

# GUJARAT TECHNOLOGICAL UNIVERSITY

M.E. Semester: III

Electronics and Communication 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.	<b>Linear prediction:</b>  Direct form linear prediction filtering, Normal equations for linear prediction filtering, Levinson algorithm, Linear prediction lattice filtering.
3.	<b>Digital Wiener Filtering :</b>  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.	<b>Least Mean Squares Adaptive Filter:</b>  LMS adaptive algorithm, Properties of LMS adaptive filter, Least squares adaptive filters, Godard algorithm.
5.	<b>Normalizes Least Mean Square Filters (NLMS), Recursive Least :</b>  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.