<table>
<thead>
<tr>
<th>Year</th>
<th>Semester</th>
<th>Title</th>
<th>Internal Marks</th>
<th>External Examination</th>
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<tbody>
<tr>
<td>I</td>
<td>I</td>
<td>Paper-I Descriptive Statistical and Probability</td>
<td>25</td>
<td>75</td>
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Statistics (with Non-Maths Combination)

<table>
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<tr>
<td>I</td>
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<td>Paper-I Elementary Mathematics</td>
<td>25</td>
<td>75</td>
</tr>
</tbody>
</table>
Paper-I : Descriptive Statistics and Probability

Unit - I
Concepts of Primary and Secondary data. Methods of collection and editing of primary data, Designing a questionnaire and a schedule. Measures of Central Tendency - Mean, Median, Mode, Geometric Mean and Harmonic Mean.

Unit - II

Unit - III
Basic Concepts of Probability, random experiments, trial, outcome, sample space, event, mutually exclusive and exhaustive events, equally likely and favourable outcomes. Mathematical, Statistical, axiomatic definitions of probability. Conditional Probability and independence of events.

Unit - IV
Addition and multiplication theorems of probability for 2 and for n events. Boole’s inequality and Baye’s theorems and problems based on Baye’s theorem.

Unit - V
Definition of random variable, discrete and continuous random variables, functions of random variable. Probability mass function, Probability density function, Distribution function and its properties. Bivariate random variable - meaning, joint, marginal and conditional Distribution, independence of random variables

Practicals - Semester - I
1. Diagrammatic representation of data (Bar and Pie)
2. Graphical representation of data (Histogram, Frequency polygon, Frequency curves, Ogives)
3. Central and Non-central moments and Sheppard’s corrections for moments.
5. MS-Excel methods for the above Serial Numbers 1, 2, 4.

Note:
1. MS-Excel methods to be made mandatory for all the Semesters after proper training only to the teaching staff by the University concerned.
2. Reference books given at the end of the Second semester syllabus.

*****
### Paper I

**I**

Paper - I Descriptive Statistics and Probability

<table>
<thead>
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<th>Internal Marks</th>
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<tr>
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**II**

Paper II - Mathematical Expectation and Probability Distributions

<table>
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<th>External Examination</th>
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### Paper II

**III**

Paper - III Statistical Methods

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**IV**

Paper IV Statistical Inference

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Statistics (with Non - Maths Combination)

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<tr>
<td></td>
<td>II</td>
<td>Paper II - Descriptive Statistics</td>
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<td>III</td>
<td>Paper - III Statistical Methods - I</td>
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<tr>
<td></td>
<td>IV</td>
<td>Paper IV Statistical Methods - II</td>
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</table>
Unit I

Unit II

Unit III
Introduction to Probability: Basic Concepts of Probability, random experiments, trial, outcome, sample space, event, mutually exclusive and exhaustive events, equally likely and favourable outcomes. Mathematical, Statistical, axiomatic definitions of probability. Conditional Probability and independence of events.

Unit IV
Probability theorems: Addition and multiplication theorems of probability for 2 and for n events. Boole's inequality and Baye's theorems and problems based on Baye's theorem.

Unit V

Practicals - Semester - I

Conduct any 6 (Ms-exel is compulsory)
1. Computation of mean, median and mode.
2. Computation of quartile deviation.
3. Computation of mean deviation
5. Non-central moments and central moments, Sheppard corrections & Skewness based on moments and Kurtosis
6. MS-Excel methods for the above Serial numbers 1,2,3,4.

Note:
MS-Excel methods to be made mandatory for all the Semesters after proper training only to the teaching staff by the University concerned.

Text Books:
2. BA/BSc I year statistics - descriptive statistics, probability distribution - Telugu Academy - Dr M.Jaganmohan Rao, Dr N.Srinivasa Rao, Dr P.Tirupathi Rao, Smt.D.Vijayalakshmi.

Reference books:
Unit-I

Unit-II

Unit-III

Unit-IV
Continuous Distributions: Rectangular, Exponential, Gamma, Beta Distributions of two kinds. Other properties such as mean, variance, M.G.F, C.G.F, C.F, reproductive property.

Unit - V


Text Books:
2. BA/BSc I year statistics - descriptive statistics, probability distribution - Telugu Academy - Dr M.Jaganmohan Rao, Dr N.Srinivasa Rao, Dr P.Tirupathi Rao, Smt.D.Vijayalakshmi
3. K.V.S. Sarma: Statistics Made Simple: Do it yourself on PC. PHI.

Reference books:

Practicals - Semester – II

Conduct any 6 (Ms-exel is compulsory)

1. Fitting of Binomial Distribution – Recurrence relation method.
2. Fitting of Poisson Distribution - Recurrence relation method.
3. Fitting of Negative Binomial Distribution.
5. Fitting of Normal Distribution - Areas methods.
6. Fitting of Normal Distribution - Ordinates methods.
7. MS-Excel methods for the above Serial Numbers 1 and 2
Acharya Nagarjuna University

BA/BSC II YEAR : STATISTICS SYLLABUS
(With Mathematics Combination)
Semester - III CBCS
Paper - III Statistical Methods

Unit-I
Correlation: Def., scatter diagram, its coefficient and its properties, scatter diagram, computation of correlation coefficient for ungrouped data, spearman's rank correlation coefficient, properties of spearman's correlation coefficients and problems.

Unit-II
Regression: simple linear regression, properties of regression coefficients. Regression lines, Concept of Correlation ratio, partial and multiple correlation coefficients, correlation verses regression and their problems.

Unit – III
Curve fitting: Method of least square - Fitting of linear, quadratic, Exponential and power curves and their problems.

Unit-IV
Unit – V
Exact sampling distributions: Concept of population, Parameter, random sample, statistic, sampling distribution, standard error. Statement and Properties of $\chi^2$, t, F distributions and their inter relationships.

**Text books**
1. BA/BSc II year statistics - statistical methods and inference - Telugu Academy by A. Mohanrao, N.Srinivasa Rao, Dr R.Sudhakar Reddy, Dr T.C. Ravichandra Kum.
2. K.V.S. Sarma: Statistics Made Simple: Do it yourself on PC. PHI.

**Reference Books:**
2. Introduction to Mathematical Statistics : Hoel P.G.

**Practicals - Semester – III**
**Conduct any 6 (Ms-exel is compulsory)**
1. Fitting of straight line.
2. Fitting of exponential curves.
3. Fitting of power curve.
4. Computation of correlation coefficient & Fitting of Regression lines.
5. Rank correlation coefficient.
7. MS-Excel methods any for the Serial Numbers 1,2,4,5.
Acharya Nagarjuna University

BA/BSc II YEAR : STATISTICS SYLLABUS
(With Mathematics Combination)
Semester - IV CBCS.
Paper - IV : Statistical Inference

UNIT-I

UNIT II
Concepts of Statistical hypothesis: Null and alternative hypothesis, critical region, two types of errors, level of significance, power of a test. 1 tailed, 2 tailed tests, Neyman - Pearson's lemma. Examples in of Binomial, Poisson, Normal distributions.

Unit-III
Large Sample Tests: Large sample tests for single mean, two means, Single proportion, Two proportions, Standard Deviation of single and double samples and Fisher's Z transformation.

Unit-IV
Small sample tests: Tests of significance based on $\chi^2$, t and F. $\chi^2$-test for test for independence of attributes, t-test for single, double and paired tests, Variance Ratio Test (F-test).

Unit-V
Non-parametric tests - Advantages and Disadvantages. Two sample run test, Two sample Median test and Two sample sign test.

TEXT BOOKS
1. BA/BSc II year statistics - statistical methods and inference - Telugu Academy by A.Mohanrao, N.Srinivasa Rao, Dr R.Sudhakar Reddy, Dr T.C. Ravichandra Kumar.
2. K.V.S. Sarma: Statistics Made Simple: Do it yourself on PC. PHI.

REFERENCE BOOKS:
3. Introduction to Mathematical Statistics : Hoel P.G.
Practicals Semester – IV
Conduct any 6 (Ms-exel is compulsory)

1. Large sample tests for mean(s).
2. Large sample tests for proportion(s).
3. Large sample tests for standard deviation(s).
4. Large sample tests for Fisher's Z-transformation.
5. Small sample tests for Single and Doublet-test.
6. Small sample tests for Paired t-test.
7. F-Test.
8. Chi square test for independence of attributes.
11. Non-parametric tests – sign tests.
12. MS-Excel methods for the above Serial Numbers 1, 2, 3, 4 (any one of above)

Unit – II
Classification and tabulation: classification of data, frequency distribution, rules of tabulation, simple and complex tables, single, double and manifold tables.

Unit – III
Diagrammatic Representation: Bar diagrams, square, rectangle, pie charts. Histogram, frequency polygon, ogives.

Unit – IV
Measures of Central Tendency: Mean, Median, Mode, G.M. & H.M, merits and demerits, finding median by graphic method, quartiles, deciles & percentiles.

Unit – V

Text Books

2. Fundamentals of Mathematical statistics - SC Gupta and V.K. Kapoor

Reference Books:

3. Quantitative Techniques1 – Suthan Chand Publication

Practical - Semester – II

Conduct any 6 Practicals

1. Arithmetic Mean, Median, Mode, GM.HM.
2. Calculation of CV and its comparisons.
4. Pie diagram.
5. Histogram.
6. Frequency polygon.
7. O give curves.
Unit-I
Attributes: Classes, 2x2, manifold classification, class frequencies, ultimate classes frequencies, contingency tables, association and independence of attributes, consistency of data, coefficient of colligation.

Unit-II
Moments: Central and Non-Central moments, Sheppard's correction for moments for grouped data. Skewness, kurtosis, and their measures.

Unit-III
Probability: Definitions of random experiment, outcome, sample space, event, mutually exclusive event, equally likely events, favourable events, classical, statistical and axiomatic definitions of probability. Addition and multiplication theorems for two events. Conditional probability, Baye's theorem statement and problem based on it.

Unit-IV

Unit-V
Mathematical expectation: Basic results & properties of M.G.F, C.G.F, P. G.F, C.F

Text Book:

Reference books:
1. Sambavyatha - Telugu Academy.

Practicals - Semester - III
1. Non central Moments
2. Central Moments
3. Sheppard's corrections,
4. skewness and Kurtosis.
5. Coefficients of Association and colligation
Unit - I
Discrete distributions: Binomial, Poisson, Geometric distributions - definitions, means, variances and applications of these distributions. Additive property if exists. Simple problems.

Unit - II
Continuous distributions: Rectangular, Normal, exponential distributions - definitions and their properties. Simple problems.

Unit - III

Unit - IV
Curve fitting: principle of least squares - fitting of straight line, Parabola, exponential and power curves.

Unit - V
Correlation and Regression: Meaning, types, scatter diagrams, Correlation coefficient, spearman's rank correlation. Regression lines, Regression coefficients and their properties

Text Books:

Reference Books:
1. Sambuvyatha - Telugu Academy.
2. Fundamentals of statistics - Goon, Gupta and Das Gupta

Practicals - Semester - IV
Conduct any 6 Practicals
1. Fitting of Binomial by Direct method
2. Poisson Distribution by Direct method.
3. Fitting of Normal Distribution by Ordinates methods.
4. Fitting of Straight Line,
5. Fitting of Parabola,
6. Fitting of $y=ax^b$,
7. Fitting of $y=ab^x$,
8. Fitting of $y=ae^{bx}$
9. Correlation coefficient for ungrouped data.
10. Regression lines.
MODEL QUESTION PAPER
STATISTICS
(With Mathematics Combination)
Common to B.A / B.Sc

Time: 3 Hours
Max. Marks: 75

Section A
Answer any Five questions, each question carry 5 Marks
5x5 = 25 marks

1.
2.
3.
4.
5.
6.
7.
8.

Section B
Answer all questions, each question carry 10 Marks
5x10 = 50 marks

UNIT - I
9(a)
Or (b)

UNIT - II
10(a)
Or (b)

UNIT - III
11(a)
Or (b)

UNIT - IV
12(a)
Or (b)

UNIT - V
13(a)
Or (b)