

COURSE CODE	COURSE TITLE	L	T	P	C
1151CS113	COMPUTER GRAPHICS AND IMAGE PROCESSING	3	0	0	3

Course Category: Program Core

A. Preamble:

To introduce the necessary background, the basic algorithms, and the applications of computer graphics and image processing.

B. Pre-requisite

Sl. No	Course Code	Course Name
1	1150MA103	Engineering Mathematics 2
2.	1150CS201	Problem Solving using C

C. Link to Other courses

Sl. No	Course Code	Course Name
1	1152CS111	Multimedia Systems
2	1152CS113	Computer Vision

D. Course Outcomes

CO Nos.	Course Outcomes	Level of learning domain (Based on revised Bloom's taxonomy)
CO1	Explain about basics of Computer Graphics	K2
CO2	Summarize in the Shading models	K2
CO3	Explain various Advance Modeling Techniques	K2
CO4	Summarize in Basic of Image Processing	K2
CO5	Explain various image restoration techniques	K3

E. Correlation of COs with Programme Outcomes:

COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO 1	PSO 2	PSO 3
CO1	M	L	L											M	
CO2	M		L		M									H	
CO3	M										L			M	
CO4	M	L	M		M						L			L	
CO5	M	L			M						L				

H- Strong; M-Medium; L-Low

F. Course content

UNIT I REVIEW OF GRAPHICS FUNDAMENTALS

9

Basic raster graphical algorithm for 2D primitives, Line drawing algorithm, Circle drawing algorithm, Ellipse drawing algorithm, 2D and 3D transformations; Window, Viewport, Clipping algorithm, Bezier curve, b-spline curve, surfaces and Solid modeling.

UNIT II SHADING **9**

Parallel projection-Perspective projection, Buffer algorithm, Scan line algorithm. Area subdivision and Ray tracing algorithms. Illumination mode, Specular reflection model, Shading models for curve surfaces, Recursive ray tracing, Texture mapping

UNIT III ADVANCE MODELLING AND IMAGE PROCESSING **9**

Procedural Models, Fractal Models, Grammar based models, particle systems. Image – Introduction, Elements of visual perception, Steps in Image Processing Systems – Image Acquisition – Sampling and Quantization – Pixel Relationships

UNIT IV COLOR MODELS AND SEGMENTATION **9**

Color Model- RGB- CMYK -HSV- Watersheds and minimum spanning trees Deformable Methods – Intelligent scissors/ livewires, active contours; DP snakes

UNIT V IMAGE RECONSTRUCTION AND PATTERN ANALYSIS **9**

Restoration, noise removal, clustering. K means, K-medoids, Mixture of gaussian, classification: discriminate function, supervised, un supervised, semi-supervised; classifiers: Bayes, KNN, ANN models.

TOTAL: 45 Periods

G. Learning materials

i. TEXT BOOKS

1. Hearn & Baker, “Computer Graphics C version”, 2nd ed. Pearson Education, 2012.
2. Rafael C. Gonzalez and Richard E. Woods, “Digital Image Processing”, Third Edition, Pearson Education, 2008.

ii. Reference Books

1. DaveShreiner, Graham Sellers, John M. Kessenich, Bill M. Licea-Kane ,”OpenGL Programming Guide: The Official Guide to Learning OpenGL, Version 4.3”, 8th Edition, ARB working group.
2. Hearn and Baker, “Computer Graphics using open GL”, 3rd edition, Pearson Education,2009.
3. Rogers, “Procedural Element for Computer Graphics”, 2nd ed, Tata McGraw Hill, 2001.

iii Web References

1. www.cs.manchester.ac.uk/ugt/COMP27112/
2. www.slideshare.net/.../computer-graphics-image-processing-lecture-n.