PUNE DISTRICT EDUCATION ASSOCIATION'S

MAMASAHEB MOHOL COLLEGE

48/1A, Erandwane, Paud Road, Pune - 411038(Maharashtra) India

DEPARTMENT OF COMPUTER SCIENCE

Course Outcome

Course Name : Statistical Methods I

Name of the Teacher: Prof. Seema Patil

Class: F.Y.B.Sc. (C.S.) Pattern:2013(Annual)

Course Outcomes: COs:

CO 1)To understand basic tools and methods required for data analysis.
CO 2) To understand how to apply required techniques in computer based applications.
CO 3) To understand graphical methods for data representation.
CO 4) Know the relationship between data elements.
CO 5) Apply statistical methods in the field of data mining.

Course: Statistical Methods I	**Course Specific Outcomes CSO**	**Methodology**	**Reference Book**	**No.of Lectures**
Data condensation and Graphical methods: histogram, stem and leaf chart,Ogives.	To understand basic terms about the statistics. To understand graphical methods for data representation	Constructive	Fundamentals of Applied Statistics Gupta S. C. and Kapoor V. K.	5
Review/Revision of Descriptive Statistics: Measures of Central tendency, Measures of Dispersion	To understand basic concept about central tendency. To understand basic concept about dispersion. To develop knowledge about partition values.	Constructive	Fundamentals of Applied Statistics Gupta S. C. and Kapoor V. K.	7
Moments: Raw and Central moments, Relation between raw and central moments upto fourth order,Numerical problems.	To understand various types of moment.	Constructive	Fundamentals of Applied Statistics Gupta S. C. and Kapoor V. K.	3
Measures of Skewness and Kurtosis: Measures of skewness-Pearson's measure, Bowley's measure, $\beta 1$, $\gamma 1$. type of kurtosis: leptokurtic, platykurtic and mesokurtic. Numerical problems related to real life situations.	To understand symmetry of the data. To know peakedness and flatness of the data.	Constructive	Fundamentals of Applied Statistics Gupta S. C. and Kapoor V. K.	4
Discrete Random variable: Definition of random variable and discrete random variable.	To understand basic concept about discrete random variable.	Constructive	Fundamentals of Applied Statistics Gupta S. C. and	8

Definition of probability mass function, distribution function and its properties. Definition of expectation and variance, theorem on expectation.			Kapoor V. K.	
Standard Discrete Distributions: Uniform, Bernoulli, Binomial Distribution: definition, mean, variance, additive property. Geometric Distribution definition, mean, variance. Poisson Distribution: definition, mean, variance,Numerical problems related to real life situations.	To know different discrete distribution. Apply the applications of distributions in real life. To understand basic concepts about distributions.	Constructive	Fundamentals of Applied Statistics Gupta S. C. and Kapoor V. K.	15
Correlation (for bivariate raw data) : Bivariate data, Scatter diagram. Correlation, Positive Correlation, Negative Correlation, Karl Pearson's coefficient of correlation (r), interpretation of r, Numerical Problems.	To understand relationship between data elements. To know the types of correlation.	Constructive	Fundamentals of Applied Statistics Gupta S. C. and Kapoor V. K.	6
Regression (for ungrouped data): Regression,Linear Regression..Fitting of straight line using least square method. Properties of regression coefficients.Non Linear regression models.Numerical problems.	Apply regression technique for prediction.	Constructive	Fundamentals of Applied Statistics Gupta S. C. and Kapoor V. K.	9
Multiple and Partial Correlation and Regression (for trivariate data): Yule's notation and concept of multiple regressions. Fitting of multiple regression plane. Partial regression coefficient, interpretation. Multiple correlation coefficient, Partial correlation coefficient.	To understand relationship between more than two variables. Analyze regression plane.	Constructive	Fundamentals of Applied Statistics Gupta S. C. and Kapoor V. K.	8
Time Series: Components of Time Series.Additive and Multiplicative models.Methods of	To understand the components of time series. Use different methods of time series for calculating	Constructive	Fundamentals of Applied Statistics Gupta S. C. and Kapoor V. K.	7

estimating trend: moving average method, least squares method and exponential smoothing method. Elimination of trend using additive and multiplicative models.Simple time series models, Numerical problems.	trend.			

Course: Statistical Methods II

Name Of the Teacher: Prof. Seema Patil

Class: F.Y.B.Sc.(C.S.) Pattern:2013(Annual)

Course Outcomes: COs: Statistical Methods II

CO 1) Improve logical thinking.
CO 2) To know statistical inferential methods.
CO 3) To know probability and the mathematical foundation of statistics.
CO 4) Know statistical modeling and its limitations.
CO 5) Analyze data using statistical computing tools and software.

Course: Statistical Methods II	**Course Specific Outcomes CSO**	**Methodology**	**Reference Book**	**No.of Lectures**
Detailed Review / Revision of Theory of Probability Counting Principles, Permutation and Combination, Deterministic and non-determination models. Random Experiment, Sample Spaces, Events: types of events, Operations on events. Classical definition, probability models, axioms of probability, probability of an event. Theorems of probability (with proof) Numerical problems.	To understand basic terms related to probability theory.	Constructive	Fundamentals of Applied Statistics Gupta S. C. and Kapoor V. K.	5
Advanced Theory of Probability: Concepts and definitions of conditional probability, multiplication theorem $P(A \cap B)=P(A).P(B\|A)$ Bayes' theorem (without proof) Concept and definition of independence of two events. Numerical problems.	To understand how to calculate probability for given condition. Implement application of conditional probability.	Constructive	Fundamentals of Applied Statistics Gupta S. C. and Kapoor V. K.	12
Continuous Random Variable: Definition of continuous random variable. Probability density function (p.d.f.), Cumulative	To understand basic terms related to continuous random variable	Constructive	Fundamentals of Applied Statistics Gupta S. C. and Kapoor V. K.	6

distribution function (c.d.f.), its properties. Numerical problems.				
Standard Continuous Probability Distributions: Uniform Distribution p.d.f., mean, variance, Exponential Distribution: mean, variance, lack of memory property. Normal Distribution: statement of p.d.f., standard normal distribution, independent normal variables, computations of probabilities using normal probability table, normal approximation to binomial and Poisson distribution,Numerical problems.	To understand the use of continuous probability distribution in real life. Able to compute the expected value and variance.	Constructive	Fundamentals of Applied Statistics Gupta S. C. and Kapoor V. K.	13
Concepts and definitions related to testing of hypothesis Definitions: population, statistic, SRSWR, SRSWOR, random sample from a probability distribution, parameter, statistic, standard error of estimator. Concept of null hypothesis and alternative hypothesis, critical region, level of significance, type I and type II error.	To understand basic terms of testing of hypothesis. Develop the research skills.	Constructive	Fundamentals of Applied Statistics Gupta S. C. and Kapoor V. K.	5
Large Sample Tests : Ho: $\mu = \mu_o$ Vs H1: $\mu \neq \mu_o$, $\mu < \mu_o$, $\mu > \mu_o$ (One sided and two sided tests) Ho: $\mu_1 = \mu_2$ Vs H1: $\mu_1 \neq \mu_2$, $\mu_1 < \mu_2$, $\mu_1 > \mu_2$ (One sided and two sided tests) Ho: $P = P_o$ Vs H1: $P \neq P_o$, $P < P_o$, $P > P_o$ (One sided and two sided tests) Ho: $P_1 = P_2$ Vs H1: $P_1 \neq P_2$, $P_1 < P_2$, $P_1 > P_2$ (One sided and two sided tests) Numerical problems.	Apply the test procedure for a test of hypothesis concerning a population mean, proportion.	Constructive	Fundamentals of Applied Statistics Gupta S. C. and Kapoor V. K.	7
Tests based on t-distribution: Ho: $\mu = \mu_o$ Vs H1: $\mu \neq \mu_o$, $\mu < \mu_o$, $\mu > \mu_o$ (One sided and two sided	To understand inference for comparing means of two populations.	Constructive	Fundamentals of Applied Statistics Gupta S. C. and Kapoor V. K.	8

tests) Ho: μ1 = μ2 Vs H1: μ1≠μ2, μ1 < μ2, μ1 > μ2 (One sided and two sided tests) Paired t-test.Test of significance of correlation coefficient for bivariate raw data. Test of significance of regression coefficients for bivariate raw data. Numerical problems.				
Test based on Chi-square distribution: Chi square test for goodness of fit,Test for independence of attributes (m X n contingency table) Test for significance of variation for a population, Numerical problems.	Use a chi-square test to evaluate the fit of a hypothesized distribution.	Constructive	Fundamentals of Applied Statistics Gupta S. C. and Kapoor V. K.	3
Non parametric tests: Run test ,Sign test.Kolmogrov - Smirnov test, Mann – Whitney test ,Numerical problems.	To understand non parametric test procedure.	Constructive	Fundamentals of Applied Statistics Gupta S. C. and Kapoor V. K.	6
Simulation: Introduction to Simulation, merits and demerits random number generator , Model Sampling from uniform and exponential distribution., Box-Muller transformation. Numerical problems.	To understand the procedure for simulation. Know the use of simulation in real life.	Demonstrative	Fundamentals of Applied Statistics Gupta S. C. and Kapoor V. K.	7