Revised Common Framework of CBCS for Colleges in Andhra Pradesh
(A.P. State Council of Higher Education)
Table-7: B.Sc., SEMESTER – I

Sno	Course	Total Marks	Mid Sem Exam*	Sem End Exam	Teaching Hours	Credits
1	First Language (Tel/Hin/Urdu/Sans…)	100	25	75	4	3
2	Second Language English	100	25	75	4	3
3	*Foundation Course - 1* HVPE (Human Values & Professional Ethics)	50	0	50	2	2
4	*Foundation course -2* Communication & Soft Skills -1	50	0	50	2	2
5	DSC 1 A (Group Sub- 1)	100	25	75	4	3
6	DSC 1 A Lab Practical	50	0	50	2	2
7	DSC 2 A (Group Sub- 2)	100	25	75	4	3
8	DSC 2 A Lab Practical	50	0	50	2	2
9	DSC 3 A (Group Sub- 3)	100	25	75	4	3
10	DSC 3 A Lab Practical	50	0	50	2	2
	Total	750	-	-	30	25

Note: For Science Domain Subjects which had no lab practical component earlier (eg. Mathematics) the following format is applicable. They, however, will have co-curricular activities (eg. Problem solving sessions etc.). The total marks will change accordingly for such combinations. For example for Maths, Physics and Chemistry the total marks will be 700.

	DSC (without Lab Practical)	100	25	75	6	5

*Mid sem exam at the college (The marks split between Formal Test and Co-curricular activities may be decided by the University concerned). End Sem Exam by the Univ.

*Practical component will not be applicable to those science subjects which had no such component earlier (ex. Mathematics)

**Syllabus size shall be in accordance with the number of teaching hours

Table-8: B.Sc., SEMESTER – II

Sno	Course	Total Marks	Mid Sem Exam	Sem End Exam	Teaching Hours	Credits
1	First Language (Tel/Hin/Urdu/Sans…)	100	25	75	4	3
2	Second Language English	100	25	75	4	3
3	*Foundation course - 3* Environmental Sci	50	0	50	2	2
4	*Foundation course – 4A* ICT – 1 (Information & Communication Technol)	50	0	50	2	2
5	DSC* 1 B (Group Sub- 1)	100	25	75	4	3
6	DSC 1 B Lab Practical	50	0	50	2	2
7	DSC 2 B (Group Sub- 2)	100	25	75	4	3
8	DSC 2 B Lab Practical	50	0	50	2	2
9	DSC 3 B (Group Sub- 3)	100	25	75	4	3
10	DSC 3 B Lab Practical	50	0	50	2	2
	Total	750	-	-	30	25

B.Sc. Table-9: B.Sc., SEMESTER – III

SEMESTER – III

Sno	Course	Total Marks	Mid Sem Exam	Sem End Exam	Teaching Hours	Credits
1	First Language (Tel/Hin/Urdu/Sans…)	100	25	75	4	3
2	Second Language English	100	25	75	4	3
3	*Foundation Course - 5* Entrepreneurship	50	0	50	2	2
4	*Foundation course -2B* Communication & Soft Skills -2	50	0	50	2	2
5	DSC 1 C (Group Sub- 1)	100	25	75	4	3
6	DSC 1 C Practical	50	0	50	2	2
7	DSC 2 C (Group Sub- 2)	100	25	75	4	3
8	DSC 2 C Practical	50	0	50	2	2
9	DSC 3 C (Group Sub- 3)	100	25	75	4	3
10	DSC 3 C Practical	50	0	50	2	2
	Total	750	-	-	30	25

Table-10: B.Sc., SEMESTER – IV

SEMESTER – IV

Sno	Course	Total Marks	Mid Sem Exam*	Sem End Exam	Teaching Hours**	Credits
1	*Foundation Course – 2C** Communication & Soft Skills -3	50	0	50	2	2
2	*Foundation Course – 6** Analytical Skills	50	0	50	2	2
3	*Foundation Course - 7* ** CE (Citizenship Education)	50	0	50	2	2
4	*Foundation course – 4B* ICT – 2 (Information & Communication Technol)	50	0	50	2	2
5	DSC 1 D (Group Sub- 1)	100	25	75	4	3
6	DSC 1 D Lab Practical	50	0	50	2	2
7	DSC 2 D (Group Sub- 2)	100	25	75	4	3
8	DSC 2 D Lab Practical	50	0	50	2	2
9	DSC 3 D (Group Sub- 3)	100	25	75	4	3
10	DSC 3 D Lab Practical	50	0	50	2	2
	Total	750	-	-	30	25

*To be taught by English Teachers (and partly by Maths/Stat Teachers)

** To be taught by Telugu Teachers

Table-11: B.Sc., SEMESTER – V

Sno	Course	Total Marks	Mid Sem Exam	Sem End Exam	Teaching Hours	Credits
1	Skill Development Course – 1 (University's Choice)	50	0	50	2	2
2	DSC 1 E (Group Sub- 1)	100	25	75	4	3
3	DSC 1 E Lab Practical	50	0	50	2	2
4	DSC 2 E (Group Sub- 2)	100	25	75	4	3
5	DSC 2 E Lab Practical	50	0	50	2	2
6	DSC 3 E (Group Sub- 3)	100	25	75	4	3
7	DSC 3 E Lab Practical	50	0	50	2	2
8	Elective -1*: DSC 1 F / Inter-disp	100	25	75	4	3
9	Elective-1 Lab Practical	50	0	50	2	2
10	Elective*-2: DSC 2 F / Inter-disp	100	25	75	4	3
11	Elective-2 Lab Practical	50	0	50	2	2
12	Elective*-3: DSC 3 F / Inter-disp	100	25	75	4	3
13	Elective-3 Lab Practical	50	0	50	2	2
14	Total	950	-	-	38	32

6th (F) paper of each of the domain specific subjects (2nd paper of semester V) may preferably be an Elective. More than one Elective may be offered giving choice to students. The Electives may be of Domain (applied/specialization) or Inter-disciplinary in nature. The number of Electives may be decided (along with the syllabus) by the University concerned keeping the feasibility of conduct of University examinations in view.

Table-12: B.Sc., SEMESTER – VI

Sno	Course	Total Marks	Mid Sem Exam	Sem End Exam	Teaching Hours	Credits
1	Skill Development Course – 2 (University's Choice)	50	0	50	2	2
2	DSC 1 G (Group Sub- 1)	100	25	75	4	3
3	DSC 1 G Lab Practical	50	0	50	2	2
4	DSC 2 G (Group Sub- 2)	100	25	75	4	3
5	DSC 2 G Lab Practical	50	0	50	2	2
6	DSC 3 G (Group Sub- 3)	100	25	75	4	3
7	DSC 3 G Lab Practical	50	0	50	2	2
8	Elective -4*: DSC 1 H / Inter-disp/Gen Elec	100	25	75	4	3
9	Elective-4 Lab Practical	50	0	50	2	2
10	Elective*-5: DSC 2 H / Inter-disp/Gen Elec	100	25	75	4	3
11	Elective-5 Lab Practical	50	0	50	2	2
12	Elective*-6: DSC 3 H / Inter-disp/Gen Elec	100	25	75	4	3
13	Elective-3 Lab Practical	50	0	50	2	2
14	Total	950	-	-	38	32

*$\mathbf{8^{th}}$ (H) paper of each of the domain specific subjects (2^{nd} paper of semester VI) may preferably be an Elective. More than one Elective may be offered giving choice to students. The Electives may be of Domain (applied/specialization) or Inter-disciplinary or General in nature. The number of Electives may be decided (along with the syllabus) by the University concerned keeping the feasibility of conduct of University examinations in view.

Total Credits for a B.Sc. Course: 164

Statistics (with Maths Combination)

Year	Semester	Title	Internal Marks	External Examination
I	I	Paper - I Descriptive Statistics and Probability	25	75
	II	Paper II - Mathematical Expectation and Probability Distributions	25	75
II	III	Paper - III Statistical Methods	25	75
	IV	Paper IV Statistical Inference	25	75
III	V	Paper - V Sampling Techniques and Design of Experiments	25	75
		Paper - VI - Quality, Reliability	25	75
	VI	Paper - VII Applied Statistics	25	75
		Paper - VIII Operations Research	25	75

Statistics (with Non - Maths Combination)

Year	Semester	Title	Internal Marks	External Examination
I	I	Paper - I Elementary Mathematics	25	75
	II	Paper II - Descriptive Statistics	25	75
II	III	Paper - III Statistical Methods -1	25	75
	IV	Paper IV Statistical Methods - II	25	75
III	V	Paper - V Statistical Applications - I	25	75
		Paper - VI - Statistical Applications - II	25	75
	VI	Paper - VII Sampling Techniques	25	75
		Paper - VIII Official Statistics & Design of Experiments	25	75

CBCS SYLLABUS (Semester wise) 2015-16
BA/BSC I YEAR : STATISTICS SYLLABUS

(With Mathematics Combination)
Semester - I (I Year)
Paper - I Descriptive Statistics and Probability

Unit-I

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

Unit-II

Measures of dispersion: Range, Quartile Deviation, Mean Deviation and Standard Deviation. Descriptive Statistics -Central and Non-Central moments and their interrelationship. Sheppard's correction for moments. Skewness and kurtosis.

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

Random variable: 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 Distributions, independence of random variables.

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
4. Computation of Standard 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:

1. V.K.Kapoor and S.C.Gupta: Fundamentals of Mathematical Statistics, Sultan Chand & Sons, New Delhi.
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:

1. Willam Feller: Introduction to Probability theory and its applications. Volume –I, Wiley
2. Goon AM, Gupta MK, Das Gupta B : Fundamentals of Statistics , Vol-I, the World Press Pvt.Ltd., Kolakota.
3. Hoel P.G: Introduction to mathematical statistics, Asia Publishing house.
4. M. JaganMohan Rao and Papa Rao: A Text book of Statistics Paper-I.
5. Sanjay Arora and Bansi Lal: New Mathematical Statistics: Satya Prakashan , New Delhi
6. Hogg Tanis Rao: Probability and Statistical Inference. 7^{th} edition. Pearson.

CBCS SYLLABUS (Semester wise) 2015-16
BA/BSC I YEAR : STATISTICS SYLLABUS

(With Mathematics Combination)
Semester - II CBCS (I Year)
Paper - II Mathematical Expectation and Probability Distributions

Unit-I

Mathematical expectation : Mathematical expectation(ME) of a random variable and function of a random variable. Moments and covariance using mathematical expectation with examples. Addition and Multiplication theorems on expectation. Definitions of M.G.F, C.G.F, P.G.F, C.F its properties. Chebyshev and cauchy - Schwartz inequalities.

Unit-II

Discrete Distributions : Binomial and Poisson distributions, their definitions, 1^{st} to 4 central moments, M.G.F, C.F, C.G.F, P.G.F, mean, variance, additive property if exists. Possion approximation to Binomial distribution.

Unit-III

Negative Binomial, geometric, hyper geometric distributions - Definitions, means, variances, M.G.F, C.F, C.G.F, P.G.F, reproductive property if exists. Binomial approximation to Hyper Geometric Distribution, Poisson approximation to Negative binomial distribution.

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

Normal Distribution: Definition, Importance, Properties, M.G.F, additive properties, Interrelation between Normal and Binomial, Normal &Poisson distribution. Cauchy Distribution .

Text Books:

1. V.K.Kapoor and S.C.Gupta: Fundamentals of Mathematical Statistics, Sultan Chand & Sons, New Delhi.
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:

1. Willam Feller : Introduction to Probability theory and its applications. Volume –I, Wiley
2. Goon AM, Gupta MK, Das Gupta B : Fundamentals of Statistics , Vol-I, the World Press Pvt.Ltd., Kolakota.
3. Hoel P.G: Introduction to mathematical statistics, Asia Publishing house.
4. M. JaganMohan Rao and Papa Rao: A Text book of Statistics Paper-I.
5. Sanjay Arora and Bansi Lal: New Mathematical Statistics: Satya Prakashan , New Delhi
6. Hogg Tanis Rao: Probability and Statistical Inference. 7th edition Pearson.

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.
4. Fitting of Geometric 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

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 spearrman'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

Attributes : Introduction, Nature, and consistency and mention its conditions. Independence and association of attributes, co-efficient of association, coefficients of contingency and their problems.

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.
3. Fundamentals of Mathematics statistics: VK Kapoor and SC Guptha.

Reference Books:

1. Outlines of statistics, Vol II : Goon Guptha, M.K.Guptha, Das Guptha B.
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.
6. Computation of Contingency coefficients.
7. MS-Excel methods any for the Serial Numbers 1,2,4,5.

BA/BSC II YEAR : STATISTICS SYLLABUS
(With Mathematics Combination)
Semester - IV CBCS.

Paper - IV : Statistical Inference

UNIT-I

Theory of estimation: Estimation of a parameter, criteria of a good estimator – unbiasedness, consistency, efficiency, &sufficiency and. Statement of Neyman's factorization theorem. Estimation of parameters by the methods of moments and maximum likelihood (M.L), properties of MLE's. Binomial, Poisson &Normal Population parameters estimate by ML method. Confidence intervals of the parameters of normal population.

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:

1. Fundamentals of Mathematics statistics : VK Kapoor and SC Guptha.
2. Outlines of statistics, Vol II : Goon Guptha, M.K.Guptha, Das Guptha B.
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.
9. Non-parametric testst – run test.
10. Non-parametric tests - median test.
11 Non-parametric tests - sign tests.
12.MS-Excel methods for the above Serial Numbers 1,2,3,4.(any one of above)

BA/BSC III YEAR : STATISTICS SYLLABUS
(With Mathematics Combination)
Semester-V CBCS.
Paper - V Sampling Techniques and Design of Experiments

Unit-I

Sampling Theory: Principle steps in a sample survey, Censes versus sample survey, sampling and Non-sampling errors. Types of sampling - subjective, probability and mixed sampling methods.

Unit-II

Simple Random Sampling:Meaning of Samples and methods to draw, estimation of population mean, variances in SRSWR& SRSWOR.

Unit-III

Stratified random sampling: Proportional and optimum allocation of sample sizes in stratification. Variances in these methods. Systematic sampling : Systematic sampling when N = nk comparison of their relative efficiencies. Advantages and Disadvantages of above methods of sampling.

Unit-IV

Analysis of Variance: One way with equal and unequal classifications and two way classifications.

Unit - V

Design of Experiments: Principles of experimentation in Designs, analysis of completely randomised design (CRD), Randomised block design (RBD) and Latin square design (LSD) including one missing observation . efficiency of these designs and concept of factorial Experiment.

Text Books:

1.Telugu AcademyBA/BSc III year paper - III Statistics - applied statistics - Telugu academy by prof.K.Srinivasa Rao, Dr D.Giri. Dr A.Anand, Dr V.Papaiah Sastry.

2. K.V.S. Sarma: Statistics Made Simple: Do it yourself on PC. PHI.

Reference Books:

1.Fundamentals of applied statistics : VK Kapoor and SC Gupta.
2.Indian Official statistics - MR Saluja.
3.Anuvarthita Sankyaka Sastram - Telugu Academy.

Practicals Semester – V

Conduct any 6 (Ms-exel is compulsory)

1. Estimation of population Mean, variance by SRSWOR.
2. Estimation of population Mean, variance by SRSWR.
3. Comparison of proportional, optimum allocations with SRSWOR.
4. Systematic Sampling .
5. ANOVA-CRD.
6. ANOVA - RBD with one missing observation.
7. ANOVA - LSD with one missing observation.
8. Ms-excel practicals.

BA/BSC III YEAR : STATISTICS SYLLABUS

(With Mathematics Combination)

Semester-V CBCS.

Paper - VI Quality and Reliability

Unit-I

Importance of SQC in industry, statistical basis of shewart control charts, uses of control charts. Interpretation of control charts, control limits, Natural tolerance limits and specification limits.

Unit – II

Variable Control Chart: Construction of $\overline{X}$, R charts for variables, Attribute control charts- NP, P charts, C chart.

Unit-III

Acceptance sampling plans: Scope, Producer's risk and consumer's risk . Concepts of AQL and LTPD.

Unit-IV

Sampling Plans: Single and double sampling plans, OC and ASN functions, Double and single

Sampling plans for attributes using Binomial.

Unit-V

Reliability: Introduction, failure rates, Hazard function, estimation of reliability, exponential distribution as life model, its memoryless property.

Text Books:

1.BA/BSc III year paper - IV Statistics - applied statistics - Telugu academy by Prof.K.Srinivasa Rao, Dr D.Giri. Dr A.Anand, Dr V.Papaiah Sastry.

2. Fundamentals of applied statistics : VK Kapoor and SC Gupta

3. S.K Sinha: Reliability and life testing. Wiley Eastern.

Reference Books :

1.. R.C.Gupta: Statistical Quality Control.

Practicals - Semester – V

Conduct any 6 (Ms-exel is compulsory)

1Construction of($\overline{X}$,R) charts.
2.Construction of P-chart-Fixed sample size.
3. Construction of P-chart-variable sample size
4.Construction of NP-Chart .
5.Construction of C-Chart.
6.MS-Excel methods for the Serial Numbers 1.
7.MS-Excel methods for the Serial Numbers 2 to 4 .

BA/BSC III YEAR : STATISTICS SYLLABUS

(With Mathematics Combination)

Semester - VI CBCS.

Paper - VII Applied Statistics

Unit-I

Analysis of times series: Components of times series: meaning and examples, trend by least squares (straight line and parabola) methods and moving average methods. Seasonal indices by simple averages, ratio to moving average, ratio to trend and link relative methods.

Unit-II

Index numbers: Meaning, problems involved in the construction of index numbers, simple and weighted index numbers. Criteria of good index numbers. Fixed base and chain base index numbers. Cost of living index numbers, wholesale price index numbers, Base shifting, splicing and deflation of index numbers.

Unit-III

Official Statistics: Functions and organization of CSO and NSSO. Agricultural, area, yield of statistics, national income and its computation.

Unit-IV

Vital statistics: Meaning, Definition, uses, sources of vital statistics, various Death rates-CDR,ASDR,STDR and Birth rates -CBR,ASFR,TFR.

Unit-V

Reproduction Rates: Measurement of population growth, crude rate of natural increase, Pearle's vital index, Gross Reproduction Rate[GRR], Net Reproduction Rates[NRR], Life tables, construction uses of life tables and abridged life Tables.

Text Books:

1. Fundamentals of applied statistics : VK Kapoor and SC Gupta.
2. BA/BSc III year paper - III Statistics - applied statistics - Telugu academy by prof.K.Srinivasa Rao, Dr D.Giri. Dr A.Anand, Dr V.Papaiah Sastry.

Reference Books:

1.Indian Official statistics - MR Saluja.

2.Anuvarthita Sankyaka Sastram - Telugu Academy.

Practicals - Semester – VI

Conduct any 6 (Ms-exel is compulsory)

1.Measurement of Linear Trend
2.Measurement of Seasonal Indices-Link Relatives method
3. Reversal tests.
4.Cost of living Index Numbers.
5.Mortality, Fertility& Re-production rates.
6.Life tables.
7.MS-Excel Practical.

BA/BSC III YEAR : STATISTICS SYLLABUS

(With Mathematics Combination)

Semester-VI CBCS.

Paper - VIII Operations Research

Unit-I

Introduction to OR: Meaning and scope of O.R, Definition of O.R, LPP (Linear Programming Problem). Formulation of LPP, graphical solution of LPP- Problems

Unit-II

LPP: Def. of LPP , IBFS, Basic and Non-basic variable, Slack variable, Surplus variable and Artificial variable .Simplex method, Big M, two phase simplex methods and problems

Unit - III

Transportation problem : Its definition, feasible solution by North-West corner rule, matrix minima VAM methods. Optimal solution through MODI **&** stepping stone method for balanced and unbalanced transportation problem.

Unit-IV

Assignment problem: Meaning of assignment problem, unbalanced assignment problem, travelling salesman problem, Hungarian method for optimal solution.

Unit - V

Sequencing problem: Optimal sequencing of N Jobs on 2 and 3 machines without passing.

Text Books:

1.Kanti swaroop, P.K.Guptha and Man Mohan: Operation Research. Sultan Chand.

2. BA/BSc III Year paper - IV Statistics - quality, reliability and operations Research - Telugu Academy by Dr T.C.Ravichandra Kumar, Dr R.V.S.Prasad, Dr D.Giri, Dr G.S.Devasena.

3.Operation Reach – S.D.Sharma.

List of reference books

1..S.K Sinha: Reliability and life testing. Wiley Eastern.

2.Operations researcHh - Models and methods by Chandrasekar Salimath, Bhupendar Parashar.

3.Operation Research – Taha

Practicals - Semester –VI
Conduct any 6 Practical:

1.LPP - Graphic solution.

2.Simplex method.

3. Two phase simplex methods.

4.Transportation - NWCR. Matrix minima method. VAM for IBFS.

5.Assignment Problem (Balanced).

6.Unbalanced assignment problems.

7.Travelling salesman problems.

8. Sequencing problems- n jobs-2 machines sequencing problem.

9. n jobs-3 machine sequencing problem.

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BA/BSC I YEAR : STATISTICS SYLLABUS
(For Non - Mathematics Combination)
Semester - I CBCS.
Paper-I Elementary Mathematics

Unit -1

Concept of sequences and series, fundamentals of sets and functions, types of functions, solution of simultaneous linear equations, quadratic equations.

Unit-II

Progressions: - A.P, G.P, H.P. permutations, combinations, Binomial theorem and their related problems

Unit -III

Elementary Matrices: Definition and types of matrices, addition, subtraction, scalar multiplication of Matrices.

Unit-IV

Determinant of Matrix, Transpose of a matrix, inverse and rank of 3X3 matrices only. Solution - simultaneous linear equations by matrix methods.

Unit-V

Differentiations: derivatives of algebraic and exponential functions. Maxima and Minima of a function. Integration basics. Integration by parts and by substitution.

Text Books

1.Differential Calculus - Santhi Narayana.

2.Outlines of Matrices – Schaum.

Reference Books:

1.Statistical methods - S.P. Gupta.

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

3.Quantitative Techniques1 –Sulthan Chand Publication.

Practicals - Semester – 1

Conduct any 6 Practicals

1.Solution to simultaneous Linear equations.

2.Progressions - AP,GP.HP.

3.Addition, Subtraction, Multiplication of Matrices.

4.Determinant of a Matrix.

5.Solutions of equations by matrix methods.

6.Simple differentiation.

7.Integrations.

BA/BSC I YEAR : STATISTICS SYLLABUS
(For Non - Mathematics Combination)
Semester - I CBCS.
Paper-I Elementary Mathematics

Semester - II CBCS.

Paper - II Descriptive Statistics

Unit -1

Introduction to Statistics: Statistics Definition, application, scope, limitation, primary and secondary data, methods of collecting primary and secondary data. Statistical enquiry, questionnaire and schedule. Editing of data.

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, o gives.

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

Measures of Dispersion: Range, Q.D, S.D, M.D, Coefficient of variation, Lorenz cruve.

Text Books

1. Statistical methods - S.P. Gupta.
2. Fundamentals of Mathematical statistics - SC Gupta and V.K. Kapoor

Reference Books:

3. Quantitative Techniques1 –Sulthan Chand Publication

Practical - Semester – II

Conduct any 6 Practicals

1.Arithmetic Mean, Median, Mode, GM.HM.

2.Calculation of CV and its comparisons.

3.Bar diagrams.

4.Pie diagram.

5.Histogram.

6.Frequency polygon.

7.O give curves.

BA/BSC II YEAR : STATISTICS SYLLABUS
(For Non - Mathematics Combination)
Semester - III CBCS.
Paper - **III** Statistical Methods -**1**

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. Skewnes, 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

Random variable : Discrete - Probability mass function. Continuous Random Variable - Probability density function, distribution function of a R.V and properties.

Unit-V

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

Text Book: 1.Statistical Methods by S.P.Gupta.

2. Fundamentals of Mathematical statistics - S.C. Gupta & V.K.Kapoor.

Reference books:

1. Sambavyatha - Telugu Academy.
2. Fundamentals of statistics - Goon, Gupta and Das Gupta.

Practicals - Semester - III

1. Non central Moments
2. Central Moments
3. Sheppard's corrections,
4. skewness and Kurtosis.
5. Coefficients of Association and colligation
6. Baye's theorem - Problems.

BA/BSC II YEAR : STATISTICS SYLLABUS
(For Non - Mathematics Combination)
Semester -IV CBCS.
Paper - **IV** Statistical Methods - **II**

Unit -1

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

Interpolation: Need and meaning of interpolation, graphical method. Newton's and Lagrange's formulas for interpolation.

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 co-efficient, spearman's rank correlation. Regression lines, Regression coefficients and their properties

Text Books:

1.Fundamentals of Mathematical statistics - S.C. Gupta & V.K.Kapoor.
2.Statistical methods - S.P Gupta.

Reference Books:

1. Sambavyatha - 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.

BA/BSC III YEAR : STATISTICS SYLLABUS
(For Non - Mathematics Combination)
Semester - V CBCS.

Paper - V Statistical Applications - I

Unit -1

Statistical Inference –Estimation: Definitions of population, sample, parameter, statistic, sampling distribution of a statistics, standard error. Estimation - Criteria of a good estimator, meaning of interval estimation.

Unit – II

Statistical Hypothesis-Large sample Test: Null and alternative hypothesis, level of significance, type **I** and type **II** errors, power of the test. Large sample tests for proportion (single & double), means (single & double), and standard deviations.

Unit III-

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

Unit - IV

Non parametric tests :Advantages, disadvantages, sign test, median test and run test for two sample cases only.

Unit –V

Index Numbers: Definition and meaning of Index Numbers. . Problems in the construction an index number. Simple and weighted index numbers,-Laspyre's, Paache's and Fisher's indices. Cost of living index numbers.

Text Books: 1.Statistical methods - S.P. Gupta.

2. Fundamentals of statistics - Goon Gupta and Das Gupta vol I and vol II.

Reference Books:

1 .Anuvarthita Sankyaka Sastram - Telugu academy book.

2. Applied Statistics - V.K.Kapoor & S.C Gupta.

3. Applied statistics - Parimal Mukhopadhyay.

Practicals - Semester – V

Conduct any 6 Practicals

1. Large sample tests - Mean(s).
2. Large sample tests - Proportion(s).
3. Small sample tests – t for Mean(s),
4. F-test,
5. Chi square test for Independence of attributes.
6. N.P tests - Run test,Median test, Sign test.
7. Laspyre, Paashe, Fisher Indices.

BA/BSC III YEAR : STATISTICS SYLLABUS

(For Non - Mathematics Combination) **Semester - VI CBCS.**

Paper - VI Statistical Applications – II

Unit-I

Vital statistics : Meaning, definition, uses, sources, Death rates-CDR,ASDR,STDR,

Birth rates: CBR,ASFR,TFR

Unit-II

Reproductive rates: NRR.GRR. Life tables and Abridged life tables.

Unit-III

Time series: Meaning, components, trend- graphical, semi averages, straight line, parabola, moving average methods. Seasonal indices : simple averages, ratio to trend, ratio to moving, link relative methods.

Unit - IV

S.Q.C : Importance of Industry , chance, assignable causes of variation, natural tolerance and specification limits.

Unit – V

Control Charts: $\overline{X}$, R Charts, NP,P,C charts for fixed sample size only.

Text Books:

1.Statistical methods - S.P. Gupta.

2.Fundamentals of statistics - Goon Gupta and Das Gupta vol I and vol II.

Reference Books:

1.Anuvarthita Sankyaka Sastram - Telugu academy book.

2.Applied Statistics - V.K.Kapoor & S.C Gupta

3.Applied statistics - Parimal Mukhopadhyay

Practicals - Semester – VI

Conduct any 6 Practicals

1Birth rates

2.Death rates

3.Trend - straight line

4.Seasonal indices –Simple Average

5. $\overline{X}$, R Charts,

6. Attribute Control Chart:Np-chart

7. Attribute Control Chart:p-chart

BA/BSC III YEAR : STATISTICS SYLLABUS

(For Non - Mathematics Combination

Semester - V CBCS.

Paper - VII Sampling Techniques

Unit -1

Sampling theory: Population, sample, Sampling versus census, sample survey meaning, sampling and Non- Sampling errors, Limitations of sampling.

Unit-II

Sampling Methods: Principle steps in a sample survey. Types of Sampling-SRS,StRS,Sys.

Unit-III

Simple Random Sampling method: SRSWR ,SRSWOR, Random number table method and lottery system. Sample mean is an unbiased estimate of population mean, sample mean of variance.

Unit-IV

Stratified random sampling: Meaning of stratified random sampling, merits and demerits. Definitions of proportional and Optimum allocations.

Unit - V

Systematic random sampling :Definition of systematic random sampling. Comparison of(problem) SRSWOR, stratified and systematic samplings.

Text Books: 1.Applied statistics - V.K. Kapoor and S.C. Gupta.

2.Fundamentals of statistics - Goon, Gupta and Das Gupta.

Reference Books:

1.Anuvarthita Sankyaka Sastram - Telugu Academy.

2.Applied statistics - Parimal Mukhopadyaya.

3.Statistical methods - S.P. Gupta.

Practicals - Semester –V

1 .Estimation of population mean in SRSWR.

2. .Estimation of population variance in SRSWR

3. Estimation of population mean in SRSWOR.

4. Estimation of population variance in SRSWOR

5 . Comparison of SRSWOR with optimum and proportional allocations.

6. Comparison of SRSWOR, stratified and systematic samplings.

BA/BSC III YEAR : STATISTICS SYLLABUS
(For Non - Mathematics Combination)
Semester -VICBCS.
Paper - VIII Design of Experiments and Official Statistics

Unit-I

Official Statistics:National income, methods to estimateof national income, agricultural statistics.

Unit - II

Area , yield of statistics ,Functions and organization of CSO and NSSO

Unit-III

Analysis of variance :-Meaning, definition, assumptions. One way and Two way classifications.

Unit - IV

Principles of design of experiments: Principles of experiment, Completely Randomized Design, Randomized Block Design, and Latin Square Design.

Unit-V

Missing Plot Techniques: RBD, LSD, Concepts of Factorial experiments.

Text Books:

1. Fundamentals of statistics - Goon, Gupta and Das Gupta.
2. Applied statistics – Parimal Mukhopadyaya

Reference Books:

1. Anuvarthita Sankyaka Sastram - Telugu Academy.
2. Applied statistics - V.K. Kapoor and S.C. Gupta.
3. Statistical methods - S.P. Gupta.

Practicals - Semester - VI

1) ANOVA – equal One way classifications
2) ANOVA – unequal One way classifications
3) Two way classifications.
4) CRD.
5) RBD.
6) LSD.

MODEL QUESTION PAPER

STATISTICS

(With Mathematics Combination)

Common to B.A / B.Sc

Time: 3hours 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)