Computer Graphics
EG 2216 CT

Year: II
Semester: IV

Total: 5 hour /week
Lecture: 2 hours/week
Practical: 3 hours/week

Course Description:
This course deals with graphics hardware, two and three dimensional graphics, fundamentals of animation techniques; web graphics design and graphics design packages.

Course Objectives:
After completing this course the students will be able to:
1 Acquire the knowledge of computer graphics.
2 Familiarize with hardware involved in graphics.
3 Explain Algorithms to generate two and three-dimensional graphical objects and animations.

Course Contents

Unit	Topics	Contents	Hours	Methods /Media	Marks
1	**Introduction to computer graphics & graphics systems**	1.1 History of Computer Graphics, 1.2 Application of Computer Graphics 1.3 CAD and CAM 1.4 Input hardware- Mouse (Mechanical and Optical), Keyboard, Light pen, Touch panel (Optical, Sonic, and Electrical), Tablets (Electrical, Sonic, Resistive), Scanner 1.5 Output hardware – Monitors, plotters, printers 1.6 Raster and vector display technology – principles and characteristics 1.7 Raster display – Monochromatic and color CRTs	**[6]**		
2	**Two-Dimensional Graphics:**	2.1 Line drawing methods – DDA and Bresenham algorithms 2.2 Circle and ellipse drawing algorithms 2.3 Review of matrix operations – addition and multiplication 2.4 Two-dimensional transformations – translation, rotation, scaling and reflection	**[7]**		
3	**Three-dimensional Graphics:**	3.1 Projection of 3D objects onto 2D display devices 3.2 Parallel and perspective projection	**[10]**		

Unit	Topics	Contents	Hours	Methods /Media	Marks
		3.3. 3 D transformations – translation, rotation, scaling, refection 3.4 Methods of 3D object representation– polygon tables and polygon surfaces 3.5 Introduction to hidden line and surface detection techniques 3.6 Introduction to lighting models 3.7 Introduction to shading models – constant shading, Gouraud shading and Phong shading			
4	**Fundamentals of Animation Techniques:**	4.1 Animation sequence 4.2 Key-frame and parameterized systems 4.3 Morphing and simulating acceleration	**[3]**		
5	**Introduction to Web Graphics Designs and Graphics Design Packages:**	5.1 Introduction to graphics file formats 5.2 Principles of web graphics design – browser safe colors, size, resolution, background, anti-aliasing 5.3 Type, purposes and features of graphics packages 5.4 Examples of graphics packages and libraries	**[4]**		
Practical:			**[45]**		

As a part of the laboratory exercise, the students should implement all the algorithms studied in different chapters. At the end, students are required to integrate the codes they have written in earlier practical sessions to create a small project.

The lab contains few sessions dedicated to introduce the students to some of the popular professional graphics packages and CAD packages and explore their features. The course/lab instructor recommends packages to use.

Some algorithm implementation sessions may include:
a. Implementation of DDA and BLA
b. Implementation of circle and ellipse drawing algorithms
c. 2D transformations
d. Projections
e. 3D transformations.

References:
- James Foley, Andries van Dam, Steven Feiner, John Hughes, "Compute Graphics – Principles and Practice", Second Edition in C, Addison Wesley Publishing
- D. Hearn M. P. Baker, "Computer Graphics – C version", Second Edition, Prentice – Hall International, Inc.