

UNIVERSITY OF MUMBAI
No.UG / 416 of 2007

CIRCULAR :-

A reference is invited to the Scheme of Papers relating to the B.Sc. degree course vide this office Circular No. UG/428 of 2003 dated 3rd September, 2003 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 5th July, 2007 has been accepted by the Academic Council at its meeting held on 10th August, 2007 vide Item No.4.14 and that, in accordance therewith, the syllabus in the subject of Statistics Paper I-Descriptive Statistics at the F.Y.B.Sc. examination is revised as per Appendix and that the same will be brought into force with effect from the academic year 2008-2009.

MUMBAI-400 032

15th October, 2007


for I/c. REGISTRAR.

To, The Principals of the affiliated colleges in Science

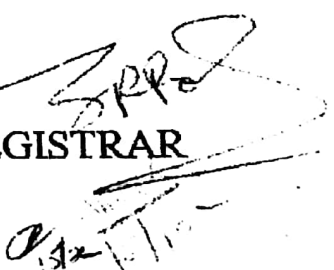
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No.UG/ 416 - A of 2007, MUMBAI-400 032

15th October 2007

Copy forwarded with compliments for information to :-

- 1) The Dean, Faculty of Science,
- 2) The Chairman, Board of Studies in Statistics
- 3) The Officer on Special Duty and Controller of Examinations


for I/c. REGISTRAR

Copy to :-

The Director, Board of College and University Development, the Deputy Registrar (Eligibility and Migration Section), 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 Officer on Special Duty and 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 Director, Institute of Distance Education, (10 copies) the Director University Computer Center (IDE Building), Vidyanagari, (2 copies) the Deputy Registrar (Special Cell), the Deputy Registrar, (PRO). the Assistant Registrar, Academic Authorities Unit (2 copies) and the Assistant Registrar, Executive Authorities Unit (2 copies). They are requested to treat this as action taken report on the concerned resolution adopted by the Academic Council referred to in the above Circular and that no separate Action Taken Report will be sent in this connection. the Assistant Registrar Constituent Colleges Unit (2 copies), BUCT (1 copy), the Deputy Account, Unit V (1 copy), the In-charge Director, Centralize Computing Facility (1 copy), the Receptionist (1 copy), the Telephone Operator (1 copy), the Secretary MUASA (1 copy), the Superintendent, Post-Graduate Section (2 copies), the Superintendent, Thesis Section (2 copies)

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UNIVERSITY OF MUMBAI



Revised Syllabus at the F.Y.B.Sc. examination in Statistics

(with effect from the academic year June 2008-2009)

PAPER- I

DESCRIPTIVE STATISTICS

UNIT- Concepts of statistical population and sample 15 L

1

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. Independence and Association for 2×2 table using Yule's coefficient of colligation.

Requirements of good statistical table.

UNIT- Diagrammatic representation using bar diagrams and pie chart. 15 L

2

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 polygon. Bivariate frequency distribution: Marginal and Conditional frequency distributions.

- UNIT- 3 Concept of central tendency or location of 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.
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- UNIT- 4 Range, Semi-inter quartile range, Mean absolute deviation, 15L
- Variance, Standard deviation, Combined variance and their relative measures of dispersion.
- Raw and Central moments up to fourth order and relationships among them. Application of Skewness and Kurtosis. Measures of Skewness and Kurtosis based on moments and quartiles.
- Box-Whisker plot.

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

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- Index Numbers. 15 L
6

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, Drobisch and Bowley's and Fisher's Index Numbers formula. Quantity Index Numbers and Value Index Numbers Time reversal test, Factor reversal test, Circular test.

Fixed base Index Numbers, Chain Index Numbers.

Base shifting, splicing and deflating

Cost of Living Index Number.

Concept of Real Income based on wholesale Price Index Number.

4

TOPICS FOR PRACTICALS

- Classification, Tabulation and Analysis of categorical data.
- Graphs and Diagrams.
- Measures of Central Tendency.
- Measures of Dispersion.
- Skew ness and Kurtosis.
- Correlation Analysis.
- Regression Analysis.
- Curve fitting by the method of least squares.
- Index numbers.

The Students are required to do at least two practicals (six lecture periods) with the help of any one of the 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.
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PAPER II

STATISTICAL METHODS

- UNIT-1 *Elementary Probability theory:* 15L
Trial, random experiment, sample point and sample space. Definition of an event. Operation of events, mutually exclusive and exhaustive events. Classical (Mathematical) and Empirical definitions of Probability, and their properties. Theorems on Addition and Multiplication of probabilities. Independence of events, Conditional probability. Bayes' theorem and its applications.
- UNIT-2 *Concept of Discrete random variable and properties of it's probability distribution:* 15L
Random variable. Definition and properties of probability distribution and cumulative distribution function of discrete random variable. Raw and Central moments (definition only) and their relationship. (upto order four without proof). Concepts of Skew ness and Kurtosis and their uses. Expectation of a random variable. Theorems on Expectation and Variance. Probability mass function and Cumulative distribution function of discreet random variable. Joint probability mass function of two discrete random variables. Marginal and Conditional distributions. Theorems on Expectation , Variance , Covariance and Coefficient of Correlation. Independence of two random variables.
- UNIT-3 *Some Standard Discrete Distributions:* 15L
Discrete Uniform, Binomial and Poisson distributions and derivation of their mean and variance. Recurrence relation for probabilities masses of Binomial and Poisson distributions (Without derivation). Poisson approximation to Binomial distribution (statement only).
- UNIT-4 *Concept of Continuous random variable and properties of it's probability distribution:* 15L
Probability density function and cumulative distribution function. Frequency curves and Ogives of Probability distribution of continuous random variable. Expectation of a random variable and its properties. Measures of

- location, dispersion, skewness and kurtosis. Raw and central moments (simple illustrations).
- UNIT-5 *Some Standard Continuous Distributions:* 151.
Uniform, Exponential (single or double parameter) and Normal distribution.
Derivations of mean, median and variance for Uniform and Exponential distributions. Properties of Normal distribution (without proof). Normal approximation to Binomial and Poisson distribution (statement only). Properties of Normal curve. Use of normal tables.
- UNIT-6 *Sample from a distribution:* 151.
Concept of a statistic, estimate and its sampling distribution. Parameter and it's 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 sample 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 Alternate hypothesis,
Types of errors, Critical region, Level of significance .
Large sample tests (using central limit theorem ,if necessary)
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 proportion
Use of central limit theorem

TOPICS FOR PRACTICALS

1. Probability.
2. Discrete Random Variable.
3. Bivariate Probability Distributions.

4. Binomial and Poisson distributions.
5. Continuous Random Variables.
6. Uniform, Exponential and Normal Distributions.
7. Normal Distributions.
8. Testing of Hypothesis.
9. Estimation.
10. Large Sample Tests.

Students are required to do at least two practicals on computer using Statistical Software

References:

1. Shah R.J: Statistical Methods, Seth Publications.
2. Medhi J.: Statistical Methods : An Introductory Text, 2nd Edition, New Age International Ltd.
3. B. L. Agarwal : Basic Statistics, New Age International Ltd.
4. Spiegel M.R: Theory and Problems of Statistics, Schaum's Publishing Series, Tata McGraw – Hill.
5. Kothari C.R: Quantitative Techniques, Wiley Eastern Limited.
6. David S: Elementary Probability, Cambridge University Press.
7. Hoel P.G: Introduction to Mathematical Statistics, Asia Publishing House.
8. Hogg R.V and Tanis E.P: Probability and Statistical Inference, Macmillan Pub. Co. Inc.
9. Pitan Jim: Probability, Narosa Publishing House.
10. Goon A.M, Gupta M.K, Dasgupta B: Fundamentals of Statistics, Volume II, The World Press Private Limited, Calcutta.

Students are required to do at least two practicals on computer using Statistical Software

Examination:

PRACTICAL:

It shall be conducted annually. It shall consist of two papers of duration of 3 hours. Each question paper shall have two questions (with internal options) carrying 15 marks each.

Five marks shall be reserved for the Journal.

Five marks shall be reserved for the conduct in Computer Practicals.

$$(2 \times (15 + 15) + 10 + 10 = 80)$$

Work- Load:

Theory: 3 Lectures per week per paper.

Practicals: 3 Lecture periods per paper per week per batch

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

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