(COMMON FOR THE FACULTIES OF ARTS & SCIENCE)

MOHANLAL SUKHADIA UNIVERSITY, UDAIPUR

FIRST YEAR B. Sc.

STATISTICS

2021-22

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)

MOHANLAL SUKHADIA UNIVERSITY, UDAIPUR
FIRST YEAR B. Sc. STATISTICS 2021-22
PAPER – I
DESCRIPTIVE STATISTICS

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

UNIT - I

Definition and History of Statistics, Concept of statistical population. Attributes and Variables, different methods of collection, classification and tabulation of statistical data. Representation of Data: Discrete and continuous variates, Construction of frequency tables for grouped and ungrouped data in uni-variate and bivariate cases, Histogram, Frequency polygon, curves and ogives, One, two and three-dimensional diagrams.

UNIT - II

Measures of Location: Arithmetic mean, weighted arithmetic mean, geometric mean and harmonic mean, Median and Mode. Requisites of an ideal measure of central tendency, merits and demerits of various measures of central tendency. Partition Values: Quartiles, Deciles and Percentiles.

UNIT - III

Measures of Dispersion: Range, Semi-interquartile range, Mean deviation, Root mean square deviation, Standard deviation and coefficient of variation. Lorenz curve, Requisites of an ideal measure of dispersion.

UNIT - IV

Moments: Raw, central, factorial and absolute moments, Relationship between central, raw and factorial moments.

Charlier's checks and Sheppard's corrections (without proof), effect of change of origin and scale on moments. Different measures of Skewness and Kurtosis.

UNIT - V

Theory of Attributes: Class frequencies and their order (up to three attributes only), consistency of data, association and independence of attributes. Yule's coefficient of association and coefficient of colligation.

Recommended Books :

1. Gupta S.C. and Kapoor, V.K : Fundamentals of Mathematical 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. Gokhroo, D.C. & Saini, S.R. : Mathematical Statistics (Hindi edition), Navkar Prakashan, Ajmer.
2. Gupta, S.P. : Statistical Methods, Sultan Chand & Sons, New Delhi.
3. Rao N.S., Suthar S.P. S.L. Publication, : Business Statistics (Hindi edition), Alka and Gupta Ajmer.

MOHANLAL SUKHADIA UNIVERSITY, UDAIPUR
FIRST YEAR B. Sc. STATISTICS 2021-22
PAPER -II
PROBABILITY THEORY

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

UNIT - I

Random experiment, sample space, events, elements of an event, union and intersection of events, mutually exclusive, exhaustive, independent and equally likely events. Classical and Statistical definitions of probability and simple problems, Axiomatic approach to probability. Addition law of probability for two or more events.

UNIT - II

Conditional probability, Multiplication law of probability, Statistical independence of events, Baye's theorem and its simple applications.

UNIT - III

Random Variable Discrete and continuous random variables, Probability mass and density functions,- joint, marginal and conditional probability functions, Distribution functions.

UNIT -IV

Mathematical Expectation Definition of expectation, Addition and Multiplication laws of expectation, Moments in terms of expectation, variance and covariance for the linear combination of random variables. Elementary idea of conditional expectation. Schwartz's inequality.

UNIT - V

Moment generating and Cumulants generating functions with properties, Characteristic function with properties (without proof).

Recommended Books:

1. Gupta S.C.and Kapoor V. K : Fundamentals of 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 M., K. Das Gupta B (1999) : Fundamentals of Statistics,Vol.11, World Press Calcutta

Reference Books :

1. Gokharoo D.C. and Saini, S.R. : Mathematical Statistics (Hindi edition), Navkar Prakashan, Ajmer.
2. Bhargava, S.L. and Agarwal, S.M. : Mathematical Statistics (Hindi edition), Jaipur Publishing House, Jaipur.
3. David, R. (1996) : Elementary Probability, Oxford Press.
4. Bhat B.R., Srivenkatramana T and Madhava. K.S.(1977) : A Beginner's Text, Vol II New Age Rao International (P) Ltd

MOHANLAL SUKHADIA UNIVERSITY, UDAIPUR
FIRST YEAR B. Sc. STATISTICS 2021-22

PAPER - III
COMPUTATIONAL TECHNIQUES & OFFICIAL STATISTICS

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

UNIT – I

Theory of Finite Differences: Operator, Δ , E & ∇ with their properties, Problems of identities involving Δ & E & ∇ , Factorial function; Newton-Gregory's forward and backward interpolation formulae, Estimation of missing value in equal intervals.

UNIT – II

Theory of divided differences and its properties, Newton's divided difference & Lagrange's interpolation formulae, inverse interpolation by making use of Lagrange's formula.

Numerical Integration : Trapezoidal rule, Simpson's 1/3 & 3/8th rule, Weddle's rule and related problems.

UNIT - III

Linear Programming: Definition of Linear Programming Problem (LPP), formulation of LPP, Graphical method (for two variables), Simplex computational procedure and Duality.

UNIT – IV

Statistical Quality Control: Process control and Product control, Control charts, 3a-control limits, Tools for SQC, Control charts for variables and attributes, $\overline{X}$ and R charts, $\overline{X}$ and S charts, p, np and c-charts. Criterion for detecting lack of control in various charts. Natural tolerance and specification limits, Modified control limits. Principles of Acceptance Sampling Problem of lot acceptance, good and bad lots, producer's & Consumer's risk, single & double sampling plans and their O.C. functions. Concepts of AQL, LTPD, AOQL, Average amount of Inspection and ASN functions.

UNIT - V

Statistical Organizations in India, Central Statistical Organization, National Sample Survey Organization, their functions and publications. System of collection of agricultural statistics,

crop forecasting and estimation, productivity. Industries and foreign trade related statistics. Statistical Organizations in Rajasthan, their functions and publications.

Recommended Books:

1. Saxena H.C. : Finite Differences and Numerical Analysis, S.Chand & Company Ltd., New Delhi.
2. Gokhroo D.Cand Saini S.R. : Numerical Analysis (Hindi edition), Navkar Prakashan, Ajmer
3. Gokhroo D.C.and Saini S.R. : Elements of Linear Programming (Hindi and English editions), Jaipur Publishing House
4. Asthana B.N. & Srivastava S.S. : Applied Statistics of India, Chaitanya Publishing House, Allahabad.
5. Porwal L.S.and Agarwal N.P. : Applied & Economic Statistics of India (Hindi Ed.)
6. Duncan A.J. (1914) : Quality Control and Industrial Statistics. Fourth editions, Taraporewala & Sons.
7. Montgomery, C. (1991) : Introduction to the Statistical Quality Control (Second edition.) John Wiley & Sons.

Reference Books :

1. Bhargava S.L., Sharma, K.D. Bhati, S.S. : Linear Programnling (Hindi edition), Jaipur and Publishing House, Jaipur
2. Nagar, K.N. : Fundamentals of Statistics (Hindi edition) Meenakshi Prakashan, Meerut
3. Gupta, B.N. : Statistics: Theory & Practice (Hindi and English editions), Sahitya Bhawan, Agra.
4. Saluja M.R. : Indian Official Statistical Systems, Statistical Publishing Society, Calcutta

MOHANLAL SUKHADIA UNIVERSITY, UDAIPUR

FIRST YEAR B. Sc. STATISTICS 2021-22

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. Presentation of raw data.
2. Graphical representation by (I) Histogram (ii) Frequency polygon (iii) Frequency curve and (iv) Ogives.
3. Diagrammatic representation by (i) Bars (ii) Pie diagram.
4. Measures of Central Tendency: Mean, Median, Mode, G.M., H.M., Quartiles, Deciles & Percentiles.
5. Measures of Dispersion (i) Range (ii) Semi interquartile range (iii) Mean Deviation (iv) Standard Deviation and Variance (v) Coefficient of Variation (vi) Lorenz Curve.
6. Moments and various measures of Skewness and Kurtosis.
7. Evaluation of probabilities using addition and multiplication theorems, conditional Probabilities and Baye's Theorem.
8. Exercises on Mathematical expectation and finding measures of central tendency, dispersion, Skewness and kurtosis of uni-variate probability distribution.
9. Exercises on determination of class frequencies, consistency of data and association of attributes.
10. Solution of LPP by Graphical and Simplex methods.
11. Statistical Quality Control: (i) $\overline{X}$ & R Charts (ii) X and a charts (iii) p, np and c-charts.
12. Exercises on Finite Difference Theory: (i) Construction of finite difference table. (ii) Newton Gregory's forward and backward interpolation formulae (iii) Estimation of missing value in case of equal intervals.
13. Lagrange's and Newton's divided difference formulae
14. Inverse interpolation by Langrange's formula.
15. Numerical Integration by Trapezoidal, Simpson's 1/3rd & 3/8th rules.

(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)

MOHANLAL SUKHADIA UNIVERSITY, UDAIPUR
SECOND YEAR B. Sc. STATISTICS 2022-23

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

MOHANLAL SUKHADIA UNIVERSITY, UDAIPUR
SECOND YEAR B. Sc. STATISTICS 2022-23

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.

MOHANLAL SUKHADIA UNIVERSITY, UDAIPUR
SECOND YEAR B. Sc. STATISTICS 2022-23

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.

MOHANLAL SUKHADIA UNIVERSITY, UDAIPUR
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.

(COMMON FOR THE FACULTIES OF ARTS & SCIENCE)

THIRD YEAR B. Sc.

STATISTICS

2023-24

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)

4. Visit to Local Governments/ Organizations, Semi Governments Departments/ Organizations, Government Undertaking Organizations, Statistical Institute of repute, Private sector Statistical Organization and Research Stations within Udaipur Division may be organized to familiarize students with the practical work done at these centers.

MOHANLAL SUKHADIA UNIVERSITY, UDAIPUR
THIRD YEAR B. Sc. STATISTICS 2023-24

PAPER-I
STATISTICAL INFERENCE

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

UNIT -1

Testing of Hypothesis Null, Alternative, Simple and composite hypotheses, Two types of errors, Power of the test, Power curves in simple cases, critical region and best critical region (BCR). Most powerful and uniformly most powerful tests. Neyrnan- Pearson's Lemma, Determination of B.C.R for testing simple v/s simple hypothesis in uniform and normal populations.

UNIT-II

General theory of test of significance for large samples for testing of means and proportions, Determination of Sample size, Test of significance based on 't' distribution.

UNIT-III

Tests of significance based on Chi-square and F-sampling distributions.

UNIT-IV

Methods of estimation: Method of moments, Method of least squares and Method of maximum likelihood estimation with their properties (without proof).
Elements of Non-parametric Inference: Sign, Median and run test.

UNIT -V

Elements of Sequential Analysis, Construction of sequential probability ratio tests (SPRT), O.C. and A.S. N. functions. Applications of SPRT for testing simple v/s simple hypothesis in case of Bernoulli and Normal populations.

Elements of decision problems: Loss function, risk function, estimation and testing viewed as decision problems. Bayes rule.

Recommended Books :

1. GuptA. S.C.and Kapoor V.K. : Fundamentals of Mathematical 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 Goon, A.M.,Gupta, M.K. and Das Gupta, B.(1980) : An outline of Statistical Theory,Vol.2. The world Press Publishers Private Ltd. Calcutta.
3. Rohatgi, V.K.(1986) : An Introduction to probability theory & Math. Statistics, Wiley Eastern.
4. Mood A.M.,Graybill,: F.A. and D.C.(1974) : Introduction to the theory of Statistics, Boes, Third edition McGraw Hill

MOHANLAL SUKHADIA UNIVERSITY, UDAIPUR
THIRD YEAR B. Sc. STATISTICS 2023-24
PAPER - II
DESIGN OF EXPERIMENTS AND SAMPLE SURVEYS

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

UNIT-1

Analysis of variance for one-way and two-way classification (with one observation per cell). Linear model and its different types, Transformations, Basic concepts in design of experiments, Criteria for a good design, Uniformity trials, Size and Shape of block and plots.

UNIT-II

Completely randomized and Randomized block designs. Efficiency of Randomized block design over Completely randomized design. Latin square design.Missing plot technique, Estimation of single missing value in Randomized block and Latin square designs.

UNIT-III

Concepts of population and sample, need for sampling. The principle steps in a sample survey, concept of sampling and non-sampling errors, Advantages of sample survey over complete enumeration, Limitations of sampling, types of sampling, basic principles of sampling design, procedures of selecting a random sample.

UNIT-IV

Simple random sampling with and without replacement for variables and attributes. Stratified random sampling including allocation problems, Efficiency with SRS including intra class correlation coefficient (Excluding cost function).

UNIT-V

Cluster Sampling (with equal cluster size): Definition, Estimation of mean and its variance, Variance estimator, Systematic sampling, estimation of mean and its variance, comparison with SRS and stratified random sampling for a linear trend population.

Recommended Books :

1. Gupta S.C. and Kapoor V.K. : Fundamentals of Applied Statistics, Sultan Chand & Sons, New Delhi.
2. Goon, A.M., Gupta, M.K. and Dasgupta, B. : Fundamentals of Statistics, Vol.I. The World Press Pvt. Ltd. Calcutta

3. Cochran, W.G. and Cox, G.M : Experimental Designs, John Wiley & Sons, New York.
4. Sukhatme P.V., Sukhatme B.V., : Sampling theory of Surveys, and Applications,
5. Sukhatme S. and Ashok C. : Indian Society of Agricultural Statistics, New Delhi.
6. Gupta S.C and Kapoor V.K. : Fundamentals of Applied Statistics, Sultan Chand & Sons, New Delhi

Reference Books :

1. Goulden, C.H. : Methods of Statistical Analysis (Hindi Ed.) Bihar Hindi Granth Academy, Patna
2. Snedecor, G.W. : Statistical Methods (Hindi Ed.) Commission of Scientific & Technical Words, Ministry of Education, Govt. of India
3. Mukhopadhyay, : Applied Statistics, New Central Book Agency Pvt., Ltd.Calcutta P. (1999)
4. Montgomery, D.C'.(1991) : Design and Analysis of Experiments, Wiley Eastern.
6. Goon A.M., Gupta M.K and Dasgupta, B. : Fundamentals of Statistics, Vol.11, The World and Press Pvt. Ltd., Calcutta.
7. Cochran W.G. : Sampling Techniques (Hindi and English Edition), Kendriya Hindi Granth Academy, New Delhi (Hindi Ed.), Wiley Eastern Ltd, New Delhi (English Ed.)
8. Mukhopadhyay P. (1998) : Theory and Methods of Survey Sampling, Prentice Hall
9. Sampat, S. (2000) : Sampling Theory (Narosa).

MOHANLAL SUKHADIA UNIVERSITY, UDAIPUR
THIRD YEAR B. Sc. STATISTICS 2023-24

PAPER -III
PROJECT WORK

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

The project work shall be spread over the whole year. A project may be undertaken by a group of students. However, the project report shall be submitted by each member of the group separately.

A project report shall clearly state the problem addressed, the methodology adopted, the assumptions , the hypotheses formulated, any previous reference to the study undertaken, statistical analyses performed and the broad conclusion drawn. There shall be an external examiner and an internal examiner (preferably the supervisor of the student) for the evaluation of the project work. Out of total 50 marks assigned to the project, 30 marks will be assigned on the evaluation of the project report separately by both the examiners and 20 marks will be assigned on the oral presentation and viva-voce.

Guidelines of Project Work

1. A project work is compulsory and shall be offered in third year. Project submission is in end of third year but the allocation of students should be done at the starting of third year session.
2. A project work may be taken individually or by a group of students (not more than 5 per batch).
3. Project work shall be supervised by faculty members assigned by the Head/ Incharge of the department , as the case may be at the starting of third year.
4. The orientation of Project work shall be neither of a theory paper nature nor of a lab/practical nature but shall be in the form of dessertation.
5. Students, will decide Project Topic/ Area in consultation with the supervisor. Project work may be carried out in a group of students depending upon the depth of fieldwork/ problem involved.
6. Review meetings are to be done periodically (fortnightly/monthly) to the allocated students by the respective supervisors.
7. Students may be given 6 to 10 weeks during the whole year, for their industrial work/ data collection/ survey or any other fieldwork involved in the project.
8. The project work should be selected in such a way that there is enough scope to apply and demonstrate the statistical techniques learnt in the course.

9. At the end of the session, a report on the work done should be submitted in two copies. If a team of two students jointly do a project work then they must submit individual reports separately (not copy of the same report).
10. The project report shall clearly state the selected problem, the statistical methodologies employed for data collection and analysis and the conclusions arrived at. Details of previous studies in the area of work and related references should also be given.
11. The project work will be assessed for a maximum of 50 marks. Each student shall give a presentation at the time of submission of their project work which will be evaluated internally for a maximum of 30 marks.There will be an external viva-voce examination for a maximum of 20 marks by an internal and an external examiner. The parameters for viva voce include (i) Clarity of presentation (ii) Clarity of the content / concept (iii) response to the queries and (iv) relevance of topic for carrying out the project.
12. If there is found any shortcoming in the project work, then the HOD decision shall be final in this regard.

References :

1. Kothari, C.R. (1985): Research Methodology: Methods and Techniques, Wiley Eastern.
2. Dominowski, R.L. (1980): Research Methods, Prentice Hall Inc., New Jersey.
3. Mishra, R.P. (1980): Research Methodology, Handbook Concept Publishing Company, New Delhi.
4. IIPS (1996): Research Methodology, IIPS, Mumbai.

MOHANLAL SUKHADIA UNIVERSITY, UDAIPUR
THIRD YEAR B. Sc. STATISTICS 2023-24

STATISTICS PRACTICAL

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

Introduction to C-programming Language:

Computer Programming in C-Language; Introduction to C-Language and its uses & advantages, C-Fundamentals: Character Set in C, Structure of C-Program; Data Types: constants, Variables and C-Keywords or Reserved words and defining defined Variable Names (user's defined variables indicating appropriate data types), and Characters type data, Types of Constants: Integer, Real and Character Constants and their print format specifications (Formatted and Un-Formatted Both); Declaration of Type of Variables used, operators: Arithmetic, Relational, Logical, Conditional, Assignment Operators, Making Expressions using Operators and converting mathematical expressions into C-Expressions, Commonly used C-Library functions, C-Statements: Input and Output Control Statements, Conditional Statements (simple and nested), Loop Control Statements (simple and nested), Creating Functions in C, Use of Automatic, External, Global and Static variables; Strings as Arrays.

The Characteristic Powerful Features of C: data structures; Structures: Array of structures, Introduction to multifile programs Macro, Recursion Functions passing arrays and structures as arguments to functions, functions returning pointer etc.; Pointers: Array of Pointers, Passing Pointers to Functions, Pointers and one dimensional Arrays, Pointer arithmetic, application of Pointers in processing strings, passing function to other functions.

Working with Data Flies: Defining File Name, Types of File (Sequential, Random File), Modes of Files, Opening and Closing a File, Creating a File, Creating and Processing/Updating formatting and unformatting a File containing data records, File input and Output Functions, Detecting end of a File, Removing a File.

The following practical topics are prescribed for practical work using C-programming language:

1. Large sample test of significance for mean, standard deviation and proportion for one and two sample problems.
2. t-test for the significance of single mean and difference of means (paired and unpaired cases).
3. Test for, the significance of correlation coefficient and regression coefficients,
4. F-test for equality. of two population variances.
5. Chi-square test for (i) goodness of fit (ii) Independence of attributes (iii) significance of single variance (iv) Homogeneity of several correlation coefficients.
6. Sign test, Run Test and Median Test
7. Analysis of variance for (i) One-way classification, (ii) Two-way classification with one observation per cell.
8. Analysis of (i) CRD (ii) RBD and (iii) LSD.
9. Estimation of single missing value In RBD and LSD
10. Sample Surveys : (i) SRS (ii) Stratified sampling including allocation problems.

Books Recommended:

1 Programming with C-Byron Gottfried, schaum. Series.

2 C-Programming-Balaguruswami.

3 Let us C by Kanitkar.

Reference Books:

1 Snedecor G.W and Cochran, W.G.: Statistical Methods.

2 Computer Organizations and C- Programming, William Gear, McGraw-Hill Co.

3 Data structures and Program Design-Robert L.Kruse, Prentice - Hall of India.