

GUJARAT TECHNOLOGICAL UNIVERSITY

B.E. SEMESTER : VIII

POWER ELECTRONICS ENGINEERING

Subject Name: **DIGITAL SIGNAL PROCESSING**

Sr. No.	Course Contents	Total Hrs
1.	Introduction: <ul style="list-style-type: none"> Signals – Classification – Continuous & Discrete Time Signals – Basic Operations on Signals & Sequences – Elementary Signals – Concept of Frequency in Continuous & Discrete Time Signals – Sampling & Quantization – Sampling Theorem – Aliasing & it's Effects – Up & Down Sampling – ADC – DAC System – Discrete Time Systems – Properties of System 	07
2.	Discrete Time Signals And Systems <ul style="list-style-type: none"> Discrete Time Signals & Systems – Analysis of LTI Systems – Convolution & its Properties – Interconnection of LTI Systems – Deconvolution – Discrete Time Systems Described by Difference Equations – Implementation of Discrete Time Systems – Correlation & Autocorrelation 	07
3.	Frequency Analysis Of Systems & Signals <ul style="list-style-type: none"> Frequency Analysis of Continuous Time & Discrete Time Signals – The Fourier Series – Properties of Fourier Transform – Inverse Fourier Transform – Frequency Domain Characteristics of LTI Systems – Frequency Response of LTI Systems – Parseval's Relationship – Duality 	08
4.	The z-Transform <ul style="list-style-type: none"> Introduction to Laplace Transform – The z-Transform – Difference – ROC – Properties of z-Transform and ROC-Inversion of z-Transform – z-Transform of basic sequences – One Sided z-transform – Transfer Function – Applications of z-Transforms – Analysis of LTI Systems in z-Domain 	08
5.	Discrete Fourier Transform and Fast Fourier Transform <ul style="list-style-type: none"> DFT – Frequency Domain Sampling and Reconstruction of Signal – Relationship of DFT & other transforms – DFT as Linear Transformation – Properties FFT – Direct Computation of DFT – Radix-2 FFT & DIT Algorithm – Their Applications – Quantization Effects in Computation of DFT & FFT & Errors therein 	08
6.	Implementation Discrete Time Systems <ul style="list-style-type: none"> Structures for FIR & IIR Systems – Direct, Cascade, Parallel & Lattice – State Space System Analysis & Structures – Representation of Numbers – Round Off Effects in Digital Filters – Concept of Limit Cycle Oscillations & Scaling 	08
7.	Architecture Of DSP <ul style="list-style-type: none"> Floating point & Fixed point data representation – DSP Architecture: Von Neumann, Harvard and Modified Harvard – MAC and its features – Pipelining 	08

Text Books:

- Digital Signal Processing 3rd Ed., PHI, Proakis & Manolakis
- Signals and Systems, Oxford, Tarun Kumar Rawat

Reference Books:

- Digital Signal Processing, Oppenheim & Schafer with John R. Buck
- Digital Signal Processing, Katson, Sanjay Sharma
- Digital Signal Processing, Oxford, Chi-Tsong
- Datasheets & Application Notes of various DSP chips with reference to Power Electronics Applications