School of Mathematics

Course 251 - Probability and Theoretical Statistics 1998-99
(SF MSISS, SF Mathematics, JS TSM)

Lecturer: Dr. K. Mosurski

Requirements/prerequisites: 151

Duration: 24 weeks

Number of lectures per week: 3

Assessment:

End-of-year Examination: One 3-hour examination

Description: This course will give an introduction to the mathematical theory of probability and statistics. Students will be expected already to have some knowledge of basis statistics.
Random outcomes. Events, sample spaces, probability. Axioms and the computation of probabilities. Conditional probability, independence, Bayes theorem. Basic combinations. Simple models involving probability. Random variables. Distribution and density functions. Expectation and variance, moments. Properties of E and V. Chebyshev's inequality - weak law of large numbers.
Physical models; Binomial, geometric, hypergeometric, uniform, random numbers and simulation. Poisson Process, Poisson, Exponential. Normal distribution. Sums of random variables - convolution. Moment generating functions. CLT. Bivariate distributions, marginal, conditional distributions. Conditional expectation and variance. Multinomial, Bivariate Normal, MVN. Characterisations.
Textbooks:

1. Mood, A.M., Graybill, F.A. and Boes, D.C., "*Introduction to the Theory of Statistics*," Mc Graw-Hill (paper-back).

2. Lindgren, B.W., *"Statistical Theory",* 3rd edition.

3. Hogg, R.V. and Craig, A.T., *"Introduction to Mathematical Statistics"*, MacMillan, 3rd edition.

4. Hoel, P.G., Port, S.C. and Stone, C.J., *"Introduction to Probability Theory",* Houghton Miffin.

5. Thompson, W.A. Jr., *"Applied Probability"*.

June 10, 1998