weak Contribution 0 = No Contribution

The Correlation of Course Outcomes (CO's) and Program Outcomes (PSO's)

SubjectCode: BCS515A		Course Title: Computer Graphics		Total	
List of Course Outcomes	Program Specific Outcomes				
	PSO-1		PSO-2		
CO-1	2		-	2	
CO-2	2		-	2	
CO-3	2		-	2	
CO-4	2		-	2	
CO-5	2		-	2	
Total	10		-	10	

Note: 3 = Strong Contribution 2 = Average Contribution 1= Weak Contribution 0 = No Contribution