

### THIRD YEAR

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| <b>Digital Signal Processing</b> | <b>COE304</b>    |
| <b>Prerequisite : COE202</b>     | <b>(3-2-1-2)</b> |

Analog to Digital (A/D) and Digital to Analog (D/A) Conversion. Discrete Fourier Transform: Discrete Fourier Transform (DFT), Inverse discrete Fourier transform (IDFT), Relationship between Fourier transform and Fourier series. Fast Fourier Transform (FFT): Definition, Applications, Decimation in time FFT (DIF-FFT), Decimation in Frequency FFT (DIF-FFT). Z-transform: Introduction to the Z-transform, Inverse Z-transforms, Properties of Z-transforms, Transfer Functions. Digital Filter Design: Discrete Time Filters, Design by using numerical solution, bilinear transformation, Design IIR filter using bilinear method, Analog Design using digital filter, Digital Design using digital to digital transformation, Design of finite impulse response filter (FIR), Design of FIR using windows methods, FIR design computer techniques. Realization of Digital Filters. Introduction to Statistical Signal Processing: Signal Models: types and properties of statistical models for signals. Signal Characterization: common second-order methods of characterizing signals, autocorrelation, power spectral density, and cross-power spectral density. Spectral Estimation: nonparametric methods, autocorrelation, cross-correlation, transfer functions, and coherence from finite signal samples. Optimum Linear Filters, Least Squares Estimation, Parametric Signal Modeling and Estimation.

**Practical part:** *Introduction. Time and Frequency Analysis of Communication Signals. A/D and D/A. Digital Filters Design.*