

Indian Institute of Technology Kharagpur
Department of Mathematics
MA20104: Probability and Statistics (3-0-0) CRD-3
Spring Semester 2017-18

Instructor: Bibhas Adhikari

Section: AG+MI+IM

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Course web page: <http://www.facweb.iitkgp.ernet.in/~bibhas/Teaching.html>

Syllabus:

Probability: Classical, relative frequency and axiomatic definitions of probability, addition rule and conditional probability, multiplication rule, total probability, Bayes' Theorem and independence, problems. **Random Variables:** Discrete, continuous and mixed random variables, probability mass, probability density and cumulative distribution functions, mathematical expectation, moments, moment generating function, median and quantiles, Chebyshev's inequality, problems. **Special Distributions:** Discrete uniform, binomial, geometric, negative binomial, hypergeometric, Poisson, continuous uniform, exponential, gamma, Weibull, Pareto, beta, normal, Cauchy distributions, reliability of series and parallel systems, problems. **Function of a Random Variable:** Distribution of function of a random variable, problems. **Joint Distributions:** Joint, marginal and conditional distributions, product moments, correlation, independence of random variables, bivariate normal distribution, problems. **Transformations:** functions of random vectors, distributions of sums of random variables, problems. **Sampling Distributions:** The Central Limit Theorem, distributions of the sample mean and the sample variance for a normal population, Chi-Square, t and F distributions, problems. **Estimation:** Unbiasedness, consistency, the method of moments and the method of maximum likelihood estimation, confidence intervals for parameters in one sample and two sample problems of normal populations, confidence intervals for proportions, problems. **Testing of Hypotheses:** Null and alternative hypotheses, the critical and acceptance regions, two types of error, power of the test, the most powerful test and Neyman-Pearson Fundamental Lemma, tests for one sample and two sample problems for normal populations, tests for proportions, Chi-square goodness of fit test and its applications, problems.

Texts/References:

Probability and Statistics in Engineering by W.W. Hines, D.C. Montgomery, D.M. Goldsman, C.M. Borror
Introduction to Probability and Statistics for Engineers and Scientists by S.M. Ross
Introduction to Probability Theory by P.G. Hoel, S.C. Port, C.J. Stone
Introduction to Statistical Theory by P.G. Hoel, S.C. Port, C.J. Stone
Introduction to Probability and Statistics by J.S. Milton & J.C. Arnold
Introduction to Probability Theory and Statistical Inference by H.J. Larson
Probability and Statistics for Engineers and Scientists by R.E. Walpole, R.H. Myers, S.L. Myers, Keying Ye
An Introduction to Probability and Statistics by V.K. Rohatgi & A.K. Md. E. Saleh
Modern Mathematical Statistics by E.J. Dudewicz & S.N. Mishra
Introduction to the Theory of Statistics by A.M. Mood, F.A. Graybill and D.C. Boes

Class Timings:

MON(08:00-08:55) , MON(09:00-09:55) , TUE(12:00-12:55) Room: NR121.