(COMMON FOR THE FACULTIES OF ARTS & SCIENCE)

MOHANLAL SUKHADIA UNIVERSITY, UDAIPUR

SECOND YEAR B. Sc.
STATISTICS
2022-23

Papers	Periods per week	Examination Hours	Maximum Marks	
Theory Papers			**B.A**	**B.Sc.**
Paper I	2	3	45	50
Paper II	2	3	45	50
Paper III	2	3	45	50
Practicals**	4	4	65	75
Total Marks			200	225

*** 1 Period = 1 hours**

**** per batch**

NOTE:

1. Common papers will be set for both the Faculties of Arts & Science.
2. Students are allowed to use simple electronic desk calculators (as per University guidelines).
3. Statistical Tables may be used (as per University guidelines)

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PAPER –I
PROBABILITY DISTRIBUTIONS

TIME: 3 hours **Max. Marks 50**

UNIT I

Chebyshev's inequality, Weak law, of large numbers, Central limit theorem for i.i.d. random variables and simple problems on them.

UNIT II

Uni-variate Discrete Probability Distributions: Bernoulli, Binomial and Poisson distributions with their derivations, properties and simple applications. Fitting of Binomial and Poisson distributions.

UNIT III

Negative-Binomial and Hyper-geometric distributions with their derivations, properties and simple applications. Elementary idea of Geometric and Multinominal distributions.

UNIT IV

Univariate Continuous Probability Distributions: Rectangular, Normal and Cauchy distributions, with their derivations- properties and simple applications. Fitting of normal distribution.

UNIT V

Exponential, Beta type I, Beta type II and Gamma distributions with their derivations, properties and simple applications.

Recommended Books:

1. Gupta S.C. Kapoor V.K. : Fundamentals of and Mathematical Statistics, Sultan Chand & Sons, New Delhi
2. Kapur, J.N.and Saxena H.C. : Mathematical Statistics, S.Chand & Company Ltd New Delhi.
3. Goon A.M., Gupta & Das Gupta, B. : An outlines of Statistical Theory Vol. I & II, World Press, M. K. Calcutta

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PAPER – II
SAMPLING DISTRIBUTIONS AND ELEMIENTS OF ESTIMATION

TIME: 3 hours **Max. Marks 50**

UNIT I

Uni-variate Sampling Distributions: Concept of random sampling, statistic and sampling distribution. Concept of standard error of an estimate. Standard errors of sample mean, sample proportions. Sampling distribution of sum of binomial, Poisson and mean of normal distribution its derivation, distribution, Chi-square distribution its derivation, properties and problems.

UNIT II

t, F, and Z sampling distributions with their derivations, properties and Inter-relationships with Chi-square distribution.

UNIT III

Elements of Point Estimation:Bias, Mean Square error,variance and relation among them of an estimator, Concept of point estimation, properties of point estimators such as consistency, unbiased ness, efficiency and simple notion of sufficiency, Factorization theorem (without proof).

UNIT IV

Minimum variance unbiased estimator and its properties (excluding, Cramer-Rao inequality) and problems on them.

UNIT V

Interval Estimation: Concept of interval estimation, confidence interval and confidence coefficient. Confidence interval for mean and variance in case of normal population.
Definition of order Statistic and sampling distributions of medic-in and 'range from any uni-variate population.

Recommended Books:

1. Gupta.S.C., Kapoor,V.K. : Fundamentals of Mathematical and Statistics, Sultan Chand & Sons, New Delhi
2. Kapur J.N. and Saxena, H.C. : Mathematical Statistics S.Chand & Company Ltd., New Delhi.

Reference Books:

1. Singh, J. : Statistical Inference (Hindi edition) Madhya Pradesh Hindi Granth Academy, Bhopal.
2. Freund J.E.(2,001) : Mathematical Statistics Prentice Hall of India
3. Goon A.M. Gupta, M.K. and Das Gupta : An out lines of Statistical Theory Vol. I & II World Press, Calcutta.

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PAPER- III
APPLIED STATISTICS

TIME: 3 hours **Max. Marks 50**

UNIT-1

Theory of curve Fitting: Method of least squares, fitting of straight line, parabola, Kth degree polynomial, exponential and logarithmic curves (reducible to linear forms). Most plausible solution of linear equations.

UNIT-II

Linear correlation and regression, concept of intra-class correlation, Spearman's rank correlation. Partial Correlation coefficient, Multiple correlation coefficient and multiple regression for three variables only.

UNIT-III

Vital Statistics: Uses of vital statistics, methods of obtaining vital statistics, Measurement of mortality crude death rate, specific death rates, standardized death rates. Life table, assumptions, description and construction of life table and its uses, Fertility, measurements of fertility, crude, general, specific and total fertility rates. Measurements of population growth, gross and net reproduction rates.

UNIT-IV

Time series and its components, methods of determining trend and seasonal components.

UNIT-V

Index Numbers: Problems involved in the construction of Index numbers, types of index numbers, construction of index numbers by aggregate methods and price relative methods, chain indices.

Requisites of an ideal index number. Uses and limitation .of the index numbers. Errors in index numbers. Base shifting, splicing and deflating concepts, cost of living and wholesale price index numbers.

Recommended Books:

1. Gupta S.C. and Kapoor V.K. : Fundamentals of Mathematical Statistics, Sultan Chand & Sons, New Delhi.
2. Gupta S.C. and Kapoor V.K. : Fundamentals of Applied Statistics, Sultan Chand & Sons, New Delhi.
3. Kapur, J.N.and Saxena H.C. : Mathematical Statistics, S.Chand & Company Ltd., New Delhi.
4. M.K. and Das Gupta, B(1991) : Fundamentals of Statistics Vol. I & II World Press, Calcutta
5. Srivastava, O.S. (1983) : A text book of demogrdphy, Vikas Publishing House, New Delhi
6. Benjamin B. (1959) : Health and vital Statistics, Allen and Unwin.

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SECOND YEAR B. Sc. STATISTICS 2022-23
STATISTICS PRACTICAL

Duration of Examination: Four Hours **Max. Marks: Arts - 65**
Science – 75

TIME: 3 hours **Max. Marks 75**

The distribution of marks will be as follows:

	B.A.	**B.Sc.**
Practicals	45 Marks	45 Marks
Viva-voce	10 Marks	15 Marks
Practical Record	10 Marks	15 Marks
Total	**65 Marks**	**75 Marks**

The following topics are prescribed for practical work:

1. Fitting of (i) Binomial distribution when (a) p-known (b) p-unknown, (ii) Poisson distribution (iii) Normal distribution
2. Exercise based on area property of. Normal distribution.
3. Fitting of curves: (i) Straight line (ii) Parabola (iii) Exponential and Power curves.
4. Calculation of correlation coefficient by (i) Karl Pearson's method and (ii) Spearman's rank method.
5. Construction of regression line.
6. Preparation of bivariate frequency distribution, calculation of correlation coefficient and construction of regression lines.
7. Calculation of Multiple and Partial correlation coefficients and construction of multiple regression equations (For three variables only)

6. Confidence interval for (i) Mean in case of large and small samples and (ii) proportion.

8. Vital Statistics : (i) CDR, Age specific death rates, Standardized death rates (ii) CBR, GFR, ASFR, TFR (iii) Standardized birth rate (iv) Crud rate of natural increase GRR and NRR (v) Life tables and to find out certain values with its help.
9. Time Series : Determination of trend by (i) Least square method (ii) Moving average method (including weighted averages).
10. Determination of seasonal variation by (1) Simple average method (ii) Ratio to trend method (iii) Ratio to moving average method and (iv) Link relative methods.
11. Construction of Index Numbers by - (i) Laspeyre's (ii) Paasche's (iii) Fisher's (iv) Dorbish-Bowley's and (v) Marshall Edgeworth's formulas.
12. Tests of Ideal Index numbers.
13 (i) Fixed base and chain base Index numbers (ii) Whole sale price Index number (iii) Cost of living Index number (iv)Base shifting, splicing & deflating.