

Branch Name:	Computer Engineering / Information technology
Semester/Year:	Semester VII / Final Year
Subject Title:	Image Processing (Elective-II)
Subject Code:	1ET1030706
Pre-requisite:	Basic of mathematics: calculus, linear algebra and probability. Ability to program in C/C++/MATLAB and algorithms. , Some background knowledge of image

Course Objective:

- To understand the basic concept of image processing.
- Understanding of various applications of image processing in industry, medicine, and defence.
- Acquire an appreciation for the image processing issues and techniques and be able to apply these techniques to real world problems.
- To understand the various techniques of image enhancement, reconstruction, compression and segmentation

Teaching Scheme (Hours per week)				Evaluation Scheme (Marks)				
Lecture (L)	Tutorial (T)	Practical (P)	Credit	Theory (Marks)		Practical (Marks)		Total (Marks)
				University Assessment	Continuous Assessment	University Assessment	Continuous Assessment	
03	-	02	04	70	30	30	20	150

Subject Contents			
Sr. No	Topic	Total Hours	Weightage (%)
1	Introduction: Overview, Fields in Digital Image Processing, fundamental steps in Digital Image Processing, Application in image processing, components of an Image Processing System.	05	16
2	Digital Image Fundamentals: Elements of visual perception, light and the electromagnetic spectrum, image sensing and acquisition, image sampling and quantization, basic relationships between Pixels, Classification of image processing operations.	06	16
3	Image Enhancement in the Spatial Domain: Background, some basic gray level transformations, histogram processing, enhancement using arithmetic/logic operations, basics of spatial filtering, smoothing spatial filters, sharpening spatial filters, combining spatial enhancement methods.	12	25
4	Introduction to Image Restoration: Image degradation/restoration model, noise models	06	15
5	Morphological Image Processing: Preliminaries, dilation and erosion, opening and closing, the Hit-or-Miss transformation, some basic morphological algorithms.	06	16
6	Basic Concept: Fundamental of Image Segmentation, Representation and Description, Color Image Processing	04	12

Course Outcome:

After learning the course, the students will be able to understand the basic concept of image and image processing. They can also understand the image processing technique apply it in their real time environment. Student can examine various types of images, intensity transformations and spatial filtering of digital image processing. They can also be able to develop Fourier transform for image processing in frequency domain and Evaluate the methodologies for image segmentation, restoration etc. They can also understand and Implement image process and analysis algorithms and apply image processing algorithms in practical applications.

List of Text Books:

- 1 Digital Image Processing By Rafael C. Gonzalez and Richard E. Woods.

List of Reference Books:

1. Digital Image processing By S. Sridhar, (Oxford University Press)
2. Fundamentals of Image Processing By Anil K Jain

List of Suggested titles of Experiments:

1. Write a code for reading and displaying of gray scale images.
2. Write a code for displaying of color images.
3. Write a code for converting given color image into gray-scale image.
4. Write a code for converting given color/gray-scale image into black & white image.
5. Write a code Separate color image in three R G & B planes.
6. To write and execute image processing programs using point processing method for Obtain Negative image.
7. To write and execute programs for image arithmetic operations.
8. Apply the Histogram display and histogram equalization on image.
9. To study compressing technique of digital camera (e.g. DSLR)
10. To study about the face recognition & finger print recognition technique of smart device

Note: Use image processing tools like matlab/scilab for illustrating the above experiment.

e-Resources:

1. <http://nptel.ac.in/>
2. <https://www.scilab.org/>
3. <https://in.mathworks.com/>