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KU6SECCSC112: COMPUTER GRAPHICS

Semester	Course Type	Course Level	Course Code	Credits	Total Hours
6	SEC	100-199	KU6SECCSC112	3	60

Learning Approach (Hours/ Week)			Marks Distribution			Duration of ESE (Hours)
Lecture	Practical/ Internship	Tutorial	CE	ESE	Total	
2	2	-	25	50	75	1.5 hrs.

Course Description:

This course provides an introduction to the principles and practices of computer graphics. It covers fundamental concepts such as 2D and 3D graphics programming, rendering, animation, and graphical user interfaces. Students will learn about graphics systems, primitives, drawing algorithms, transformations, viewing techniques, and illumination models. Practical implementation and application of these concepts will be emphasized through programming assignments and projects.

Course Prerequisite: NIL

Course Outcomes:

CO No.	Expected Outcome	Learning Domains
1	Discuss the basics and history of computer graphics.	U
2	Use 2D graphics techniques like drawing and filling shapes.	A

3	Implement the knowledge to Transform 2D objects with translation, rotation, and scaling.	A
4	Develop rendered images using various shading and rendering techniques.	C

**Remember (R), Understand (U), Apply (A), Analyse (An), Evaluate (E), Create (C)*

Mapping of Course Outcomes to PSOs

	PSO 1	PSO 2	PSO 3	PSO 4	PSO 5	PSO 6	PSO 7
CO 1	3						2
CO 2	2	2	3				
CO 3	3	2	2				
CO 4	3	2	2				2

COURSE CONTENTS

Contents for Classroom Transaction:

MODULE	UNIT	DESCRIPTION	HOURS
1		**INTRODUCTION TO COMPUTER GRAPHICS**	12
	1	**Introduction to computer graphics**	
		a) Introduction	
		b) History and evolution	
	2	**Overview of Graphics Systems**	
		a) Display devices, Input devices, Hard-Copy devices	
	3	**Graphics Primitives and Drawing**	
		a) Points, lines, and polygons, Circle and ellipse generation algorithms.	
		b) Drawing algorithms for lines and polygons	

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	4	**Graphics Software and Hardware**	
		a) Overview of graphics software	
		b) Graphics hardware	
		c) Graphics standards and file formats	

2	**TWO-DIMENSIONAL GRAPHICS**		
	1	Two-Dimensional primitives: Points, lines, and polygons	12
	2	Scan Conversion: Line, Circle, and Ellipse drawing algorithms	
	3	Polygon Filling Algorithms: Flood fill, Boundary fill	
	4	Geometric Transformations in 2D: Translation, Rotation, Scaling	
	5	Clipping in 2D	

3	**THREE-DIMENSIONAL GRAPHICS**		
	1	Three-Dimensional Primitives: Points, Lines, and Polygons	12
	2	3D Transformations	
		a) Translation	
		b) Rotation	
		c) Scaling	
	3	Viewing in 3D: Perspective and Orthographic projections	

4	**RENDERING AND ANIMATION**		
	1	Introduction to Rendering	12
		a) Types of rendering: wireframe, hidden-line, flat, Gouraud, Phong	
	2	Illumination Models:, Phong Model	
		a) Diffuse and Specular Reflection, Phong Model	
		b) Shading models: flat, Gouraud, Phong	
	3	Ray Tracing Basics	
		a) Ray-object intersection, Reflection and refraction , Raytracing algorithm	

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5	**Teacher Specific Module**	
	Concerned teacher can adopt proper methodologies to apply and enhance the skill in respective topics.	
		12

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Essential Readings:

1. Computer Graphics: Principles and Practice by John F. Hughes, Andries van Dam, Morgan McGuire, David F. Sklar, James D. Foley, Steven K. Feiner, Kurt Akeley

2,Hearn, D., & Baker, M. P. (2014). *Computer Graphics with OpenGL*. Pearson Education.

3,Rogers, D. F. (2013). Procedural Elements for Computer Graphics. Springer Science & Business Media.

4.Shirley, P., & Marschner, S. R. (2014). Fundamentals of Computer Graphics. CRC Press.

Suggested Readings:

1. Watt, A., & Watt, M. (2017). Advanced Animation and Rendering Techniques: Theory and Practice. Addison-Wesley Professional.

Assessment Rubrics:

Evaluation Type		**Marks**
End Semester Evaluation		**35(Theory)**
Practical		15(practical)
Code writing		**8**
Execution without error		**5**
viva		**2**
Continuous Evaluation		**15(Theory) 10(practical)**
a)	Test Paper- 1	5

b)	Model Examination	5
c)	Assignment/viva	5
	Practical	
	Model exam	5
	Record	2
	Punctuality and lab performance	3
Total		**75**

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