

GUJARAT TECHNOLOGICAL UNIVERSITY
COMPUTER ENGINEERING
B. E. SEMESTER: VII

Subject Name: **Computer Signal Processing (Department Elective -I)**
Subject Code: **170706**

Teaching Scheme				Evaluation Scheme			
Theory	Tutorial	Practical	Total	University Exam (E)		Mid Sem Exam (Theory) (M)	Practical (Internal)
				Theory	Practical		
4	0	2	6	70	30	30	20

Sr. No.	Course Contents	Total Hrs
1.	Discrete Time Signals & System: Discrete-time signals, Discrete-time systems, Analysis of discrete-time LTI systems, Discrete-time systems described by differential equations, Implementation of discrete-time systems, Correlation of discrete-time systems	06
2.	Z-Transform: Definition and Properties of Z-transform, Rational Z-transforms, Inverse Z-transform, one-sided Z-transform, Analysis of LTI systems in Z-domain	06
3.	Frequency Analysis of Signals and Systems: Frequency analysis: Continuous time signals and Discrete-time signals, Properties of the Fourier transform for discrete-time signals, Frequency domain characteristics of LTI systems, LTI system as a frequency selective filter, Inverse systems and de convolution	08
4.	Discrete Fourier Transform: Frequency domain sampling, Properties of DFT, Linear filtering method based on DFT, Frequency analysis of signals using DFT, FFT algorithm, Applications of FFT, Goertzel algorithm, Quantization effects in the computation of DFT	08
5.	Implementation of Discrete Time Systems: Structure of FIR systems, Structure of IIR systems, quantization of filter coefficients, round-off effects in digital filters	06

6.	Design of Digital Filters: Design of FIR filters, Design of IIR filters from analog filters, frequency transformations, Design of digital filters based on least-squares method digital filters from analogue filters, Properties of FIR digital filters, Design of FIR filters using windows, Comparison of IIR and FIR filters, and Linear phase filters.	10
7.	Introduction to DSP co-processors: TMS 320C40/50, Analog Devices.	06
8.	Applications : Image processing, Control, Speech, Audio, Telecommunication	04

Text Books:

1. J.G. Proakis, "Introduction to Digital Signal Processing", PHI
2. Oppenheim and Schaffer, "Discrete Time Signal Processing"

Reference Books:

1. S.K. Mitra, "Digital Signal Processing", TMH.
2. T.J. Cavicchi, "Digital Signal Processing", John Wiley.
3. L.C. Ludeman, "Fundamentals Of Digital Signal Processing", John Wiley.
4. E.C. Ifeachor, B.W. Jervis, "Digital Signal Processing", Pearson Education.
5. Digital Signal Processing – Shaila Apte, Wiley(India)
6. Digital Signal Processing, - Salivahanan, Vallavaraj and Gnanapriya, McGrawHill
7. "Analog and Digital Signal Processing", Thompson Learning
8. Digital Signal Processing, Tan, Elsevier