SEMESTER S8

DIGITAL IMAGE PROCESSING

Course Code	**PEEVT 864**	**CIE Marks**	40
Teaching Hours/Week (L: T:P: R)	3:0:0:0	**ESE Marks**	60
Credits	3	**Exam Hours**	2 Hrs. 30 Min.
Prerequisites (if any)	Signal Processing (Course code)	**Course Type**	Theory

Course Objectives:

1. To study the image fundamentals and transforms necessary for image processing.
2. To familiarize different image processing techniques

SYLLABUS

Module No.	Syllabus Description	Contact Hours
1	Digital Image Fundamentals-Elements of visual perception, image sensing and acquisition, image sampling and quantization, basic relationships between pixels – neighborhood, adjacency, connectivity, distance measures. Brightness, contrast, hue, saturation, mach band effect, Colour image fundamentals-RGB, CMY, HIS models, 2D sampling, quantization.	**9**
2	Image Enhancement: Spatial domain methods: point processing-intensity transformations, histogram processing, image subtraction, image averaging, geometric transformation Sharpening filters – first and second derivative, two-dimensional DFT and its inverse, frequency domain filters – low-pass and high-pass.	**9**
3	Image segmentation: Classification of Image segmentation techniques, region approach, clustering techniques. Classification of edges, edge detection Image restoration: Restoration Models, Linear Filtering Techniques: Inverse and Wiener	**9**
4	Image Compression- Need for compression, redundancy, classification of image compression schemes,–inter-pixel and psycho-visual; Lossless compression – predictive, Lossy compression- predictive and transform coding –DCT, (basics only); Still image compression standards – JPEG .	**9**

Course Assessment Method
(CIE: 40 marks, ESE: 60 marks)

Continuous Internal Evaluation Marks (CIE):

Attendance	Assignment/ Microproject	Internal Examination-1 (Written)	Internal Examination- 2 (Written)	Total
5	15	10	10	40

End Semester Examination Marks (ESE)

In Part A, all questions need to be answered and in Part B, each student can choose any one full question out of two questions

Part A	Part B	Total
• 2 Questions from each module. • Total of 8 Questions, each carrying 3 marks **(8x3 =24marks)**	• Each question carries 9 marks. • Two questions will be given from each module, out of which 1 question should be answered. • Each question can have a maximum of 3 sub divisions. **(4x9 = 36 marks)**	**60**

Course Outcomes (COs)

At the end of the course students should be able to:

Course Outcome		Bloom's Knowledge Level (KL)
CO1	Understand the various concepts and mathematical transforms for image transform	**K2**
CO2	Interpret the various image enhancement techniques	**K2**
CO3	Illustrate the image segmentation algorithm	**K2**
CO4	Summarise basic image compression techniques	**K2**

Note*: K1- Remember, K2- Understand, K3- Apply, K4- Analyse, K5- Evaluate, K6- Create*

CO-PO Mapping Table (Mapping of Course Outcomes to Program Outcomes)

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1	**3**	**1**										**2**
CO2	**3**	**2**			**2**							**2**
CO3	**3**	**2**			**2**							**2**
CO4	**3**	**2**			**2**							**2**

Note: *1: Slight (Low), 2: Moderate (Medium), 3: Substantial (High), -: No Correlation*

Text Books				
Sl. No	**Title of the Book**	**Name of the Author/s**	**Name of the Publisher**	**Edition and Year**
1	Digital Image Processing	Gonzalez Rafel C	Pearson Education	2009
2	Digital Image Processing	S Jayaraman, S Esakkirajan, T Veerakumar	Tata Mc Graw Hill	2015

Reference Books				
Sl. No	**Title of the Book**	**Name of the Author/s**	**Name of the Publisher**	**Edition and Year**
1	Fundamentals of Digital Image Processing	Jain Anil K	PHI	1988
2	Digital image processing	Kenneth R Castleman	Pearson Education,	2/e,2003
3	Digital Image Processing	Pratt William K	John Wiley	4/e,2007

Video Links (NPTEL, SWAYAM…)	
Module No.	**Link ID**
1	https://nptel.ac.in/courses/117105135
2	https://nptel.ac.in/courses/117105135
3	https://nptel.ac.in/courses/117105135
4	https://nptel.ac.in/courses/117105135