

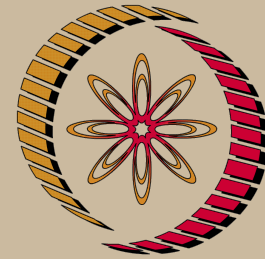
Statistical Methods for Scientists and Engineers - Video course

COURSE OUTLINE

Review of Probability and Distributions. Parametric Methods: Point estimation - methods of obtaining estimators. Interval estimation - confidence intervals for means, variances and proportions. Testing of Hypotheses - tests for parameters of normal populations and for proportions, Goodness of fit test and its applications. Multivariate normal, Wishart and Hotelling's T^2 distributions and their applications, classification of observations, principal component analysis, canonical correlations and canonical variables. Nonparametric Methods - Empirical distribution function, single sample problems, problems of location, prediction intervals, Kolmogorov-Smirnov one sample statistics, sign test, Wilcoxon signed rank statistics, two sample problems, Mann-Whitney-Wilcoxon tests, scale problems, Kolmogorov-Smirnov two sample criterion, Hoeffding's U-statistics.

COURSE DETAIL

Module	Learning Units	Lectures
Module I	Review of Probability and Distributions: Rules for probability, random variables and their distributions, moments, special discrete and continuous distributions, laws of large numbers and central limit theorem, sampling distributions.	8
Module II	Parametric Methods: Point estimation – unbiasedness, consistency, UMVUE, sufficiency and completeness, method of	7



NP-TEL

NPTEL

<http://nptel.ac.in>

Mathematics

Pre-requisites:

Probability and distributions, Statistical Inference

Additional Reading:

1. Statistical Inference by G. Casella & R.L. Berger
2. Applied Multivariate Statistical Analysis by R.A. Johnson & D.W. Wichern
3. Nonparametric Inference by Z. Govindarajulu

Hyperlinks:

<http://nptel.ac.in/courses/111105041/>

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	moments, maximum likelihood estimation and method of scoring. Bayes, minimax and admissible estimators. Interval estimation - confidence intervals for means, variances and proportions. Testing of Hypotheses - tests for parameters of normal populations and for proportions, goodness of fit test and its applications.	
Module III	Multivariate Analysis: Multivariate normal, Wishart and Hotelling's T^2 distributions and their applications in testing of hypotheses problems. Classification of observations, principal component analysis, canonical correlations and canonical variables.	12
Module IV	Nonparametric Methods: Empirical distribution function, asymptotic distributions of order statistics, single sample problems, problems of location, prediction intervals, Kolmogorov-Smirnov one sample statistics, sign test, Wilcoxon signed rank statistics, two sample problems, Mann-Whitney-Wilcoxon tests, scale problems, Kolmogorov-Smirnov two sample criterion, Hoeffding's U-statistics.	13

References:

1. An Introduction to Probability and Statistics by V.K. Rohatgi & A.K. Md. E. Saleh.
2. Modern Mathematical Statistics by E.J. Dudewicz & S.N. Mishra
3. Introduction to Probability and Statistics for Engineers and Scientists by S.M. Ross
4. An Introduction to Multivariate Analysis by T. W. Anderson
5. Nonparametric Statistical Inference by J.D. Gibbons & S. Chakraborti