



# 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:	2025

### Work Plan

Unit No.	Learning Objective	Lecture No.	Topics to be Covered
1	<b>Introduction: Digital Image Fundamentals</b>	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	<b>Spatial Domain Filtering</b>	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	<b>Filtering in Frequency Domain</b>	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	<b>Image Restoration</b>	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	<b>Image Compression</b>	35	Fundamentals of Image Compression
		36	Huffman Coding,
		37	Huffman Coding,
		38	Run Length Coding,
		39	Bit Plane Coding
		40	Bit Plane Coding
6	<b>Morphological Image Processing</b>	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	<b>Image Segmentation</b>	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

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

II	<b>Spatial Domain Filtering</b> 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	<b>Filtering in Frequency Domain</b> The Discrete Fourier Transformation (DFT), Frequency Domain Filtering: Ideal and Butterworth Low pass and High pass filters, DCT Transform (1D, 2D).	10
IV	<b>Image Restoration:</b> Image Degradation/Restoration Process, Noise models, Noise Restoration Filters	8
V	<b>Image Compression:</b> Fundamentals of Image Compression, Huffman Coding, Run Length Coding, JPEG	6
VI	<b>Morphological Image Processing:</b> Erosion, Dilation, Opening, Closing, Hit-or-Miss Transformation, Basic Morphological Algorithms	10
VII	<b>Image Segmentation:</b> Point, Line and Edge Detection, Thresholding, Region Based Segmentation	8
	<b>Total</b>	<b>60</b>

**Text Books/Suggested Readings:**

S. No.	Name of Authors/Books/Publishers	Year of Publication/ Reprint
1.	<b>References</b> 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.	<b>Additional Resources</b> 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

<b>Paper Components</b>			
<b>Credits</b>	<b>Lecture (L)</b>	<b>Tutorial (T)</b>	<b>Practical (P)</b>
	<b>3</b>	<b>0</b>	<b>1</b>
<b>Assessment Scheme</b>			
<b>S.No.</b>	<b>Component</b>	<b>Marking Scheme</b>	<b>Total Marks</b>
1	Internal Assessment <ul style="list-style-type: none"> <li>Assignment/Quiz/Project/Presentation</li> <li>Class Test</li> <li>Attendance</li> </ul>	12 12 6	30
2.	Continuous Assessment ( <b>Tutorial</b> ) <ul style="list-style-type: none"> <li>Activity 1</li> <li>Activity 2</li> <li>Attendance</li> </ul>	NA NA NA	NA
3.	Practical <ul style="list-style-type: none"> <li>Continuous Assessment</li> <li>End Term Written/Practical Exam</li> <li>Viva</li> </ul>	10 20 10	40
4.	End Semester Examination		90