SEMESTER: I PART: Open Elective-I	22PSTAO16-1: STATISTICAL METHODS	CREDIT: 3 HOURS : 3

THE PROPORTION BETWEEN THEORY AND PROBLEMS SHALL BE 20:80

COURSE OBJECTIVES

Students can learn advanced contents in statistics with application for business and economics. At the end of the course students will be able to understand, interpret and apply several statistical methods and models commonly used in the analysis of business data.

UNIT I: **Hours: 8**

Partial correlation-Partial correlation coefficient-Partial correlation in case of four variables, Multiple correlation -Multiple regression.

UNIT II: **Hours: 8**

Theory of probability - probability rules – Baye's theorem - Probability distribution-Characteristics and application of Binomial, Poisson and Normal distribution.

UNIT III: **Hours: 8**

Sampling- sampling methods- sampling error and standard error- relationship between sample size and standard error. Testing of hypothesis- testing of means and proportions-large and small samples- Z test and't' test.

UNIT IV: **Hours: 8**

Chi square distribution- Characteristics and applications- test of goodness of fit and test of independence- Test of Homogeneity of variances.

UNIT V: **Hours: 8**

F test for attributes- testing equality of population variances- Analysis of variance- one way and two way classification.

Note: The emphasis is only on the application of the methods. The derivations of the formulae are not necessary.

COURSE OUTCOMES

At the end of the course, the students will be able to

1. Know Partial and Multiple correlations.
2. Know Probability and discrete distributions.
3. Understand the Sampling technique, Hypothesis, Z-Test and t-test.
4. Have the awareness about application of Chi- Square distribution.
5. Know about Analysis of Variance and F-test.

Text Books

1. Gupta, S.P. (2000). *Statistical Methods.* Sultan Chand & Sons, New Delhi.
2. Samcheri, D.C & Kapoor, V.K. *Business Statistics*. Sultan Chand and sons, New Delhi.

Supplementary Readings

1. Richard I Levin & David S. Rubit (2002). S*tatistics for Management* (7th ed.). Pearson Education, New Delhi.
2. Sharma. K, *Business Statistics*- Pearson Education.

OUTCOME MAPPING

	PO1	PO2	PO3	PO4	PO5
CO1	3	3	3	3	3
CO2	3	3	3	3	3
CO3	3	3	3	3	3
CO4	3	2	2	3	3
CO5	2	3	3	3	3
CORRELATION LEVEL: 1-LOW, 2-MEDIUM, 3-HIGH					

SEMESTER: I PART: Open Elective-I	22PSTAO16-2: DESCRIPTIVE STATISTICS	CREDIT: 3 HOURS: 3

NOTE: THE PROPORTION BETWEEN THEORY AND PROBLEMS SHALL BE 20:80

COURSE OBJECTIVES

To enable students to learn basic statistics, function of statistics, elementary probability, random variables, computation of correlation and regression coefficients.

UNIT I: **Hours: 8**

Origin, scope, functions, limitations, uses and misuses of statistics. Classification and tabulation of data, Diagrammatic and graphic representation of data.

UNIT II: **Hours: 8**

Measure of central tendency–Measures of dispersion-relative measures of dispersion-Skewness and Kurtosis-Lorenz's curve.

UNIT III: **Hours: 8**

Elementary probability space-Statistical probability, axiomatic approach to probability-Finitely additive and countable additive probability functions-Addition and multiplication theorems- Conditional probability-Bayes theorem-Simple problems.

UNIT IV: **Hours: 8**

Random variables- Discrete and continuous random variables-Distribution function and probability density function of a random variable-Expectation of a random variable-Addition and product theorems-Evaluation of standard measures of location, dispersion, Skewness and Kurtosis.

UNIT V: **Hours: 8**

Simple linear correlation and regression-Regression equations- properties of regression coefficient- Spearman's Rank correlation co-efficient.

Note: The emphasis is only on the application of the methods. The derivations of the formulae are not necessary.

COURSE OUTCOMES

At the end of the course, the students will be able to

1. Know functions of statistics
1. Understand the measures of central values and dispersion
2. Gain the knowledge about concept of probability
3. Solve the problems in expected values of the random variables
4. Understand correlation and regression

TEXT BOOKS

1. Gupta, S. C., & Kapoor, V.K.(2014). *Fundamentals of Mathematical Statistics* (11th ed.).Sultan Chand &Sons, New Delhi.
2. Gupta, S. P. (2014). *Statistical Methods*. Sultan Chand & Sons, New Delhi.

SUPPLEMENTARY READINGS

1. Goon,A.M.,Gupta,M.K.,&DasGupta,B.(2013). *Fundamentals of Statistics*,Vol.1, World Press Private Ltd, Calcutta.
2. Goyal, J. K., & Sharma, J.N.(2014). *Mathematical Statistics*. Krishna Prakashan Private Ltd, Meerut.
3. Rohatgi, V.K.(1988). *An Introduction to Probability Theory and Mathematical Statistics.* Wiley Eastern(India) Ltd. New Delhi.

OUTCOME MAPPING

	PO1	**PO2**	**PO3**	**PO4**	**PO5**
CO1	3	3	3	3	3
CO2	3	3	3	3	2
CO3	3	3	3	3	3
CO4	3	3	3	3	3
CO5	3	3	3	2	3
CORRELATION LEVEL: 1-LOW, 2-MEDIUM, 3-HIGH					

SEMESTER: I PART: Open Elective-I	22PSTAO16-3: BASIC BIO STATISTICS	CREDIT: 3 HOURS: 3

NOTE: THE PROPORTION BETWEEN THEORY AND PROBLEMS SHALL BE 20:80

COURSE OBJECTIVES

To enable the students of other discipline to understand the basic concepts of Bio Statistics in Biological applications.

UNIT I: **Hours: 8**

Definition, scope, functions and limitations of Statistics – Collection, Classification, tabulation of data, Diagrammatic representation of data – Simple, Multiple and percentage bar diagram, Pie diagram and Graphical representation of data – Histogram, frequency polygon, frequency curve and ogives. Primary and secondary data – Questionnaire method.

UNIT II: **Hours: 8**

Measures of central tendency – Mean, Median and mode and their practical usages. Measures of dispersion: Range, Quartile deviation, Mean deviation, Standard deviation, Variance and coefficient of variation. Measures of skewness – Pearson's, Bowley's method. Applications of binomial and normal distributions. Applications to biological studies.

UNIT III: **Hours: 8**

Measure of bivariate data – Simple, Partial and multiple correlation. Scatter diagram, Pearson's method and rank correlation method. Regression and their equations – Prediction. Basic concept of sampling – Parameter and statistics – Sampling distribution and standard error – Simple random sampling and stratified random sampling. Applications to biological studies.

UNIT IV: **Hours: 8**

Tests of Significance with their important concepts. Tests for large samples - Test for mean, difference of means, proportion and equality of proportions. Small sample tests – Test for mean, difference of means, paired samples, test for correlation and regression coefficients. Applications to biometric experiments.

UNIT V: **Hours: 8**

Chi square test for goodness of fit and independence of attributes. F-test – Analysis of variance, Assumptions, Applications, One way ANOVA and Two way ANOVA. Applications to clinical experiments.

Note: The emphasis is only on the application of the methods. The derivations of the formulae are not necessary.

COURSE OUTCOMES

At the end of the course, the student will be able to:

1. Draw the various diagrams and graphs for statistical data.
2. Calculate the various statistical methods.
3. Calculate the measures for bivariate data.
4. Understand the use of tests of significance.
5. Understand the use of chi square and ANOVA tests.

TEXT BOOKS

1. Gupta, S.P. (2011). *Statistical Methods.* Sultan Chand & Sons, Pvt. Ltd, New Delhi.

SUPPLEMENTARY READINGS

1. Darren George& Paul Mallery. (2011). *SPSS for Windows* (10th ed.). Pearson.
2. Gupta, S.C & Kapoor, V.K. (2011), *Fundamentals of Mathematical Statistics*, Sultan Chand & Sons, Pvt. Ltd, New Delhi.

OUTCOME MAPPING

	PO1	**PO2**	**PO3**	**PO4**	**PO5**
CO1	3	3	3	2	3
CO2	3	3	2	2	3
CO3	2	3	3	3	3
CO4	3	3	3	3	3
CO5	3	3	2	2	3
CORRELATION LEVEL: 1-LOW, 2-MEDIUM, 3-HIGH					