

GUJARAT TECHNOLOGICAL UNIVERSITY

Digital Signal and Image Processing SUBJECT CODE: 3716101

Type of course: Elective

Prerequisite: NA

Rationale:

Teaching and Examination Scheme:

Teaching Scheme			Credits C	Examination Marks				Total Marks
L	T	P		Theory Marks		Practical Marks		
				ESE(E)	PA (M)	PA (V)	PA (I)	
3	0	2	4	70	30	30	20	150

Content:

Sr. No.	Content	Total Hrs	% Weightage
1	Review of Discrete Time signals and systems, Characterization in time and Z and Fourier –domain, Fast Fourier Transform algorithms – In-place computations, Butterfly computations, bit reversal's.		
2	Digital Filter design: FIR - Windowing and Frequency Sampling, IIR – Impulse invariance, bilinear Transformation.		
3	Fixed point implementation of filters – challenges and techniques		
4	Digital Image Acquisition, Enhancement, Restoration. Digital Image Coding and Compression – JPEG and JPEG 2000		
5	Color Image processing – Handling multiple planes, computational challenges		
6	VLSI architectures for implementation of Image Processing algorithms, Pipelining		

Reference Books:

1. J.G. Proakis, Manolakis “Digital Signal Processing”, Pearson, 4th Edition
2. Gonzalez and Woods, “Digital Image Processing”, PHI, 3rd Edition
3. S. K. Mitra. “Digital Signal Processing – A Computer based Approach”, TMH, 3rd Edition, 2006
4. A. K. Jain, “Fundamentals of Digital Image Processing”, Prentice Hall
5. KeshabParhi, “VLSI Digital Signal Processing Systems – Design and Implementation”, Wiley India

Course Outcome:

After learning the course the students should be able to:

1. Analyze discrete-time signals and systems in various domains
2. Design and implement filters using fixed point arithmetic targeted for embedded platforms
3. Compare algorithmic and computational complexities in processing and coding digital images