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AY 24

Gandhi Institute of Engineering and Technology University, Odisha, Gunupur
(GIET University)

M.Tech. (First Semester – Regular/ Supplementary) Examinations, January – 2026

24MECPC11002– Digital Image and Video Processing
(ECE)

Time: 3 hrs | Maximum: 60 Marks

Answer ALL questions

(The figures in the right hand margin indicate marks)

PART – A **(2 x 5 = 10 Marks)**

Q.1. Answer ALL questions		CO #	Blooms Level
a.	Define a digital image and mention any two standard image formats.	CO1	K1
b.	What is histogram equalization?	CO2	K2
c.	Define thresholding and mention global vs adaptive thresholding.	CO3	K2
d.	What is YCbCr? Mention one application.	CO4	K2
e.	Differentiate supervised and unsupervised learning (one point).	CO5	K2

PART – B **(10 x 5 = 50 Marks)**

Answer ALL the questions		Marks	CO #	Blooms Level
2. a.	Explain 2-D sampling and aliasing with a suitable example. Discuss anti-aliasing filtering before sampling.	5	CO1	K3
b.	Compare image interpolation methods: nearest-neighbour, bilinear, and bicubic. Mention merits/demerits.	5	CO1	K2
	(OR)			
c.	Derive the 2-D DFT and explain how frequency-domain filtering is performed for images.	5	CO1	K4
d.	Explain DCT and its energy compaction property. Describe how it supports block-based compression.	5	CO1	K4
3.a.	Explain histogram equalization and histogram specification. Compare outcomes on contrast enhancement.	5	CO2	K4
b.	Describe spatial filtering for enhancement: mean, Gaussian and median filters. Compare for different noise types.	5	CO2	K2
	(OR)			
c.	Explain degradation and restoration model. Discuss inverse filtering and Wiener filtering with limitations.	5	CO2	K4
d.	Explain block-based motion estimation. Describe full search and one fast search strategy.	5	CO2	K4
4.a.	Explain discontinuity-based segmentation. Compare gradient operators and Canny edge detector.	5	CO3	K4
b.	Describe Hough transform for line detection and explain how peaks represent lines.	5	CO3	K4
	(OR)			
c.	Explain thresholding methods: Otsu and adaptive thresholding. Discuss advantages and limitations.	5	CO3	K2
d.	Discuss region-based segmentation: region growing and watershed. Compare over-segmentation issues.	5	CO3	K3

5.a.	Explain colour fundamentals and perception. Relate them to image processing needs.	5	CO4	K3
b.	Describe RGB, HSV/HSI, and YCbCr colour models. Compare their uses for enhancement and compression.	5	CO4	K4
	(OR)			
c.	Derive conversion steps for RGB to HSV (or RGB to YCbCr) and discuss numerical issues.	5	CO4	K4
d.	Explain pseudo-colour processing. Design a mapping for a grayscale medical/thermal image and justify.	5	CO4	K3
6.a.	Explain boundary descriptors: chain code and Fourier descriptors. Discuss invariance aspects.	5	CO5	K4
b.	Describe regional descriptors: moments (central/Hu) and texture features. Explain their usefulness.	5	CO5	K4
	(OR)			
c.	Discuss feature selection: filter vs wrapper vs embedded methods. Explain why selection is needed.	5	CO5	K3
d.	Derive Bayes decision rule and explain minimum error classification with priors and likelihoods.	5	CO5	K4

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