COURSE MODULE OF THE SUBJECT TAUGHT FOR THE SESSION

2025- 26(Even SEM)

Course Syllabi with CO's

Academic Year: 2025 - 2026						
Department : Electronics and Communication Engineering						
Course Code	**Course Title**	**Core / Elective**	**Contact Hours**			**Total Hrs/ Sessions**
			L	**T**	**P**	
BEC613C	Digital Image Processing	Elective	3	0	0	40
Course Objectives	This course will enable students to: 1. **Identify and explain** the basic concepts of digital image processing. 2. **Describe** commonly used image transformation techniques in digital image processing. 3. **Apply** basic image enhancement techniques in the spatial domain. 4. **Explain and demonstrate** fundamental color image processing and frequency domain enhancement techniques. 5. **Explain** the purpose and basic methods of image restoration in digital image processing.					

Topics Covered as per Syllabus

Module-1

Digital Image Fundamentals: What is Digital Image Processing?, Origins of Digital Image Processing, Examples of fields that use DIP, Fundamental Steps in Digital Image Processing, Components of an Image Processing System, Elements of Visual Perception, Image Sensing and Acquisition, Image Sampling and Quantization, Some Basic Relationships Between Pixels. **RBT Level:L1.L2.L3**

Module-2

Image Transforms: Introduction, Two-Dimensional Orthogonal and Unitary Transforms, Properties of Unitary Transforms, 2-D DFT, cosine Transform, Haar Transform. **RBT Level:L1.L2.L3**

Module-3

Spatial Domain: Some Basic Intensity Transformation Functions, Histogram Processing, Fundamentals of Spatial Filtering, Smoothing Spatial Filters, Sharpening Spatial Filters **RBT Level:L1.L2.L3**

Module-4

Frequency Domain: Basics of Filtering in the Frequency Domain, Image Smoothing and Image Sharpening Using Frequency Domain Filters. **Color Image Processing:** Color Fundamentals, Color Models, Pseudo-color Image Processing. **RBT Level:L1.L2.L3**

Module-5

Restoration: A model of the Image Degradation/Restoration Process, Noise models, Restoration in the Presence of Noise Only using Spatial Filtering and Frequency Domain Filtering, Inverse Filtering, Minimum Mean Square Error (Wiener) Filtering. **RBT Level:L1.L2.L3**

List of Text Books

1. Digital Image Processing- Rafael C Gonzalez and Richard E Woods, PHI, 3rd Edition 2010.
2. Fundamentals of Digital Image Processing- A K Jain, PHI Learning Private Limited 2014.

List of Reference Books

1.Digital Image Processing- S Jayaraman, S Esakkirajan, T Veerakumar, Tata McGraw Hill, 2014

Web links and Video Lectures (e-Resources)

- Image databases, https://imageprocessingplace.com/root_files_V3/image_databases.htm
- https://imageprocessingplace.com/root_files_V3/students/students.htm
- NPTEL Course, Introduction to Digital Image Processing, https://nptel.ac.in/courses/117105079
- Computer Vision and Image Processing, https://nptel.ac.in/courses/108103174
- Image Processing and Computer Vision – Matlab and Simulink,
- https://in.mathworks.com/solutions/image-video-processing.html

Course Outcomes	At the end of the course the students will be able to: **1.** Explain image formation and the role of human visual system plays in perception of gray and color image data. **2.** Compute various transforms on digital images. **3.** Conduct independent study and analysis of Image Enhancement techniques. **4.** Apply image processing techniques in frequency (Fourier) domain. **5.** Design image restoration techniques.

The Correlation of Course Outcomes (CO's) and Program Outcomes (PO's)

Subject Code: Digital Image Processing												**Title:**BEC613C
List of Course Outcomes	**Program Outcomes**											Total
	PO1	**PO2**	**PO3**	**PO4**	**PO5**	**PO6**	**PO7**	**PO8**	**PO9**	**PO10**	**PO11**	**PO12**	
CO-1	3	2	-	-	-	-	-	-	2	-	-	-	**7**
CO-2	3	2	-	-	2	-	-	-	-	-	-	2	**9**
CO-3	2	2	-	2	-	-	-	-	-	-	-	2	**8**
CO-4	2	2	2	-	-	-	-	-	-	-	-	2	**8**
CO-5	2	2	3	2	2	-	-	-	-	-	-	2	**13**
Total	**12**	**10**	**5**	**4**	**4**	**-**	**-**	**-**	**2**	**-**	**-**	**8**	**45**

Note: 3 = Strong Contribution 2 = Average Contribution 1 = Weak Contribution - = No Contribution

The Correlation of Course Outcomes (CO's) and Program Specific Outcomes (PSO's)

Subject Code: Digital Image Processing			**Title:**BEC613C
List of Course Outcomes	**Program Specific Outcomes**		
	PSO1	**PSO2**	**Total**
CO-1	2	-	**2**
CO-2	2	-	**2**
CO-3	2	2	**4**
CO-4	2	2	**4**
CO-5	2	-	**2**
Total	**10**	**4**	**14**

Note: 3 = Strong Contribution 2 = Average Contribution 1 = Weak Contribution - = No Contribution