ANALYSIS OF RANDOM SIGNALS

Syllabus : (10 hrs., 10 wks.)

Random variables : definition, distribution and density functions, transformation of random variables, expectation, moments. Tchebycheff's inequality, weak law of large numbers, characteristic functions, joint distributions, random variables that are uncorrelated, orthogonal and statistically independent, sum of two independent random variables. Binomial, Possion and Gaussian distributions. Central limit theorem.

Random processes : sample functions, ensemble and time averages, stationary and ergodic processes, mean, auto-correlation and auto-covariance functions, power spectral density, the random walk. Gaussian random process : white Gaussian noise, passage of a random process through a linear filter.

References

[1] * Schanmugan, K. S., Digital and Analog Communication Systems, John Wiley, 1979.

[2] * Peebles, P. Z., Probability, Random Variables and Random Signal Principles, 2/e, McGraw-Hill, 1987.

[3] * Papoulis, A., Probability, Random Variables, and Stochastic Processes, 3/e, McGraw-Hill, 1991. (0-07-048477-5)s

[4] Hsu, H., Schaum's Outline of Probability, Random Variables and Random Processes, McGraw-Hill, 1996. (0-07-030644)

[5] Leon-Garcia, Probability and Random Processes for Electrical Engineering, 2/e, Addison-Wesley, 1994. (0-201-50037-X)

[6] Taub, H. and Schilling, D. L., Principles of Communication Systems, 2/e, McGraw-Hill, 1987.

[7] Proakis, J. G. and Salehi, M., Communication Systems Engineering, Prentice-Hall, 1994.