Course Code	CSE 533/333
Course Name	Computer Graphics
Credits	4
Course Offered to	UG/PG
Course Description	This course will provide basic concepts of computer graphics including necessary mathematics and algorithms. Primary focus of this course will be to understand the basics of 2D/3D rendering. The course will also cover various aspects of the rendering pipeline and realistic image synthesis using raytracing. The standard shader based OpenGL rendering API will be introduced, and used with lab exercises, assignments, and projects. The students will learn building complete graphics systems through projects.

Pre-requisites

Pre-requisite (Mandatory)	Pre-requisite (Desirable)	Pre-requisite(other)
CSE101 Intro to Programming	CSE102 Data Structures & Algorithms	C/C++ Programming

*Please insert more rows if required

Post Conditions*(For suggestions on verbs please refer the second sheet)

CO1	CO2	CO3	CO4	
Understand fundamental graphics algorithms and data structures used in rendering.	Use shader based OpenGL API for 2D/3D rendering,	Understand spatial data structures for shape representation	Able to use spatial algorithms for geometry processing and display, and understand the graphics pipeline and graphics hardware.	

Weekly Lecture Plan

Week Number	Lecture Topic	COs Met	Assignment/Labs/Tutorial
1	Introduction, Shape representation	CO3	
2	Shape representation	CO3, CO5	
3	OpenGL basics and programmable graphics pipeline, Rasterization and scan conversion	CO2, CO5	
4	2D/3D transformations	CO1, CO4	2D drawing with OpenGL
5	Modelling, viewing, and projection transformations	CO1, CO4	Transformations in 3D
6	Clipping	CO1, CO4	Viewing and projection
7	Visibility	CO1, CO4	
8	Color	CO1, CO4	
9	Lighting and shading	CO1, CO4	
10	Texturing, Implicit modelling	CO1, CO3, CO4, CO5	Lighting and shading
11	Parametric curves and surfaces	CO1, CO3, CO4	Texturing
12	Raytracing, Animation	CO1, CO4	
13	Advanced raytracing, introduction to global illumination, and Ambient occlusion	CO1, CO4	Raytracing

Weekly Lab Plan

Week Number	Laboratory Exercise	COs Met	Platform (Hardware/Software)
1, 2, 3	Basic GLUT and OpenGL	CO2	Any/OpenGL
4 - 13	TBD		

*Please insert more rows if required

Assessment Plan

Type of Evaluation	% Contribution in Grade
Assignment	20
Quiz	5
Laboratory	5
Project	30
Mid-sem	15
End-sem	25

*Please insert more row for other type of Evaluation

Resource Material

Type	Title
Textbook	Peter Shirley, Fundamentals of Computer Graphics, AK Peters Ltd.
Reference	Andries Van Dam, Steven K. Feiner, Morgan McGuire, and David F. Sklar, Computer graphics: principles and practice, Pearson Education
Reference	Donald Hearn, and M. Pauline Baker, Computer Graphics, Prentice-Hal
Reference	Interactive Computer Graphics – A top-down approach with OpenGL, Edward Angel and Dave Shreiner, 6th Ed., Addison-Wesley.