

GUJARAT TECHNOLOGICAL UNIVERSITY

M.E. Semester: III

Communication Systems Engineering

Subject Name: **Adaptive Signal Processing (Major Elective - IV)**

Sr. No	Course content
1.	Random variables, random processes, filtered random processes, Ensemble averages, correlation, covariance, power spectrum, cross power spectrum, Ergodicity, time averages, biased & unbiased estimators, consistent estimators.
2.	Linear prediction: Direct form linear prediction filtering, Normal equations for linear prediction filtering, Levinson algorithm, Linear prediction lattice filtering.
3.	Digital Wiener Filtering : Wiener smoothing and prediction filters, Application of Wiener smoothing to noise cancelling, Application of Wiener prediction filters, Constrained, linear MMSE filtering, minimum variance beam forming.
4.	Least Mean Squares Adaptive Filter: LMS adaptive algorithm, Properties of LMS adaptive filter, Least squares adaptive filters, Godard algorithm.
5.	Normalizes Least Mean Square Filters (NLMS), Recursive Least : Square based (RLS) based filters.

Reference Books:

1. Statistical and Adaptive Signal Processing: Spectral Estimation, Signal
2. Modeling, Adaptive Filtering and Array Processing, D. Manolakis, V. Ingle, S. Kogan, McGraw Hill, 1999.
3. Adaptive Signal Processing, B. Widrow, S. Stearns, Prentice-Hall, 1985.
4. Theory and Design of Adaptive Filters, J. Trierchler, C. Johnson, M. Larimore Prentice-Hall, 1995.
5. Adaptive Filtering: Algorithms and Practical Implementation, P. Diniz, Kluwer, 1997.
6. Adaptive Filters: Structures, Algorithms and Applications, M. Honig, D. Messerschmitt, Kluwer, 1984.
7. Adaptive Signal Processing, L. Sibul, Ed., IEEE Press, 1987.