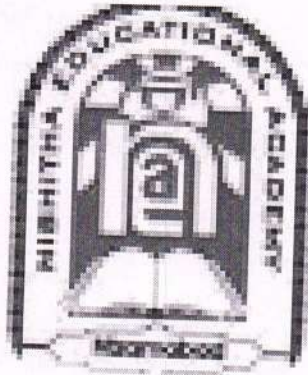


**NISHITHA DEGREE COLLEGE
(AUTONOMOUS)**

ACCREDITED WITH "A" GRADE BY NAAC
UGC RECOGNIZED UNDER SECTION 2(F) & 12B



B.Sc (Statistics)
Under CBCS System
Scheme w.e.f A.Y 2022-2023

In the year 2020 management was introduced a new course **B.Sc (Maths, Statistics , Data science)** with intake of 50 students and In the year 2021 management was introduced a new course **M.Sc(Statistics)** with 48 students.

PROPOSED SCHEME FOR CHOICE BASED CREDIT SYSTEM

Semester	Course Type	Hours Per Week		No.of Credits	Marks			
		Theory	Practical		IA	EA	Practical	Total
I	DSC -2A	4	3	4+1	30	70	50	150
II	DSC -2B	4	3	4+1	30	70	50	150

DSC – Discipline Specific Core Course

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PROPOSED SCHEME FOR CHOICE BASED CREDIT SYSTEM

Semester	Course Type	Hours Per Week		No. of Credits	Marks			
		Theory	Practical		IA	EA	Practical	Total
I	DSC -2A	4	3	4+1	30	70	50	150
II	DSC -2B	4	3	4+1	30	70	50	150

DSC – Discipline Specific Core Course

Theory Papers :

Total Marks : 100 (30 for IA and 70 for EA)

Practical : 50 Marks (45 marks + 5 marks lab record)

Theory Papers

Internal Assessment Test (IA) 1	20
Internal Assessment Test (IA) 2	20
Average of Contiguous Internal Internal Assessment Test (IA + EA)/2	20
Skill Based Test (Assessment +Presentation)	5
Attendance <i>adrian</i>	5

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SYLLABUS SCHEME FOR CHOICE BASED CREDIT SYSTEM

Semester	Course Type	Hours per Week		No.of Credits	Marks			
		Theory	Practical		IA	EA	Practical	Total
III	DSC -3A	4	3	4+1	30	70	50	150
IV	DSC -4A	4	3	4+1	30	70	50	150

DSC – Discipline Specific Core Course

Theory Papers :

Total Marks : 100 (30 for IA +70 for EA)

Practical : 50 Marks (45 Marks + 5 Marks lab record)

Theory Papers

Internal Assessment Test (IA)1	20
Internal Assessment Test(IA)2	20
Average Contiguous Internal Assessment Test(IA1+IA2)/2	20
Seminar	10

B.Sc. (STATISTICS) Practical Question Paper Pattern

w.e.f: Academic Year: 2023-2024

(With Mathematics Combination)

Time: 3 hours]

[Max. Marks: 50

Solve any THREE problems choosing at least one from each Section

(3Q x15 m=45m) and Record: 5m

Section-A

1. From Part 1

2. From Part 1

3. From Part 1

Section – B

4. From Part 2

5. From Part 2

B.Sc (Statistics)
Theory Question Paper Pattern

Time: 3 hours

[Max. Marks: 70]

Section - A

Answer any **SIX** Questions. All questions carry equal marks. (6*5=30 Marks)

1. From Unit I
2. From Unit I
3. From Unit II
4. From Unit II
5. From Unit III
6. From Unit III
7. From Unit IV
8. From Unit IV
9. From Unit I (OR) III
10. From Unit II (OR) IV

Section - B

Answer ALL questions. All questions carry equal marks. (4*10=40 Marks)

11. a) From Unit I
(or)
b) From Unit I
12. a) From Unit II
(or)
b) From Unit II
13. a) From Unit III
(or)
b) From Unit III
14. a) From Unit IV
(or)
b) From Unit IV

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Practical Examination Question Paper Pattern
(w.e.f : Academic year ; 2022-2023)
(With Mathematics Combination)

Time ; 3 Hrs

Max .Marks :50 (45 +5)

Solve any THREE problems choosing at least one question from each section

Section – A

- 1 From Part I
- 2 From Part I
3. From Part I

Section – B

4. From Part – 2
- 5 From Part - 2

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SYLLABUS FOR B.Sc (M.S.Cs) & B.Sc (M.S.Ds) - SEMESTER SYSTEM

(APPROVED) 2022 ONWARDS

~~B.A/B.Sc.~~ I Year I Semester (CBCS) : Statistics Syllabus

(With Mathematics Combination)

(Examination at the end of Semester -I)

Paper-I: Descriptive Statistics and Probability

[4HPW::4 Credits::100 Marks (External:70, Internal:30)]

Unit-I

Descriptive Statistics: Concept of primary and secondary data, Classification of data, Measures of central tendency (Arithmetic mean, median, mode, geometric mean and harmonic mean) with simple applications, Absolute and relative measures of dispersion (range, quartile deviation, mean deviation, standard deviation and variance) with simple applications.

Importance of moments, central and non-central moments, their inter-relationships, Sheppard's correction for moments for grouped data, Measures of skewness based on quartiles and moments, kurtosis based on moments with real life examples.

Measurement scale - nominal, ordinal, interval and ratio.

Unit-II

Probability: Basic concepts of probability, deterministic and random experiments, trial, outcome, sample space, event, operations of events, mutually exclusive and exhaustive events, equally likely and favorable events with examples, Mathematical, Statistical and Axiomatic definitions of probability, their merits and demerits. Properties of probability based on axiomatic definition. Conditional probability and independence of events, Addition and multiplication theorems for 'n' events, Boole's inequality and Bayes' theorem, Problems on probability using counting methods and theorems.

Unit-III

Random Variables: Definition of random variable, discrete and continuous random variables, functions of random variables, probability mass function and probability density function with illustrations. Distribution function and its properties, Transformation of one-dimensional random variable (simple 1-1 function only). Notion of bivariate random variable, bivariate distribution, statements of its properties, Joint, marginal and conditional distributions, Independence of random variables.

Unit-IV

Mathematical Expectation: Mathematical expectation of a function of a random variable, mathematical expectations in terms of central moments, covariance using mathematical expectation with examples, Addition and multiplication theorems of expectation. Chebyshev's and Cauchy-Schwartz's inequalities and their applications.

Definitions of moment generating function (m.g.f), characteristic function (c.f), cumulant generating function (c.g.f), probability generating function (p.g.f) and statements of their properties with applications.

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Reference books:

1. Fundamentals of Statistics, (Vol-I)- Goon AM, Gupta MK, DasGupta B, The World Press (Pvt) Ltd., Kolkata.
2. Fundamentals of Mathematical Statistics - V. K. Kapoor and S. C. Gupta, Sultan Chand & Sons, New Delhi.

Additional References:

1. Sanjay Arora and Bansilal: New Mathematical Statistics, Satya Prakashan, New Delhi.
2. William Feller: Introduction to Probability theory and its applications, (Vol-I), Wiley.
3. M. Jagan Mohan Rao and Papa Rao: A Textbook of Statistics (Paper-I).
4. Hogg, Tanis, Rao: Probability and Statistical Inference, (7th edition), Pearson.
5. K. V. S. Sarma: Statistics Made Simple: Do it yourself on PC, PHI.
6. Gerald Keller: Applied Statistics with Microsoft Excel, Duxbury, Thomson Learning.
7. Levine, Stephen, Krehbiel, Berenson: Statistics for Managers using Microsoft Excel (4th edition), Pearson Publication.

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***B.A/B.Sc. I Year I Semester (CBCS) : Statistics Syllabus
(With Mathematics Combination)
(Examination at the end of Semester-I)***

***Practical: Descriptive Statistics and Probability
[3HPW:1Credit:50Marks]
Part-1 (Using Calculator)***

1. Graphical presentation of data (Histogram, frequency polygon ,Ogives) and its interpretation.
2. Diagrammatic presentation of data (Bar and Pie).
3. Computation of central tendency and dispersion measures for ungrouped and grouped data.
4. Computation of non-central and central moments—Sheppard's corrections for grouped data.
5. Computation of coefficients of Skewness- Karl Pearson's, Bowley's, β_1 and Kurtosis – β_2 and their interpretation.

Part-2 (Using MS-Excel)

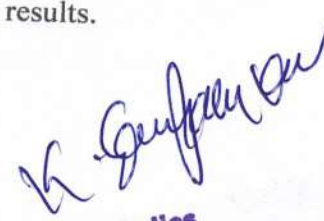
1. Basics of Excel-Data entry, editing and saving ,establishing and copying formulae, Builtin Functions-copy and paste ,Find and Replace, Sorting.
2. Basics of Excel-Builtin Functions-Filtering, Conditional formatting and creating Hyperlinks, Exporting to MS word document
3. Computation of descriptive Statistics using Pivote table- Univariate.
4. Data visualization through diagrams.
5. Computation of central tendency and dispersion measures, Coefficient of Variation forum grouped and grouped data.
6. Computation of Coefficients of Skewness, Kurtosis using MS-Excel and interpretation.

Note: Training shall be on establishing formulae in Excel cells and deriving the results.
The Excel output shall be exported to MSWord for writing inferences.

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B.A/B.Sc. I Year II Semester (CBCS) : Statistics Syllabus

(With Mathematics Combination)

(Examination at the end of Semester -II)

Paper-II: Probability Distributions

[4HPW::4 Credits ::100Marks (External:70 : Internal:30)]

Unit-I

Discrete distributions-I: Bernoulli distributions: definitions, mean, variance and Simple examples. Definition and derivation of probability mass functions of Binomial distribution, Poisson distribution, properties of these distributions: median, mode, m.g.f, c.g.f., p.g.f., c.f., and moments up to fourth order, reproductive property (wherever exists) and their real life applications. Poisson approximation to Binomial distribution.

Unit-II

Discrete distributions – II: Negative binomial, Geometric distributions: Definitions and real life applications, properties of these distributions: m.g.f, c.g.f., p.g.f., c.f. and moments up to fourth order, reproductive property (wherever exists), lack of memory property for Geometric distribution. Poisson approximation to Negative binomial distribution. Hyper-geometric distribution: definition, real life applications, derivation of probability function, means, variance. Binomial approximation to Hyper-geometric distribution.

Unit-III

Continuous distributions– I: Normal distributions–definition, properties such as m.g.f, c.g.f., c.f. and moment fourth order reproductive property, wherever exists and their real life applications. Normal distribution as a limiting case of Binomial and Poisson distributions.

Unit-IV

Continuous distributions–II: Rectangular, Exponential, Gamma distributions–definition, properties: m.g.f, c.g.f., c.f. and moments up to fourth order, reproductive property (wherever exists) and their real life applications. Beta distribution of two kinds: Definitions, mean and variance. Cauchy Distribution- properties and c.f. Use of Central Limit Theorem, Strong Law of Large Numbers.

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Referencebooks:

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2. Fundamentals of Mathematical Statistics - V. K. Kapoor and S. C. Gupta, Sultan Chand&Sons,NewDelhi.

AdditionalReferences:

1. SanjayAroraandBansilal:NewMathematicalStatistics,SatyaPrakashan,NewDelhi.
2. WilliamFeller:IntroductiontoProbabilitytheoryanditsapplications,(Vol-I),Wiley.
3. M.JaganMohanRao and PapaRao: A Textbook of Statistics(Paper-I).
4. Hogg,Tanis,Rao:ProbabilityandStatisticalInference,(7thedition),Pearson.
5. K.V.S.Sarma: Statistics Made Simple: DoityourselfonPC, PHI.
6. GeraldKeller:AppliedStatisticswithMicrosoftExcel,Duxbury,ThomsonLearning.
7. Levine,Stephen,Krehbiel,Berenson:StatisticsforManagersusingMicrosoftExcel(4th edition),PearsonPublication.

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M. Raja

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B.A/B.Sc. I Year II Semester (CBCS) : Statistics Syllabus
(With Mathematics Combination)
(Examination at the end of Semester-II)

Practical 2: Probability Distributions
(3HPW :: 1Credit :: 50Marks)

Part-1(Using Calculator)

1. Fitting of Binomial distribution-Direct method.
2. Fitting of Binomial distribution-Recurrence relation Method.
3. Fitting of Poisson distribution-Direct method
4. Fitting of Poisson distribution-Recurrence relation Method.
5. Fitting of Negative Binomial distribution.
6. Fitting of Geometric distribution.
7. Fitting of Normal distribution-Areas method.
8. Fitting of Normal distribution-Ordinates method.
9. Fitting of Exponential distribution.

Part-2(Using MS-Excel)


1. Data Visualization through graphs (Histogram, frequency polygon, Ogives) using MS-Excel and their interpretation.
2. Computation of descriptive Statistics using Pivot table-Bivariate.
3. Fitting of Binomial distribution-Direct method.
4. Fitting of Poisson distribution-Direct method.
5. Fitting of Normal distribution-Areas method.
6. Fitting of Exponential distribution.

Note: Trainings shall be on establishing formulae in Excel cells and deriving the results. The Excel output shall be exported to MS Word for writing inferences.

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B.A/B.Sc. II Year III Semester (CBCS) : Statistics Syllabus

(With Mathematics Combination)

(Examination at the end of Semester - III)

Paper – III : Statistical Methods and Theory of Estimation

[4 HPW :: 4 Credits :: 100 Marks (External :70, Internal : 20, Seminar : 10)]

Unit –I

Bivariate data, Scattered diagram, Concept of correlation, computation of Karl-Pearson correlation coefficient for grouped and ungrouped data and its properties. Correlation ratio, Spearman's rank correlation coefficient and its properties. Concepts of partial and multiple correlation coefficients (only for three variables). Simple linear regression, correlation verses regression, properties of regression coefficients

Unit –II

Principle of least squares, fitting of straight line, quadratic and power curves. Analysis of categorical data, their independence, Association and partial association of attributes. Various measures of association: (Yule's) for two way data and coefficient of contingency (Pearson and Tcherprow) and coefficient of colligation.

Unit – III

Concepts of Population, Parameter, Random sample, Statistic, Sampling distribution and Standard error. Standard error of sample mean(s) and sample proportion(s). Exact sampling distributions - Statement and properties of χ^2 , t and F distributions and their interrelationships. Independence of sample mean and variance in random sampling from normal distributions. Point estimation of a parameter, concept of bias and mean square error of an estimate. Criteria of a good estimator- consistency, unbiasedness, efficiency and sufficiency with examples.

Unit – IV

Statement of Neyman's Factorization theorem, derivations of sufficient statistics in case of Binomial, Poisson, Normal and Exponential (one parameter only) distributions. Estimation by the method of moments, Maximum likelihood estimation (MLE), statements of asymptotic properties of MLE. Concept of interval estimation. Confidence intervals of the parameters of normal population by Pivot method.

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NISHTHA DEGREE COLLEGE, NIZAMABAD (AUTONOMOUS)

B.A/B.Sc. II Year III Semester (CBCS) : Statistics Syllabus

(With Mathematics Combination)

(Examination at the end of Semester - III)

Paper – III : Statistical Methods and Theory of Estimation

[4 HPW :: 4 Credits :: 100 Marks (External : 70, Internal : 20, Seminar : 10)]

Unit –I

Bivariate data, Scattered diagram, Concept of correlation, computation of Karl-Pearson correlation coefficient for grouped and ungrouped data and its properties. Correlation ratio, Spearman's rank correlation coefficient and its properties. Concepts of partial and multiple correlation coefficients (only for three variables). Simple linear regression, correlation verses regression, properties of regression coefficients

Unit –II

Principle of least squares, fitting of straight line, quadratic and power curves. Analysis of categorical data, their independence, Association and partial association of attributes. Various measures of association: (Yule's) for two way data and coefficient of contingency (Pearson and Tcherprow) and coefficient of colligation.

Unit – III

Concepts of Population, Parameter, Random sample, Statistic, Sampling distribution and Standard error. Standard error of sample mean(s) and sample proportion(s). Exact sampling distributions - Statement and properties of χ^2 , t and F distributions and their interrelationships. Independence of sample mean and variance in random sampling from normal distributions. Point estimation of a parameter, concept of bias and mean square error of an estimate. Criteria of a good estimator- consistency, unbiasedness, efficiency and sufficiency with examples.

Unit – IV

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B.A/B.Sc. II Year III Semester (CBCS): Statistics Syllabus
(With Mathematics Combination)
(Examination at the end of Semester - III)

Practical – 3 : Statistical Methods and Theory of Estimation
(3 HPW, Credits 1 and Marks 50)

Part – A (Using Calculator)

1. Generation of random samples from Uniform (0,1), Uniform (a,b), Normal and Poisson and Exponential Distributions.
2. Fitting of straight line and parabola by the method of least squares.
3. Fitting of power curves of the type $y = a x^b$, $y = a b^x$ and $y = a e^{bx}$ by the method of least squares.
4. Computation of Yule's coefficient of association and Pearson's, Tcherprows coefficient of contingency.
5. Computation of correlation coefficient and regression lines for ungrouped data.
6. Computation of correlation coefficient, forming regression lines for ungrouped data.
7. Computation of correlation coefficient, forming regression lines for grouped data.
8. Computation of multiple and partial correlation coefficients.
9. Computation of correlation ratio

Part – B (Using Excel)

10. Simulation of random samples from Uniform (0,1), Uniform (a,b.), Exponential, Normal and Poisson distributions using MS Excel.
11. Fitting of straight line and parabola by the method of least squares using MS Excel.
12. Fitting of power curves of the type $y = a x^b$, $y = a b^x$ and $y = a e^{bx}$ by the method of least squares using MS Excel.
13. Computation of correlation coefficient, forming regression lines using MS Excel.
14. Computation of multiple and partial correlation coefficients using MS Excel.

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2. V. K. Kapoor and S. C. Gupta: *Fundamentals of Mathematical Statistics, SultanChand & Sons, New Delhi*

Additional References:

1. Hoel P.G: *Introduction to Mathematical statistics, Asia publishing house.*
2. Sanjay Arora and Bansilal : *New Mathematical Statistics Satya Prakashan , New Delhi*
3. Hogg and Craig : *Introduction to Mathematical statistics. Prentice Hall*
4. Siegal, S., and Sidney: *Non-parametric statistics for Behavioral Science. McGraw Hill.*
5. Gibbons J.D and Subhabrata Chakraborti: *Nonparametric Statistical Inference. MarcelDekker.*
6. Parimal Mukhopadhyay : *Mathematical Statistics. New Central Book agency.*
7. Conover : *Practical Nonparametric Statistics. Wiley series.*
8. V. K. Rohatgi and A. K. Md. Ehsanes Saleh : *An introduction to probability and statistics, Wiley series.*
9. Mood A M, Graybill F A, Boe's DC. *Introduction to theory of statistics. TMH*
10. Paramiteya Mariyu Aparameteya Parikshalu. *Telugu Academy.*
11. K.V. S. Sarma: *Statistics made simple do it yourself on PC.PHI*
12. Gerald Keller : *Applied Statistics with Microsoft excel. Duxbury. Thomson Learning*
13. Levin, Stephan, Krehbiel, Berenson: *Statistics for Managers using Microsoft Excel. 4th Edition, Pearson Publication.*
14. Hogg, Tanis, Rao. *Probability and Statistical Inference. 7th edition. Pearson Publication.*
15. Milton and Arnold (fourth Edition): *Introduction to Probability and Statistics, TataMcGraw Hill Publication.*

 B.A/B.Sc. II Year IV Semester (CBCS) : Statistics Syllabus

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Mathematics Combination)
(Examination at the end of Semester - IV)

Practical – 4 : Statistical Inference
[3 HPW, Credits 1 and Marks 50]


Part – A (Using Calculator)

1. Large sample tests for mean(s), proportion(s), Standard deviation(s) and correlation coefficient.
2. Small sample tests for single mean and difference of means and correlation coefficient.
3. Paired t-test.
4. Small sample test for single and difference of variances.
5. χ^2 – test for goodness of fit and independence of attributes.
6. Nonparametric tests for two independent samples (Median test, Wilcoxon Mann Whitney -U test, Wald - Wolfowitz's runs test)


Part – B (Using Excel)

7. Use of Look up and Reference functions for data analysis.
8. Creating and assigning Macros.
9. Small sample tests for mean(s), paired t-test and correlation coefficient using MS Excel.
10. Small sample test for single and difference of variances using MS Excel.
11. χ^2 – test for goodness of fit and independence of attributes using MS Excel.
12. Nonparametric tests for single and related samples (sign test and Wilcoxon signed rank test) and one sample runs test.

Note: Training shall be on establishing formulae in Excel cells and deriving the results.
The Excel output shall be exported to MS Word for writing inferences.


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