SARDAR PATEL UNIVERSITY
Programme & Subject: M.Sc (CA & IT) Semester: I
Syllabus with Effect from: June-2019

Paper Code: PS01EIIT31	Total Credit: 4
Title Of Paper: Image Processing	

Unit	Description in Detail	Weightage (%)
I	**Introduction and fundamentals of Image processing** Introduction to Image Processing and Analysis, Applications of Image Processing and Analysis, Components of a Digital Image Processing System, Image Digitization, Fundamental Steps in Digital Image Processing, Digital Image Representation, Elements of Visual Perception.	25%
II	**Image Transforms and Enhancement** Image Transforms: Introduction to the Fourier Transform, The Discrete Fourier Transform, Some Properties of the Two-Dimensional Fourier Transform, Other Separable Image Transforms. Image Enhancement: Contrast intensification methods, smoothing methods, Image sharpening methods.	25%
III	**Image Restoration** A Model of the Image Degradation/Restoration Process, Noise Models, Linear, Position-Invariant Degradations, Estimating the Degradation Function. Inverse Filtering, Minimum Mean Square Error (Wiener) Filtering, Constrained Least Squares Filtering, Geometric Mean Filter, Geometric Transformations.	25%
IV	**Image Compression:** Fundamentals – Coding Redundancy, Interpixel Redundancy, Psychovisual Redundancy, Fidelity Criteria. Image Compression Models – The Source Encoder and Decoder, The Channel Encoder and Decoder. Elements of Information Theory – Measuring Information, The Information Channel, Fundamental Coding Theorems, Using Information Theory. Error-Free Compression – Variable-Length Coding, Bit-Plane Coding, Lossless Predictive Coding. Lossy Compression – Lossy Predictive Coding, Transform Coding.	25%

Basic Text & Reference Books:-

- Rafael. C. Gonzalez & Richard E. Woods: "Digital Image Processing", Pearson Education, New Delhi, 3rd Edition, 2006.
- W. K. Pratt: "Digital Image Processing", John Wiley & sons, 3rd Edition. Inc.,2006.
- M. Sonka et.al: "Image Processing, Analysis and Machine Vision", Thomson, Learning, India, 2nd Edition, 2007.
- Bhabatosh Chanda and Dwijesh Dutta Majumdar: "Digital Image Processing and Analysis", Prentice Hall, 8th Edition, 2000.