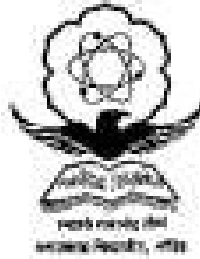


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*University, Nanded.*



**SYLLABUS**  
Of  
**STATISTICS**

B.A/B.Sc. First Year

**Semester – I**

Elementary Probability Theory

Paper-I

Descriptive Statistics

Paper-II

**Semester – II**

Discrete Probability Distributions

Paper-III

Theory of variables and attributes

Paper-IV

**Annual Practical**

Paper-V Practical – I

(2012-13)

# STATISTICS

B.A./B.Sc First Year

## Semester- I

Elementary Probability Theory

### Paper-I

#### **Unit-I- Probability:**

Random experiment, trial, outcome and event, Exhaustive events, favorable events, Independent events, sample space, classical definition of probability, Empirical definition of probability, Axiomatic approach to probability, Addition Theorem of probability, extension of Addition theorem of probability (up to 3 events), Conditional probability. Conditional probability and Independent events, mutually and pair wise independent events, multiplication theorem of probability for Independent finite events, Baye's theorem, problems

#### **Unit-II: - Random Variable (Uni-variate):-**

Random Variable, Distribution function, discrete random variable, Probability Mass Function, Distribution function of discrete random variable, Continuous random variable, Probability Density Function, Distribution function of Continuous random variable, Properties of distributions (Continuous and Discrete)

#### **Unit III: Random Variable (Bi-variate)**

Definition, Two Dimensional Probability Mass Function, Marginal Probability Function, Conditional Probability Function, Two Dimensional Distribution Function, Marginal Distribution Function Joint Density Function, Marginal Density Function, Stochastic Independence and related theorems

#### **Unit IV: Mathematical Expectations:**

Definition, Expected value of random Variable, Expected Value of Function of random variable properties of Expectations, Various measures of Central Tendency, Dispersion, skewness and Kurtosis for Discrete and continuous probability distribution, Basic concepts, Variance, Properties of variance,

covariance, Variance of a Linear combination of Random variable, conditional expectations

**Unit -V: Probability Generating function:-**

Probability Generating function, Moment Generating Function- Definition, Properties of moment generating function, cumulants, Cumulant generating function properties of cumulants problems

**Scope of Syllabus:**

**Fundamentals of Mathematical Statistics** - S.C. Gupta & V.K. Kapoor (11<sup>th</sup> Edition) Sultan Chand & Sons New Delhi

**Chapter 3:-** 3.3, 3.4, 3.4.1, 3.5.,3.8, 3.8.1, 3.8.2, 3.8.5, 3.9, 3.9.1, 3.10. 3.11, 3.12, 3.13, 3.14.1, 3.15, 3.15.1, 4.2

Theorem: - 3.2, 3.3, 3.4, 3.5, 3.6, Cor.1. Cor.2, 3, 10, 3.11, 3.12, 3.13, 3.14, 3.15, 3.16, 3.17, 3.18, 3.19, 3.20, 4.2

**Chapeter: 5** 5.1, 5.2, 5.2.1, 5.3.1, 5.3.2, 5.4, 5.4.1, 5.4.2, 5.4.3

5.5, 5.5.1, 5.5.2, 5.5.3, 5.5.4, 5.5.5, 5.5.6 Theorem 5.2 (Statement only)

**Chapter 6:-** 6.1, 6.2, 6.3, 6.4, 6.5, 6.6.,6.6.1,6.8

**Chapter 7:-** 7.1, 7.1.2, 7.2, 7.2.1

**Reference Books:-**

1. Fundamentals of statistics volume- II- Goon A.M. Gupta M.K, and Dasgupta B(The World press Pvt. Ltd. Kolkatta)
2. Modern Elementary Statistics- Miller and Friends
3. Introductory Statistics by Neil Weiss Pearson Publication.
4. Programmed statistics - B.L. Agrawal ( New Age International Publication New Delhi.)
5. Introduction to the theory of Statistics, Mood A.M., Graybill F.A. and Boes F.A
6. Introductory Probability and Statistical applications- Addison Wesley.
7. Statistical Method, S.P. Gupta, ( Sultan Chand & Sons New Delhi.)
8. Statistics - A Begineer's Text, Volume II : B.R. Bhat, T. Shrivakataramana, K.S. Madhav Rao. ( New Age International (p) Ltd.)

# **STATISTICS**

B.A./B.Sc. First Year

**Semester-I**

Descriptive Statistics

**Paper-II**

## **Unit I: - Basic Statistics & Data Condensation:**

Meaning of statistics, Importance and scope of Statistics in Industry, Medical Science, Social Sciences, Management Science, Agriculture and Insurance, Information Technology, education & Psychology, Statistical Organizations in India and their functions CSO, ISI, NSS, IIPS, Bureau of Economics and Statistics, Frequency distributions (continuous and discrete), Methods of Grouped and Ungrouped Data, Presentation of data, Graphical presentation of data by histogram Frequency curve, Frequency polygon, Ogives, Box plot and Bar Charts, Stem and Leaf Chart, Graphical method to represent bi-variate data, problems

## **Unit – II:- Simple Random Sampling:**

Population, sample, Methods of simple random sampling, stratified random sampling, systematic sampling

## **Unit –III:- Measures of central tendency:**

Measures of central tendency Arithmetic mean (simple and weighted), Combined mean, Geometric Mean, Harmonic Mean, Median ,Mode, Derivation of Median formula for grouped frequency distribution, Quartiles, Calculating quartiles by analytical and graphical method, Uses of Mean, Median, Mode, Harmonic Mean, Geometric Mean, Relation between means, Merits and demerits of measures of central tendency, problems

## **Unit - IV Measures of Dispersion:**

Concepts of measures of dispersion, Types of measures of dispersion, Range, Quartile Deviation, Mean absolute deviation, Standard deviation, Variance, Root mean square deviation, Properties of variance, relation between Root

Mean Square deviation and Standard Deviation, Coefficient of variation,  
Problems

**Unit V: - Moments:**

Raw and central moments, Relation between raw moments & central Moments  
(Up to 4th order), Effect of change of origin and scale on moments, Sheppard's  
correction for moments, Pearsonian coefficients Measures of skewness, kurtosis  
problems

**1. Fundamentals of Mathematical Statistics: - S.C. Gupta & V.K. Kapoor**  
(Sultan Chand and sons New Delhi)

**Chapter 2:-** 2.4, 2.4.1, 2.5, 2.5.1, 2.5.2, 2.5.3, 2.6, 2.6.1, 2.6.2, 2.7, 2.7.1, 2.7.2,  
2.8, 2.8.1, 2.8.2, 2.9, 2.9.1, 2.11, 2.11.1., 2.12, 2.12.1, 2.13, 2.13.1, 2.13.2,  
2.13.3, 2.13.4, 2.14, 2.14.1, 2.15, 2.15.1, 2.15.2, 2.15.5, 2.16, 2.16.1, 2.17

**2. Descriptive Statistics:-P.G.Dixit, Dr.Mrs.V.R. Prayag.D.L. Limaye**  
( Nirali Prakashan, 41 Budhwar Peth Pune-02)

Chapter1:- 1.1, 1.2, 1.3, 1.4, 1.5

Chapter2:- 2.1, 2.2, 2.3, 2.4

Chapter3:- 3.1, 3.2, 3.4,

**Reference Books:-**

1. Fundamentals of statistics volume-(1) Goon A.M. Gupta M.K. Dasgupta  
( The World Press Pvt. Ltd. Kolkatta)
2. Modern Elementary Statistics- Freund J.E. (Prentice Hall New Jersey 1979)
3. Introductory Statistics- Neil Weiss (Pearson Publications.)
4. Programmed statistics - B.L. Agrawal ( New Age International Publication  
New Delhi.)
5. Research Methodology - Kothari C.R. (Wiley Eastern Limited)
6. Statistics- A Beginner's Text, Volume I : B.R. Bhat. T. Shirvenkataramana  
K.S. MadhavRao.
7. Statistical Methods- S.P. Gupta.(Sultan Chand & Sons New Delhi).

# STATISTICS

B.Sc. First Year

**Semester - II**

Discrete Probability Distributions

**Paper-III**

## **Unit I Uniform Distribution:**

Uniform Discrete Distribution: - Definition, Mean, Variance and Moment Generating Function, Examples on real life situation

## **Unit II Binomial Distribution: -**

Bernoulli Distribution: Definition, Mean, Variance and Moment Generating function, Examples on real life situation, Binomial Distribution: Definition, Moments, Moment Generating Function, Cumulants, Additive property of Binomial Distribution, Recurrence Relation for the Probabilities of Binomial Distribution, Mode, Problems, , Examples on real life situation

## **Unit III: Poisson distribution: -**

Poisson distribution as a limiting case of Binomial Distribution, moments of Poisson distribution, mode of Poisson Distribution, recurrence relation for moment of Poisson distribution, moment Generating and cumulant generating function, additive property of Poisson Distribution, recurrence formula for the probabilities of Poisson distribution

## **Unit IV: Negative Binomial Distribution: -**

Definition, Moment Generating Function, cumulants, Moments, Geometric Distribution definition, lack of memory, Moments of geometric distribution moment generating function, mean, variance, Applications of geometric distribution in the real life situation and relation with the binomial distribution, Relation between negative binomial and binomial distribution

**Unit V: Hyper geometric Distribution: -** Definition, Mean and variance, relation with Binomial distribution.

**Scope of Syllabus:-**

(i) Fundamental of Mathematical Statistics (S.C. Gupta V.K. Kapoor)  
(11 th Edition) ((Sultan Chand & Sons New Delhi)

Chapter 8:- 8.1, 8.2, 8.3.1, 8.4, 8.4.1, 8.4.5, 8.4.6, 8.4.7, 8.4.9, 8.4.12,  
8.5, 8.5.2, 8.5.5,8.5 .7,8.5.8,8.5.10,8.6,8.6.1,8.6.2,  
8.7,8.7.1,8.7.2,8.7.3,8.8,8.8.1

**Reference Books:-**

(i) Mathematical Statistics: - H.C. Saxena (Sultan Chand & Sons New Delhi)

(ii) New Mathematical Statistics (First Edition) Arora Sanjay and Bansilal.  
Stya prakashan 16/ 7698 New Market New Delhi 5 (1989)

(iii) Statistics: - a Beginners Text Volume - II B.R. Bhat T. Shivenkataramena  
K.S. Madhav Rao.( New Age International (p) Ltd.

iv)Introduction to Discrete Probability and Probability Distributions:-  
Madhav B. Kulkarni , Surendra B. Ghatpande. (SIPE Academy, Nasik.)

# STATISTICS

B.A./B.Sc. First Year  
**Semester - II**  
Theory of Variables and attributes  
**Paper – IV**

**Unit-I: - Bivaraiate Data:** Graphical method to represents bivariate data, scatter diagram

**Unit II: - Correlation:-**

Concept of Correlation, Karl persons' product moment correlation and its properties, Independence and un co relatedness, Spearman rank correlation coefficient and its properties, Derivation of rank correlation coefficient formula, problem

**Unit –III Linear Regression :-** Regression coefficients, Lines of Regression & their properties, properties of regression coefficients, problems, Derivation of lines of regression, Residuals and their properties, Residuals plot

**Unit -IV:- Method of least squares ;**

Legendre's principle of least squares, Fitting of straight line, Second degree curve, an Exponential curve, Power curve, Logistic curve  $y = k/1+ \text{Exp}(a+ b x)$ , Interpretation of Regression coefficients, most plausible solution of system of liner equations

**Unit : V:- Theory of Attributes:-**

Concepts of attributes, Notation, Classification dichotomy, class frequency, order of classes, positive and negative class frequencies, ultimate class frequencies, relation between class frequencies, consistency of attributes, (threeattributes) Independence and association of two attributes, Yule's coefficient of association **Q**. Coefficient of colligation **Y**. Relation between them and problems.



**Scope of Syllabus :-**

(i) Fundamentals of Mathematical Statistics : S.C. Gupta V.K. Kapoor  
( 11 th Edition) Sultan chand and sons New Delhi.

Chapter10:- 10.1,10.2,10.3,10.4,10.4.1,10.4.2,  
10.7,10.7.1,10.7.3, Theorem 10.1,10.2

Chapter 11:- 11.1,11.2,11.2.1,11.2.2,11.2.3

Chapter 13:- 13.2, 13.3,13.4,13.4.1,13.4.2,13.4.3,  
13.5,13.5.1,13.6,13.7,13.7.1,13.7.2

(ii) Mathematical Statistics : Ray Sharma, Choudhari (Ramprasad and sons Agra)

Chapter 13 :- 13.2, 13.4, 13.5, 13.6, 13.12

**Reference Books :**

i) Statistics : A Begineers Text volume I B.R. Bhat, T Shrivenkataramana,  
K.S. Madhav Rao (New Age International Publications)

ii) Descriptive Statistics : (first edition July – 2008) P.G. Dixit, Dr. V.R.  
Prayag, D.L. Limaya (Nirali Publication Prakashan Pune).

# STATISTICS

B.A./ B.Sc. First Year  
PRACTICAL - I  
Paper-V (Annual Practical)

Sr. No.	Title of Experiments	No. of Experiments
1	Construction of Frequency distributions	2
2	Bar Chart, Frequency polygon, Frequency Cruve, Ogives Histogram. (Also using MS-EXCEL/Spread Sheet)	3
3	Measures of central tendencies Mean, Median and Mode. (Also using MS-EXCEL/Spread Sheet)	3
4	Compute Quartiles by analytical and graphical method	1
5	Compute measures of dispersions Range, Quartile deviation, Mean deviation Standard deviation (Also using MS-EXCEL/Spread Sheet)	3
6	Coefficient of variation	2
7	Moments	1
8	Correlation coefficient (Results to be verified by using computer)	2
9	Regression (Results to be verified by using computer)	2
10	Spearman's rank correlation coefficient (For repeated and unrepeated ranks)	2
11	Fitting of Binomial distribution	2
12	Fitting of Poisson distribution	1
13	Fitting of Curves (i) $Y=a+bx$ (ii) $Y=ab^x$ (iii) Second degree curve	2
14	Attributes	3
15	Computation of probabilities of bivariate distribution	1
16	Most Plausible values of system of liner equations	1