SUBJECT NO-EE60102, SUBJECT NAME- STATISTICAL SIGNAL PROCESSING

LTP- 3-1-0,CRD- 4

SYLLABUS :-

Course Overview: Spectral estimation, Signal modeling, Adaptive filtering, Array ProcessingReview of Probability and Stochastic ProcessEstimation Theory: MVUE, Cramer-Rao Lower bound, Best Linear Unbiased Estimator, Maximum likelihood Estimator, General Bayesian EstimatorDetection Theory: Neyman Pearson Theorem, Receiver Operating Characteristics, Matched Filters, Composite Hypothesis TestingNonparametric Spectral Estimation: Estimation of power spectrum of stationary random signal using periodogram-various methodsJoint signal analysis and estimation of cross power spectrumLinear Signal Model:Synthesis of coloring filter and Analysis of whitening filter,Rational power spectra (AR, MA, ARMA), Relationship between filter parameters and autocorrelation sequences, Lattice-Ladder filter realizationParametric Spectral Estimation:Order selection criterion of AR model,Minimum-variance, Maximum entropy and Maximum likelihood spectrum estimationHarmonic models and frequency estimation techniquesHarmonic Decomposition, MUSIC algorithm, ESPRIT algorithmLinear Optimum Filter:Optimum FIR Filter, PCA of optimum linear estimator and its frequency domain interpretationForward and Backward Linear prediction and optimum reflection coefficientsOptimum causal and non-causal IIR Filters, Deconvolution and Signal restorationAlgorithms and Structure of Optimum Linear FiltersLevinson Recursion for optimum estimate, Order-recursive algorithms for optimum FIR filters and its lattice structures. Levinson and Durbin algorithmsTUTORIAL:Assignments and Tutorials on Digital Signal Processing Hardware:Architecture of TMS320C5x, TMS320C6x Processors, DSP development tool (CCS AND DSK), selection of DSP processors, Experiments with C5510 DSK, C6416DSK and C6713 DSK