



Indraprastha College for Women

University of Delhi

Course Name:	B.A(Prog) Computer Application
Paper Title:	Digital Image Processing
Unique Paper Code:	
Semester:	VII
Faculty(s):	Ms. Seema Jangra
Year:	2026

Work Plan			
Unit No.	Learning Objective	Lecture No.	Topics to be Covered
1	Introduction: Digital Image Fundamentals	1	Brightness, Adaptation and Discrimination
		2	Brightness, Adaptation and Discrimination
		3	Light and Electromagnetic Spectrum.
		4	Light and Electromagnetic Spectrum.
		5	Image Sampling and Quantization
		6	Image Sampling and Quantization
		7	Some Basic Relationships Between Pixels,
		8	Some Basic Relationships Between Pixels
2	Spatial Domain Filtering	9	Some Basic Intensity Transformation Functions,
		10	Some Basic Intensity Transformation Functions
		11	Histogram Equalization,
		12	Histogram Equalization,
		13	Spatial Correlation and Convolution,

		14	Smoothing Spatial Filters,
		15	Smoothing Spatial Filters
		16	Smoothing Spatial Filters
		17	Sharpening Spatial Filters
		18	Sharpening Spatial Filters
3	Filtering in Frequency Domain	19	The Discrete Fourier Transformation (DFT)
		20	The Discrete Fourier Transformation (DFT)
		21	Frequency Domain Filtering
		22	Frequency Domain Filtering
		23	Frequency Domain Filtering
		24	Frequency Domain Filtering-Ideal and Butterworth Low pass and High pass filters, DCT Transform (1D, 2D).
		25	Frequency Domain Filtering-Ideal and Butterworth Low pass and High pass filters, DCT Transform (1D, 2D).
		26	Frequency Domain Filtering-Ideal and Butterworth Low pass and High pass filters, DCT Transform (1D, 2D).
		27	Frequency Domain Filtering-Ideal and Butterworth Low pass and High pass filters, DCT Transform (1D, 2D).
		28	Frequency Domain Filtering-Ideal and Butterworth Low pass and High pass filters, DCT Transform (1D, 2D).
4	Image Restoration	29	Image Degradation/Restoration Process,
		30	Image Degradation/Restoration Process,
		31	Noise models, Noise Restoration Filters
		32	Noise models, Noise Restoration Filters
		33	Noise models, Noise Restoration Filters
		34	Noise models, Noise Restoration Filters

5	Image Compression	35	Fundamentals of Image Compression
		36	Huffman Coding,
		37	Huffman Coding,
		38	Run Length Coding,
		39	Bit Plane Coding
		40	Bit Plane Coding
6	Morphological Image Processing	41	Erosion
		42	Erosion
		43	Dilation
		44	Dilation
		45	Opening, Closing,
		46	Opening, Closing,
		47	Hit-or-Miss Transformation
		48	Hit-or-Miss Transformation,
		49	Basic Morphological Algorithms
		50	Basic Morphological Algorithms
		51	Basic Morphological Algorithms
		52	Basic Morphological Algorithms
7	Image Segmentation	53	Point, Line and Edge Detection
		54	Point, Line and Edge Detection
		55	Thresholding,
		56	Thresholding,
		57	Region Based Segmentation.
		58	Region Based Segmentation
		59	Region Based Segmentation
		60	Region Based Segmentation

Syllabus		
Unit	Contents	Contact Hours
I	Introduction: Digital Image Fundamentals Brightness, Adaptation and Discrimination, Light and Electromagnetic Spectrum, Image Sampling and Quantization, Some Basic Relationships Between Pixels, Types of images	8

II	Spatial Domain Filtering Some Basic Intensity Transformation Functions, Histogram Equalization, Spatial Correlation and Convolution, Smoothing Spatial Filters: Low pass filters, Order Statistics filters, Sharpening Spatial Filters: Laplacian filter	10
III	Filtering in Frequency Domain The Discrete Fourier Transformation (DFT), Frequency Domain Filtering: Ideal and Butterworth Low pass and High pass filters, DCT Transform (1D, 2D).	10
IV	Image Restoration: Image Degradation/Restoration Process, Noise models, Noise Restoration Filters	8
V	Image Compression: Fundamentals of Image Compression, Huffman Coding, Run Length Coding, JPEG	6
VI	Morphological Image Processing: Erosion, Dilation, Opening, Closing, Hit-or-Miss Transformation, Basic Morphological Algorithms	10
VII	Image Segmentation: Point, Line and Edge Detection, Thresholding, Region Based Segmentation	8
	Total	60
Text Books/Suggested Readings:		
S. No.	Name of Authors/Books/Publishers	Year of Publication/ Reprint
1.	References Gonzalez, R. C., & Woods, R. E. (2017). Digital Image Processing. 4th edition. Pearson Education. Sons.	2017
2.	Jain, A. K. (1988). Fundamentals of Digital Image Processing. 1st edition Prentice Hall of India.	First Edition
1.	Additional Resources Castleman, K. R. (1995.). Digital Image Processing. 1st edition. Pearson Education	1st Edition

2.	Gonzalez, R. C., Woods, R. E., & Eddins, S. (2004). Digital Image Processing using MATLAB. Pearson Education Inc.	2004
3	Schalkoff, D. (1989). Image Processing and Computer Vision. 1st edition. John Wiley and	1st Edition

Paper Components			
Credits	Lecture (L)	Tutorial (T)	Practical (P)
	3	0	1
Assessment Scheme			
S.No.	Component	Marking Scheme	Total Marks
1	Internal Assessment - Assignment/Quiz/Project/ Presentation - Class Test - Attendance		30
		12	
		12	
		6	
2.	Continuous Assessment (Tutorial) - Activity 1 - Activity 2 - Attendance		NA
		NA	
		NA	
		NA	
3.	Practical - Continuous Assessment - End Term Written/Practical Exam - Viva		40
		10	
		20	
		10	
4.	End Semester Examination		90