

UNIVERSITY OF MUMBAI
No.UG/71 of 2009

CIRCULAR :-

A reference is invited to the Ordinances, Regulations and syllabi relating to the B.Sc. degree course vide this office Circular No. UG/416 of 2007 dated 15th October, 2007 and the Principals of the affiliated colleges in Science are hereby informed that the recommendation made by the Board of Studies in Statistics at its meeting held on 6th October, 2008 has been accepted by the Academic Council at its meeting held on 15th December, 2008 vide item No. 4.23 and that, in accordance therewith, the revised syllabus of Paper I and II in Statistics at the F.Y.B.Sc. examination is modified as per Appendix and that the same has been brought into force with effect from the academic year 2008 - 2009.

MUMBAI-400 032
26th February, 2009

PRIN.K.VENKATARAMANI
REGISTRAR

To,
The Principals of the affiliated Colleges in Science.

AC/4.23/15/12/2008

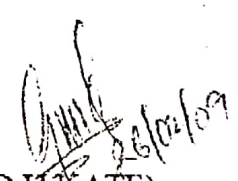
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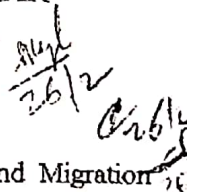
MUMBAI-400 032

26th February, 2009

Copy forwarded with compliments for information to :-

- 1) The Dean, Faculty of Science
- 2) The Chairman, Board of Studies in Statistics.
- 3) The Controller of Examinations,
- 4) The Co-Ordinator, University Computerization Centre,


(D.H.KATE)
DEPUTY REGISTRAR
U.G./P.G.Section.


26/2/09

Copy to :-

The Director, Board of College and University Development, the Deputy Registrar (Eligibility and Migration), the Director of Students Welfare, the Executive Secretary to the Vice-Chancellor, the Pro- Vice-Chancellor, the Registrar and the Assistant Registrar, Administrative sub-center, Ratnagiri for information.

The Controller of Examinations (10 copies), the Finance and Accounts Officer (2 copies), Record Section (5 copies), Publications Section (5 copies), the Deputy Registrar, Enrolment, Eligibility and Migration Section (3 copies), the Deputy Registrar, Statistical Unit (2 copies), the Deputy Registrar (Accounts Section), Vidyanagari (2 copies), the Deputy Registrar, Affiliation Section (2 copies), the Professor-cum- Director, Institute of Distance Education, (10 copies) the Deputy Registrar, University Computer Center (IDE Building), Vidyanagari, (2 copies) the Deputy Registrar (Special Cell), the Deputy Registrar (P.G. Section) and the Assistant Registrar.



15.12.2008

UNIVERSITY OF MUMBAI



Modified Syllabus
at the F.Y.B.Sc. (Paper-I& II)
in the Subject of
Statistics

(With effect from the academic year 2008-2009)

DESCRIPTIVE STATISTICS

UNIT - 1 Concepts of statistical population and sample.

(15 L)

Different types of scales nominal, ordinal, interval and ratio.

Types of Data from a population : Qualitative and quantitative data; time series data; discrete and continuous data.

Primary Data : Concept of a questionnaire and a schedule and distinction between them. Verification for consistency.

Secondary Data : its major sources including some government publications.

Construction of tables with one, two or three factors of classification. Consistency of data. Independence and Association for 2×2 table using Yule's coefficient of Association, Coefficient of Colligation. (Relationship between these two coefficients is expected.)

Requirements of good statistical table.

UNIT - 2 Diagrammatic representation using bar diagrams and pie chart. Univariate frequency distribution of discrete and continuous variables. Cumulative frequency distribution. Graphical representation of frequency distribution by Histogram, frequency polygon, Stem and leaf diagram and Cumulative frequency curve.

(15 L)

Bivariate frequency distribution. Marginal and Conditional frequency distributions.

UNIT - 3 Concept of central tendency or location data.

(15 L)

Measures of central tendency or location.

Arithmetic mean (simple and weighted), Combined mean, Geometric mean and Harmonic mean.

Median, Quartiles, Deciles, Percentiles.

Mode

Uses of Mean, Median and Mode their Merits and demerits.

Requirements of a good average.

UNIT - 4 Range, Semi-inter quartile range, Mean absolute deviation, Variance, Standard deviation, Combined variance and their relative measures of dispersion. (15 L)

Raw and Central moments up to fourth order and relationships among them. (proofs of relationship expected)

Application of Skewness and Kurtosis. Measures of Skewness and Kurtosis based on moments and quartiles.

Box-Whisker Plot.

UNIT - 5 Scatter diagram, Product moment correlation coefficient and its properties. (15 L)

Spearman's Rank correlation.

Concept of linear regression.

Principle of least squares.

Fitting a straight line by method of least squares. Relation between regression coefficients and correlation coefficient.

Fitting of curves reducible to linear form by transformation.

Concept and use of coefficient of determination (r^2).

Fitting a quadratic curve by method of least squares.

UNIT - 6 Index Numbers. (15 L)

Index Numbers as comparative tool.

Stages in the construction of Price Index Numbers.

Measures of Simple and Composite Index Numbers.

Laspeyre's, Paasche's, Marshal-Edgeworth's, Dorbisch-Bowley's and Fisher's Index Numbers. Quantity Index Numbers and Value Index Numbers.

Time reversal test, Factor reversal test, Circular test,

Fixed base Index Numbers, Chain Base Index Numbers.

Base shifting, splicing and deflating.

Cost of Living Index Number.

Concept of Real Income based on wholesale Price Index Number.

TOPICS FOR PRACTICALS

- 1) Classification, Tabulation and Analysis of categorical data.
- 2) Graphs and Diagrams
- 3) Measures of Central Tendency
- 4) Measures of Dispersion
- 5) Skewness and Kurtosis
- 6) Correlation Analysis
- 7) Regression Analysis
- 8) Curve fitting by the method of least squares
- 9) Index Numbers

The students are required to do at least two practicals (six lecture periods) using computerized statistical software.

One case study should be discussed by the teacher in the class.

REFERENCES :

1. Spiegel M.R.: Theory and Problems of Statistics, Schaum's Publications series. Tata McGraw-Hill
2. B.L. Agarwal : Basic Statistics, New Age International Ltd.
3. Hogg R.V. and Tannis E.P.: Probability and Statistical Inference. McMillan Publishing Co.
4. Kothari C.R.: Research Methodology, Wiley Eastern Limited.
5. Goon A.M., Gupta M.K., Dasgupta B.: Fundamentals of Statistics, Volume I. The World Press Private Limited. Calcutta.

F.Y.B.Sc.
PAPER – II
STATISTICAL METHODS

UNIT - 1 Elementary Probability theory :

(15 L)

Trial, random experiment, sample point and sample space. Definition of an event. Algebra of events, mutually exclusive and exhaustive events, complementary events. Classical (mathematical) and Empirical definitions of Probability and their limitations. Theorems on Addition and multiplication of probabilities (with proofs). Independence of events, Conditional probability. Bayes' theorem and its applications.

UNIT - 2 Discrete Random variable :

(15 L)

Random variable, Probability distribution, probability mass function and cumulative distribution function of discrete random variable. Raw and central moments and their relationship, upto order four with proof. Concept of Skewness and Kurtosis and their uses. Expectation of a random variable. Theorems on expectation and variance. Probability mass function and Cumulative distribution function of discrete random variable. Joint Probability mass function of two discrete random variables. Marginal and Conditional Probability distributions. Theorems on Expectation, Variance and Covariance. Coefficient of Correlation between two random variables. Independence of two random variables.

UNIT - 3 Standard Discrete Distributions :

(15 L)

Discrete Uniform, Binomial and Poisson distributions : probability mass functions and derivation of mean and variance, Recurrence relation for probability masses of Binomial and Poisson distributions, (with proof). Poisson approximation to Binomial distribution (with proof).

UNIT - 4 Continuous random variable

(15 L)

Definition and properties of probability density function and cumulative distribution function. Frequency curves and graph of cumulative distribution function. Expectation of a random variable and its properties. Measures of location, dispersion, skewness and kurtosis. Raw and central moments (simple illustrations).

UNIT-5 Standard Continuous Distributions :
Uniform, Exponential (single) and Normal distributions.
Derivations of mean, median and variance for Uniform and Exponential distributions. Properties of Normal distribution (without proof), Normal approximation to Binomial and Poisson distributions (statement only). Use of Normal tables.

(15 L)

UNIT-6 Estimation and Testing of Hypothesis

(15 L)

Concept of a statistic, estimator and its sampling distribution.
Parameter and its estimator.
Concept of bias and Standard error of an estimator.
Central Limit Theorem (statement only).
Sampling distribution of sample mean and sample proportion
(For large samples only).
Standard errors of sample mean and sample proportion.
Point and Interval estimate of single mean, single proportion from sample of large size.
Statistical tests.
Concept of hypothesis.
Null and Alternative hypothesis,
Types of errors, Critical region, Level of significance (simple illustrations)
Large sample tests
for testing specified value of population mean
for testing specified value in difference of two means
for testing specified value of population proportion
for testing specified value in difference of population proportions.

TOPICS FOR PRACTICALS :

1. Probability
2. Discrete Random Variable.
3. Bivariate Probability Distributions (Discrete case only)
4. Binomial and Poisson distributions
5. Continuous Random Variables
6. Rectangular and Exponential Distribution
7. Normal Distributions
8. Testing of Hypothesis
9. Estimation
10. Large Sample Tests

Students are required to do at least two practicals i.e. Six Lecture period using Computerized Statistical Software.

References :

1. Medhi J : Statistical Methods : An Introductory Text, 2nd Edition, New Age International Ltd.
2. David S : Elementary Probability, Cambridge University Press.
3. Hoel P.G. : Introduction to Mathematical Statistics. Asia Publishing House.

4. Hogg R.V. and Tannis E.P. : Probability and Statistical Inference, McMillan Pub.Co.Inc.
5. Kothari C.R.: Quantitative Techniques, Wiley Eastern Limited
6. Pitan Jim : Probability, Narosa Publishing House.
7. Spiegel M.R.: Theory and Problems of Statistics, Schaum's Publishing Series, Tata McGraw-Hill
8. Goon A.M., Gupta M.K. and Dasgupta B: Fundamentals of Statistics, Volume II, The World Press Private Limited, Calcutta

Work-load :

Theory : 3 Lectures per week per paper.

Practicals : 3 Lecture periods per week per batch of 20 students.

THESE THREE LECTURE PERIODS SHOULD BE CONDUCTED IN SUCCESSION TOGETHER ON A SINGLE DAY.

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