SCHEME OF COURSE WORK

Course Details:

Course Title	: **DIGITAL IMAGE PROCESSING**		
Course Code	**:** 13EC1131	**L T P C**	**:4 0 0 3**
Program:	**: B.Tech**		
Specialization:	**: Electronics & Communication Engineering**		
Semester	**: VII**		
Prerequisites	**: SIGNALS AND SYSTEMS,DIGITAL SIGNAL PROCESSING**		
Courses to which it is a prerequisite	**: DIGITAL VIDEO PROCESSING**		

Course Outcomes (COs):

CO1	Comprehend fundamentals of Image Processing.
CO2	Describe various transforms used in image processing.
CO3	Describe various techniques of image enhancement in the spatial and frequency domain.
CO4	Comprehend the color image processing and restoration techniques.
CO5	Analyze the various compression and segmentation techniques.

Course Outcome Vs **Program Outcomes:**

COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO-1	S	S	S	S	S				M	M		S
CO-2	S	S	S	S	S				M	M		M
CO-3	S	S	S	S	S				M	M		S
CO-4	S	S	S	S	S	M			M	M		S
CO-5	S	S	S	S	S	S	M		M	M		S

S - Strongly correlated, *M* - *Moderately* correlated, *Blank* - *No correlation*

Assessment Methods:	Assignment / Quiz / Seminar / Case Study / Mid-Test / End Exam

Teaching-Learning and Evaluation

Week	TOPIC / CONTENTS	Course Outcomes	Sample questions	TEACHING-LEARNING STRATEGY	Assessment Method & Schedule
1	**UNIT-I** **INTODUCTION:** Digital image fundamentals, Concept of gray levels, Applications of image processing,	CO-1	1. Discuss in detail the basic block diagram of Image Processing System. 2.Mention few applications of image Processing.	▫ Lecture ▫ Discussion	Assignment I/Quiz-I/Mid-I
2	Image Sensing and Acquisition, Image Sampling and Quantization,	CO-1	1.Explain the concept of sampling and quantization in image processing	▫ Lecture ▫ Discussion	Assignment I/Quiz-I/Mid-I
3	Gray level to binary image conversion, Relationships between pixels.	CO-1	1. Explain Gray level to binary conversion of an image in detail. 2.Discuss about m-adjacency	▫ Lecture ▫ Discussion	Assignment I/Quiz-I/Mid-I

			in detail.		
4	**UNIT-II** **IMAGE TRANSFORMS:** 2-D DFT, Properties, Walsh transform, Hadamard Transform.	CO-2	1. Derive the properties of image Transforms. 2. What are the properties of walsh and Hadamard transform?	▫ Lecture ▫ Discussion	Assignment I/Quiz-I/Mid-I
5	Discrete Cosine Transform, Haar transform, Slant transform	CO-2	1.Obtain the Discrete Cosine Transform for N=8 2. Obtain the slant transform matrix for N=8	▫ Lecture ▫ Discussion	Assignment I/Quiz-I/Mid-I
6	Transform Hotelling transform, Discrete wavelet transform.	CO-2	1.What are the Properties of Hotelling Transform	▫ Lecture ▫ Discussion	Assignment I/Quiz-I/Mid-I
7	**UNIT-III** **IMAGE ENHANCEMENT IN THE SPATIAL DOMAIN :** Point processing, Histogram processing, Spatial filtering.	CO-3	1.Explain Image Enhancement by various point processing techniques	▫ Lecture ▫ Discussion	Assignment I/Quiz-I/Mid-I
8	**IMAGE ENHANCEMENT IN THE FREQUENCY DOMAIN:** Image smoothing, Image sharpening, Homomorphic Filtering	CO-3	2.Discuss various smoothing and sharpening techniques of enhancing an image.	▫ Lecture ▫ Discussion	Assignment I/Quiz-I/Mid-I
9	Mid-Test-1	--	---------	------	----------
10	**UNIT-IV** **COLOR IMAGE PROCESSING:** Color models, Pseudo color image processing,	CO-4	1. Describe the conversion process of RGB to HIS. 2.Discuss in detail about Pseudo color image processing	▫ Lecture ▫ Discussion	Assignment II/Quiz-II/Mid-II
11	Full color image processing.	CO-4	1.Explain in detail about full color image processing	▫ Lecture ▫ Discussion	Assignment II/Quiz-II/Mid-II
12	**IMAGE RESTORATION:** Degradation model, Algebraic approach to restoration, Inverse filtering,	CO-4	1.Analyze image restoration by inverse filtering 2.Derive the expression for degradation model	▫ Lecture ▫ Discussion	Assignment II/Quiz-II/Mid-II
13	Least mean square filters, Constrained Least Squares Restoration, Interactive Restoration.	CO-4	2.Analyze image restoration by Least mean square filters.	▫ Lecture ▫ Discussion	Assignment II/Quiz-II/Mid-II
14	**UNIT-V** **IMAGE COMPRESSION:** Redundancies and their removal methods, Fidelity criteria, Image compression models	CO-5	1.what is redundancy? 2.Discuss about different types of redundancies in images.	▫ Lecture ▫ Discussion	Assignment II/Quiz-II/Mid-II
15	Source encoder and decoder, Error free compression, Lossy compression.	CO-5	1. Discuss about Lossy and Lossless Predictive Coding systems.	▫ Lecture ▫ Discussion	Assignment II/Quiz-II/Mid-II

16	**IMAGE SEGMENTATION:** Detection of discontinuities, Edge linking and boundary detection	CO-5	1.Explain Global processing via Hough Transform 2. what are various discontinuities in images.	▫ Lecture ▫ Discussion	Assignment II/Quiz-II/Mid-II
17	Thresholding, Region oriented segmentation.	CO-5	1.Explain the concept of Thresholding based on image segmentation.	▫ Lecture ▫ Discussion	Assignment II/Quiz-II/Mid-II
18	**Mid-Test 2**	CO-4 & CO-5			
19/20	**END EXAM**				