Course code	Course Name	L-T-P-Credits	Year of Introduction
IT367	Computer Graphics & Multimedia	3-0-0-3	2016

Prerequisite : Nil

Course Objectives

- To build an understanding of the fundamental concepts of Computer Graphics & Multimedia
- To familiarize with the working principles of various display technologies.
- To prepare for understanding advanced courses in Computer Graphics.

Syllabus

Graphics Systems, Line & Circle generation Algorithms, Compression techniques in Multimedia, Display Technologies, Transformations in 2D and 3D, Matrix representation of transformations, Clipping Algorithms, Hidden surface removal techniques, Digital Image processing**.**

Expected Outcome

The students will be able to

i. Explain the techniques used for display in CRT, LCD, LED displays.
ii. Identify the intermediate points needed to plot a line, given only its end points.
iii. Write the matrix corresponding to various 2D & 3D transformations.
iv. Find the vertices of the clipped polygon against a rectangular window by applying the learned polygon clipping algorithm.
v. Write an algorithm for finding & labeling different regions in a digital image.

References

1. Donald Hearn, Pauline Baker, " *Computer Graphics – C Version*", Pearson Education.
2. Steinmetz R. & Nahrstedt K., "*Multimedia: Computing, Communications and Applications*", Pearson Education.
3. David F. Rogers, "*Procedural Elements for Computer Graphics*", Tata McGraw-Hill
4. Foley, van Dam, Feiner & Hughes, "*Computer Graphics Principles & Practice*", Pearson Education.
5. William M. Newman, Robert F. Sproull, "*Principles of Interactive Computer Graphics*" , Tata McGraw-Hill.
6. David F. Rogers, J. Alan Adams, "*Mathematical Elements for Computer Graphics*", Tata McGraw-Hill.
7. Tay Vaughan, "Multimedia: Making it Work", Tata McGraw-Hill.

Module	Course Plan	Hours	Sem. Exam Marks
I	Graphics Systems – Raster Scan & Random Scan systems. Output Primitives – Line Drawing Algorithms (DDA, Bresenham), Circle generation algorithm. Filled Area Primitives – Scan Fill, Flood Fill, Boundary Fill. Inside outside tests.	7	15%
II	Multimedia: Data Compression- Source, Entropy & Hybrid Coding, Basic compression techniques, JPEG, H.261, MPEG, DVI.	7	15%
	FIRST INTERNAL EXAM		
III	Display Technologies: Working principle behind CRT, LCD, Plasma, LED, OLED, AMOLED, E-Paper displays.	6	15%

IV	2-Dimensional Geometric Transformations (Basic Transforamtions, Reflection & Shear), Homogenous Matrix representation of transformations. Composite Transformations.	**7**	**15%**
SECOND INTERNAL EXAM			
V	2-D Clipping- Point Clipping, Cohen-Sutherland Line Clipping Algorithm, Sutherland-Hodgeman Polygon Clipping Algorithm. 3-Dimensional Geometric Transformations -Basic Transforamtions, Composite 3 D transformations.	**8**	**20%**
VI	Visible Surface Detection Methods: Back Face Detection, Depth Buffer, A-Buffer, Scan line, Depth sorting methods. Digital Image Processing: Histogram, Equalisation, Image Segmentation, Region Labeling.	**7**	**20%**
END SEMESTER EXAM			

QUESTION PAPER PATTERN

Maximum Marks: 100 Exam Duration: 3 hours

The question paper shall consist of Part A, Part B and Part C.

Part A shall consist of three questions of 15 marks each uniformly covering Modules I and II. The student has to answer any two questions (15×2=30 marks).

Part B shall consist of three questions of 15 marks each uniformly covering Modules III and IV. The student has to answer any two questions (15×2=30 marks).

Part C shall consist of three questions of 20 marks each uniformly covering Modules V and VI. The student has to answer any two questions (20×2=40 marks).

Note : Each question can have a maximum of 4 subparts, if needed