**MA4701 Statistics and Probability**

**Probability:** Axiomatic definition, Properties, Conditional probability, Bayes rule and independence of events, Random Variables, Distribution function, Probability mass and density functions, Expectation, Moments, Moment generating function, Chebyshev’s inequality, Special distributions: Bernoulli, Binomial, Geometric, Negative binomial, Hypergeometric, Poisson, Uniform, Exponential, gamma; Joint distributions, Marginal and

conditional distributions, Moments, Independence of random variables, Covariance, Correlation, Functions of random variables, Weak law of large numbers, P.Levy’s Central limit theorem (i.i.d. finite variance case), Normal and Poisson approximations to Binomial.

**Statistics: Introduction:** Population, sample, parameters; Point Estimation: Method of moments, MLE, Unbiasedness, Consistency, Comparing two estimators (Relative MSE), Confidence interval estimation for mean, difference of means, variance, proportions, Sample size problem; Tests of Hypotheses: N-P lemma, examples of MP and UMP tests, p-value, Likelihood ratio test, Tests for mean, variance, two sample problems, Tests for proportions, Relation between confidence interval and tests of hypotheses, Chi-square goodness of fit tests.

**References:**

1. Sheldon M. Ross, “A first course in Probability,” Prentice-Hall, 6ed, 2001
2. P. Meyer, “Introductory probability and statistical applications,” Oxford and IBH Publishing Co. PVT Ltd, 1970
3. W. Feller, An Introduction to Probability Theory and its Applications, Vol. 1, 3rd Ed., Wiley, 1968.
4. Miller& Freund's Probability and Statistics for Engineers, 7th Edition, Pearson Prentice Hall, 2005
5. V.K. Rohatgi, A.K.Md.E.Saleh, An Introduction to Probability and Statistics, Wiley-Interscience, 2000.
6. Probability and Statistics in Engineering by W.W. Hines, D.C. Montgomery, D.M. Goldsman, C.M. Borror
7. Introduction to Probability and Statistics for Engineers and Scientists by S.M. Ross
8. Introduction to Mathematical Statistics, Seventh Edition, by Robert V. Hogg, J.W. McKean, and Allen T. Craig, Pearson Education, Asia