DIGITAL IMAGE PROCESSING
(Effective from the academic year 2018 -2019)
SEMESTER – VI

Subject Code	18AI62	**CIE Marks**	40
Number of Contact Hours/Week	3:2:0	**SEE Marks**	60
Total Number of Contact Hours	50	**Exam Hours**	03

CREDITS –4

- **Course Learning Objectives:** This course will enable students to:
- Understand the fundamentals of digital image processing
- Understand the image transform used in digital image processing
- Understand the image enhancement techniques used in digital image processing
- Understand the image restoration techniques and methods used in digital imageprocessing
- Understand the morphological operations and segmentation used in digital image processing

Module-1	Contact Hours.
Digital Image Fundamentals: What is Digital Image Processing?,Originsof Digital Image Processing, Examples of fields that use DIP, FundamentalSteps in Digital Image Processing, Components of an Image ProcessingSystem, Elements of Visual Perception, Image Sensing and Acquisition,Image Sampling and Quantization, Some Basic Relationships betweenPixels, Linear and Nonlinear Operations [Text1: Chapter 1 and Chapter 2: Sections 2.1 to 2.5, 2.6.2]	10
RBT: L1,L2	
Module-2	
Spatial Domain: Some Basic Intensity Transformation Functions,Histogram Processing, Fundamentals of Spatial Filtering.-SmoothingSpatial Filters Sharpening SpatialFiltersFrequency Domain: Preliminary Concepts, The Discrete FourierTransform (DFT) of Two Variables, Properties of the 2-D DFT, Filtering inthe Frequency Domain, Image Smoothing and Image Sharpening UsingFrequency Domain Filters, and Selective Filtering. [Text1: Chapter 3: Sections 3.2 to 3.6 and Chapter 4: Sections 4.2, 4.5 to4.10]	10
RBT: L1,L2, L3	
Module-3	
Restoration: Noise models, Restoration in the Presence of Noise Onlyusing Spatial Filtering and Frequency Domain Filtering, Linear, Position-Invariant Degradations, Estimating the Degradation Function, InverseFiltering, Minimum Mean Square Error (Wiener) Filtering, and ConstrainedLeast Squares Filtering. [Text1: Chapter 5: Sections 5.2, to 5.9]	10
RBT: L1,L2, L3	
Module-4	
Color Image Processing: Color Fundamentals, Color Models, and Pseudo-colorImage Processing. **Wavelets:** Background, Multiresolution Expansions.	10
Morphological Image Processing: Preliminaries, Erosion and Dilation,Opening and Closing,	

- Apply effectively ML algorithms for appropriate applications.
- Apply bayesian techniques and derive effectively learning rules.

Question Paper Pattern:

- The question paper will have ten questions.
- Each full Question consisting of 20 marks
- There will be 2 full questions (with a maximum of four sub questions) from each module.
- The students will have to answer 5 full questions, selecting one full question from each module.

Textbooks:

1. Tom M. Mitchell, Machine Learning, McGraw-Hill Education, 2013
2. AurelienGeron, Hands-on Machine Learning with Scikit-Learn &TensorFlow , O'Reilly, Shroff Publishers and Distributors pvt.Ltd 2019

Reference Books:

1. EthemAlpaydin. Introduction to Machine Learning. PHI Learning Pvt. Ltd. 2nd Ed.. 2013
2. T. Hastie, R. Tibshirani, J. H. Friedman, The Elements of Statistical Learning, Springer, 1st edition, 2001
3. Machine Learning using Python ,Manaranjan Pradhan, U Dinesh kumar, Wiley, 2019
4. Machine Learning, SaikatDutt, Subramanian Chandramouli, Amit Kumar Das, Pearson,2020

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