

RAJAH SERFOJI GOVT. COLLEGE
(AUTONOMOUS AND NAAC "A" GRADE COLLEGE)
THANJAVUR-613005

PG DEPARTMENT OF STATISTICS
(2018-2019 onwards)



UG PROGRAMME: B.STATISTICS
CBCS-COURSE PATTERN (2018-2019)
SEMESTER WISE DISTRIBUTION OF
PAPERS (COURSES)

DEPARTMENT OF STATISTICS
UG - SYLLABUS CONTAINS

1. Core Course Papers
2. Major Elective Course Papers
3. Non Major Elective Course Papers
 - (i) B.Sc., Bio-Chemistry
 - (ii) B.Sc., Bio-Technology
4. Skill Based
5. B.Sc., Mathematics - 3 Allied Papers
6. B.Statistics - 3 Allied Papers
7. B.Com., - 1 Allied Paper
8. B.B A., - 1 Allied Paper

List of Major (Core Course) Papers

- CC1 - Descriptive Statistics
- CC2 - Probability and Discrete Distributions
- CC3 - Major Practical - I
- CC4 - Continuous Probability Distributions
- CC5 - Statistical Inference - I
- CC6 - Major Practical - II
- CC7 - Sampling Techniques
- CC8 - Statistical Inference II
- CC9 - Major Practical - III
- CC10 - Time Series and Index Numbers
- CC11 - Statistical Quality Control
- CC12 - Design of Experiments
- CC13 - Major Practical - IV

Semester – I

Code : S1ST1

(For students admitted from 2018 onwards)

CC 1 - DESCRIPTIVE STATISTICS

Credits : 5

Medium of Instruction : English

Hours / Week: 6

Learning objective: Learning the preliminary tools and concepts (diagrams and graphs)

Unit I: Statistics - Definition - functions and scope of statistics - Primary and Secondary data - methods of collection and sources - merits and demerits. Classification - definition and types. Tabulation - steps in tabulation, types of tables

Unit II: Diagrammatic Representation - Bar diagram - Types of bar diagrams, Pie diagram. Graphical Representation - Histogram, Frequency curve, Frequency polygon, Ogives and Lorenz curve (construction and uses). Measures of Central Tendency - Arithmetic Mean, Median, Mode, Geometric mean and Harmonic mean

Unit III: Measures of Dispersion - Range, Quartile deviation, Mean deviation, Standard Deviation and Coefficient of Variation (Concept, problems and uses). Measures of moments, skewness and kurtosis (Concept & Problems).

Unit IV: Correlation Analysis - Definition and types of Correlation properties (Statement and proof), Methods - Scatter diagram, Karl Pearson's Coefficient of Correlation and Spearman's Rank Correlation Coefficient. Regression lines and Regression coefficient - Properties and problems.

Unit V: Association of Attributes - Class frequencies - Order of frequencies - 2×2 contingency table - finding missing frequencies - Yule's coefficient of association and Yule's coefficient of colligation.

Learning Outcomes: To provide that the basic statistical tools, methods of statistics and diagrammatic and graphical representations.

Text Books and Reference

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

S.P.Gupta - Statistical Methods, Sultan Chand and Sons New Delhi.

Question Paper Pattern

Maximum Marks:75 Exam duration: Three Hours

Part A $10 \times 2 = 20$ Answer **All** Questions (Two questions from each unit)

Part B $5 \times 5 = 25$ Answer **All** Questions (Either or type-Two questions from each unit)

Part C $3 \times 10 = 30$ Answer Any **Three** Questions (One question from each unit)

Semester - II

Code : S2ST2

(For students admitted from 2018 onwards)

CC2 - PROBABILITY AND DISCRETE DISTRIBUTIONS

Credits : 5

Medium of Instruction : English

Hours / Week: 6

Learning objective: To learn adapt to the distributions in the various fields (especially chance factors in all disciplines)

Unit I: Events - Types of events - Sample Space - definition and Axioms of Probability. Addition theorem on Probability. Conditional Probability - Multiplication theorem on Probability - Independent events - Mutual and pairwise events- Baye's theorem and its applications.

Unit II: Random variables - Definition - Univariate Discrete random Variable - Definition. Probability mass functions - Distribution function, properties. Bivariate random variables - Definition - Joint Probability mass function - marginal and Conditional distribution functions and their Properties.

Unit III: Mathematical expectations - Definition - Properties - Measures of A.M, S.D, Moments, and Correlation Coefficient for discrete random Variables. Moment generating functions, Characteristics function, Cumulant generating function - Definition and their Properties (Univariate and bivariate discrete distributions).

Unit IV: Discrete distributions: Binomial, Poisson and Geometric distributions- Constants and Properties - Fitting of Binomial, Poisson distributions (Simple problem only)

Unit V: Hyper Geometric, Negative Binomial, and discrete Uniform distributions Constants and Properties.

Learning Outcomes: Discrete distribution expose the real-life applications.

Text Books and Reference

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

Johnson and Kotz - Discrete distribution. John Wiley Publications, New York.

Question Paper Pattern

Maximum Marks:75 Exam duration: Three Hours

Part A $10 \times 2 = 20$ Answer **All** Questions (Two questions from each unit)

Part B $5 \times 5 = 25$ Answer **All** Questions (Either or type-Two questions from each unit)

Part C $3 \times 10 = 30$ Answer Any **Three** Questions (One question from each unit)

Semester - II

Code : S2STP1

(For students admitted from 2018 onwards)

CC 3 - MAJOR PRACTICAL-I

Credits : 5

Medium of Instruction : English

Hours / Week: 3

Learning objective: Practiced to the realized concept of preliminary tools

Construction of Univariate and Bivariate Frequency Distributions. Diagrammatic representations - Bar and Pie diagrams. Graphical representations - Histograms, Frequency curve, Frequency Polygon, Ogive curves

Measures of Central Tendency - Arithmetic Mean, Median, Mode, Geometric mean and Harmonic mean. Measures of Dispersion - Mean Deviation, Quartile Deviation, Standard deviation and Co-efficient of variation. Moments, Measures of Skewness - Bowley's and Karl Pearson method.

Computation of Karl Pearson's Co-efficient of Correlation and Spearman's Rank Correlation, Regression equations (two variables only).

Marginal and Conditional distribution - Expectation - Mean, Variance, and Correlation Co-efficient for Bivariate Distribution only,

Fitting of Binomial and Poisson distribution, Calculation of Yule's Co-efficient of association and Yule's Co-efficient of Colligation.

Learning Outcomes: To practiced into the basic level statistical tools, methods of statistics and diagrammatic and graphical representation.

Pattern of Practical

Practical Exam duration: Three Hours

Internal Marks: (Model Practical :25 + Observation :10 + Record Note: 5 = 40 Marks)

Practical Exam (Lab) : 4 X 15 = 60 Marks

HOD

COE

Semester - III

Code : S3ST3

(For students admitted from 2018 onwards)

CC4 - CONTINUOUS PROBABILITY DISTRIBUTIONS

Credits : 5

Medium of Instruction : English

Hours / Week: 6

Learning objective: The students should have understood the applications and nature of the probability distributions such as Normal, t , χ^2 and F . Calculation of Partial, Multiple Correlation Coefficients and Multiple Linear Regression line

Unit I: Univariate and Bivariate continuous Random variables - Definitions - Distribution Function, Joint, marginal and conditional density functions - expectations - Covariance and Correlation.

Unit II: Continuous Distributions- Uniform, Normal, Exponential, Gamma and Beta - definition, M.G.F, C.G.F, Mode, Moments, characteristics functions, Additive property (on using M.G.F).

Unit III: Sampling Distributions - Chi square Distribution - definition, M.G.F, Mode, Additive Property - Student's 't' and 'F' distributions - definition and derivation of density Functions.

Unit IV: Convergence in probability-definition. Chebyche'v inequality and weak law of large numbers (with proof) and Statement of strong law of large numbers - Central limit theorems - De Moivre's Laplace theorem.

Unit V: Concept and derivation of partial and Multiple Correlation Coefficients, Multiple Regression (Three variables only) - Simple problems.

Learning Outcomes: To expose the real-life applications of continuous distribution

Text Books and Reference

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

Johnson and Kotz - Continuous Distributions - I, John Wiley Publications, NY.

Question Paper Pattern

Maximum Marks:75 Exam duration: Three Hours

Part A $10 \times 2 = 20$ Answer **All** Questions (Two questions from each unit)

Part B $5 \times 5 = 25$ Answer **All** Questions (Either or type-Two questions from each unit)

Part C $3 \times 10 = 30$ Answer Any **Three** Questions (One question from each unit)

Semester – IV

Code : S4ST4

(For students admitted from 2018 onwards)

CC5 – STATISTICAL INFERENCE –I (Theory of Estimation and Large Sample Theory)

Credits : 5
Hours / Week: 6

Medium of Instruction : English

Unit I: Point Estimation: Definition , Parameter Space, Statistic, Estimator, Estimate Characteristics of Estimators – Unbiasedness, Consistency, Efficiency, and Sufficiency , (Simple Problems) – Neymann Factorization Theorem (Statement Only) - Cramer –Rao Inequality.

Unit II: Complete family of distribution: Definition, Rao - Blackwell theorem, Methods of Estimation – Method of maximum likelihood estimation, Method of Minimum Variance, Method of Moments, Method of Least Square.

Unit III: Interval Estimation: Confidence interval and confidence limits, Confidence intervals for proportions, Mean, Variance , and Variance ratio based on Chi- square , Students 't' , F and Normal distributions.

Unit IV: Large Sample Theory: Parameter and Statistic – Sampling Distribution of a Statistic – Standard Error. Test of Significance – Null and Alternative hypothesis, Errors in sampling, Critical Region, Level of Significance, One-tailed and Two- tailed test, Critical value.

Unit V: Large Sample test: Test of Significance for single proportion and difference of proportion , Test of significance for single mean and difference of Mean and Standard Deviation (Known and Unknown Variance).

Text Books and Reference

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

Goon A.M. Gupta M.A and Das Gupta B (1980) – An Outline of Statistical Theory, Volume 2

Question Paper Pattern

Maximum Marks:75 Exam duration: Three Hours

Part A 10 x 2 = 20 Answer **All** Questions (Two questions from each unit)

Part B 5 x 5 = 25 Answer **All** Questions (Either or type-Two questions from each unit)

Part C 3 x10 = 30 Answer Any **Three** Questions (One question from each unit)

HOD

COE

Semester – IV

Code : S4STP2

(For students admitted from 2018 onwards)

CC 6 - MAJOR PRACTICAL-II

(Based on CC4 and CC5)

Credits : 5

Medium of Instruction : English

Hours / Week: 3

Continuous distribution function: marginal and conditional density function - expectation - covariance and correlation.

Drawing samples (of size not exceeding 25) from

- (i) Uniform distribution
- (ii) Normal distribution and
- (iii) Exponential distribution

Computation of partial and multiple correlation coefficients and multiple linear regression equation (3 variables)

Interval estimation - confidence interval and confidence limits for proportions, mean and variance

Large sample test: test of significance for single mean, means, single proportions, difference of proportions and standard deviations (known and unknown)

Pattern of Practical

Practical Exam duration: Three Hours

Internal Marks: (Model Practical :25 + Observation :10 + Record Note: 5 = 40 Marks)

Practical Exam (Lab) : 4 X 15 = 60 Marks

HOD

COE

Semester – V

Code : S5ST5

(For students admitted from 2018 onwards)

CC7 – SAMPLING TECHNIQUES

Credits : 5
Hours / Week: 6

Medium of Instruction : English

Learning objective: To equip students with Sampling Techniques used in conducting sample surveys.

Unit I: Design, Organization, and execution of the sample surveys – principal steps in sample survey – pilot survey – sampling and non – sampling errors – Advantages of sampling over Complete enumeration – Limitations of sampling.

Unit II: Sampling from finite population – simple random sampling – unbiased estimate of the mean and variance – Estimation of standard error from a sample – Determination of sample size.

Unit III: Stratified random sampling – properties of the unbiased estimate of the mean and Variances – optimum and proportional allocation –Relative precision of a stratified sampling and simple random sampling – Estimation of gain due to stratification

Unit IV: Systematic sampling – Estimation of mean and variance – comparison of simple random sampling and stratified random sampling with systematic sampling

Unit V: Ratio – estimators – Variance of the ratio estimate – comparison of the ratio estimate with the mean per unit – Bias of the ratio estimate – Regression estimators – linear regression estimate – Regression estimators with pre-assigned ratio estimator. Large sample comparison with the ratio estimate and the mean per unit

Learning outcomes: To compare the efficiency of various estimation strategies resulting from different sampling techniques

Text Books and Reference

Kapoor V.K. and Gupta S.C. - Fundamentals of Applied statistics, Sultan Chand and Sons New Delhi.

William G.Cohran (1984) – sampling Techniques, Wiley Eastern Ltd.

Moorthy, M.N. (1967) Sampling Theory and Methods, Statistical Publishing Society, Calcutta.

Question Paper Pattern

Maximum Marks:75 Exam duration: Three Hours

Part A 10 x 2 = 20 Answer **All** Questions (Two questions from each unit)

Part B 5 x 5 = 25 Answer **All** Questions (Either or type-Two questions from each unit)

Part C 3 x10 = 30 Answer Any **Three** Questions (One question from each unit)

Semester - V

Code : S5ST6

(For students admitted from 2018 onwards)

CC8 - STATISTICAL INFERENCE -II (Testing of Hypothesis)

Credits : 4
Hours / Week: 6

Medium of Instruction : English

Unit I : Statistical Hypothesis : Definition , sample and composite hypothesis . Test of statistical hypothesis – Null hypothesis and Alternative hypothesis Critical Region , two types of errors , Levels of significance , Power of the test.

Unit II: Optimum Test : Most powerful test and (mp test) , Uniformly most powerful test (UMP test) , Neyman Pearson Lemma (with proof) , Unbiased test and Unbiased critical region , optimum regions and UMP critical region.

Unit III : Likelihood ratio test – Definition , Properties . Test for the mean and variance of a normal population and equally of two normal population , several normal population .

Unit IV: Small sample test - t test for single mean and difference of means ,paired 't' test for difference of mean, observed sample correlation, chi-square test – goodness of fit , independent of attributes and F – test.

Unit V : Non – Parametric tests - Definition , advantages and disadvantages - Run , Median , Sign , and Mann – Whitney tests (one sample and two sample problems)

Text Books and Reference

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

Goon A.M. Gupta M.A and Das Gupta B (1980) – An Outline of Statistical Theory, Volume 2

Question Paper Pattern

Maximum Marks:75 Exam duration: Three Hours

Part A 10 x 2 = 20 Answer **All** Questions (Two questions from each unit)

Part B 5 x 5 = 25 Answer **All** Questions (Either or type-Two questions from each unit)

Part C 3 x10 = 30 Answer Any **Three** Questions (One question from each unit)

HOD

COE

Semester - V

Code : S5STP3

(For students admitted from 2018 onwards)

CC 9 - MAJOR PRACTICAL-III

(Based on CC7 and CC8)

Credits : 4

Medium of Instruction : English

Hours / Week: 4

Estimation of mean and variance of the population and variance of the estimator of the mean using simple random sampling and stratified random sampling with optimum and proportional allocations, Estimation of sample size.

Ratio and linear regression methods of estimation of population mean and total estimation of mean and variance of the population and variance of the estimator of mean using systematic random sampling.

Small sample test : Student's - t test for single mean and difference of means, paired t test for difference of mean , observed sample correlation , chi-square test - goodness of fit , independent of attributes and F - test.

Non - Parametric tests: Run , Median , Sign , and Mann - Whitney tests (one sample and two sample problems)

Pattern of Practical

Practical Exam duration: Three Hours

Internal Marks: (Model Practical :25 + Observation :10 + Record Note: 5 = 40 Marks)

Practical Exam (Lab) : 4 X 15 = 60 Marks

HOD

COE

Semester – VI

Code : S6ST7

(For students admitted from 2018 onwards)

CC10 – TIME SERIES AND INDEX NUMBERS

Credits : 5
Hours / Week: 6

Medium of Instruction : English

Learning objective: To give an exposure to the students as to how statistics is applied in real life situations.

Unit – I: Analysis of Time Series – definition and uses, Additive and Multiplicative Models in Time Series, Components of Time Series - Secular Trend, Seasonal variation, Cyclic Variations and Irregular fluctuations- Definition and Concepts.

Unit – II: Measurement of Trend – Graphic method, Method of Semi-Averages, Method of Moving Averages and Method of Least Squares. Fitting of Straight line trend and Parabolic trend (theory and problems).

Unit-III: Measurement of Seasonal Variations – Method of Simple Averages, (problems) Ratio to Moving Average method by additive and multiplicative model (problems), Ratio to Trend Method and Link Relative Method (concepts and procedure only).

Unit-IV Index Numbers – Definition and Uses, Types of Index Numbers, Problems involved in the construction of Index Numbers. Construction of Simple Index Numbers. – Simple aggregate method and Simple average of Price Relatives using A.M & G.M. Construction of Weighted Index Numbers – Laspeyres, Paasches, Dorbish and Bowley, Marshall - Edge worth and Fisher’s Ideal Index Numbers(Problems).

Unit – V Construction of Weighted Average of Price relatives Index Numbers using A.M & G.M. Fixed Base Index Numbers and Chain Base Index Numbers. Tests of adequacy of a good Index Number – Time Reversal Test, Factor Reversal Test, Unit test and Cyclic test.

Text Books and Reference

Gupta S,C and Kapoor V.K (2013): Fundamental of Applied Statistics. - Sultan Chand & Sons, New Delhi.

Gupta S.P (1995) , Statistical Methods, Sultan Chand & Sons, New Delhi.

Goon A.M, Gupta M.A and Das Gupta (1987) , Fundamentals of Statistics, Sultan Chand & Sons, New Delhi.

Question Paper Pattern

Maximum Marks:75 Exam duration: Three Hours

Part A 10 x 2 = 20 Answer **All** Questions (Two questions from each unit)

Part B 5 x 5 = 25 Answer **All** Questions (Either or type-Two questions from each unit)

Part C 3 x10 = 30 Answer Any **Three** Questions (One question from each unit)

HOD

COE

Semester – VI

Code : S6ST8

(For students admitted from 2018 onwards)

CC11 - STATISTICAL QUALITY CONTROL

Credits : 4
Hours / Week: 6

Medium of Instruction : English

Learning objectives: An exposure to quality control and its concepts and also explains the reliability concept.

Unit I: Concept of SQC - Chance and Assignable causes of variation, Uses of SQC, Process and product control - - natural tolerance limits and Specification limits - control chart for variables - \bar{X} and R- charts, Revised control charts.

Unit II: Control charts for attributes, definition OC, ASN function - Control chart for fraction defectives (p-chart), control chart for number of defectives (d-chart) (for fixed and variable sample sizes), control chart for number of defects per unit (c - chart).

Unit III: Acceptance sampling by attributes: definition OC, ASN functions - Acceptance Quality level (A.Q.L), - Lot tolerance percent defectives (L.T.P.D), process average fraction defectives (P), producer's and consumer's risks. Rectifying inspection plans. Average outgoing quality limit (A.O.Q.L).

Unit IV: Operating Characteristic (O.C) curve - Average sample number (A.S.N) single sample plans: Determination of n and c A.O.Q.L - O.C and A.O.Q curves - Double sampling plans: O.C. curve, A.S.N and A.T.I curves - comparison with single sampling plan.

Unit V: Sequential sampling - Sequential Probability Ratio Test (S.P.R.T) O.C. of sequential sampling plans, A.S.N function of sequential sampling plans.

Learning outcomes: Almost used in all industries such as electrical and electronics, plastic, Rubber, chemicals, petroleum, Transportation, ISI, ISSO, medicine (cardiograph) and other various fields.

Text Books and Reference

Gupta. S.C. & Kapoor, V.K; Fundamentals Applied statistics Sultan Chand & co.

Duncan A.J. : Statistical Quality control, Mc Graw Hill, New York.

Question Paper Pattern

Maximum Marks:75 Exam duration: Three Hours

Part A 10 x 2 = 20 Answer **All** Questions (Two questions from each unit)

Part B 5 x 5 = 25 Answer **All** Questions (Either or type-Two questions from each unit)

Part C 3 x10 = 30 Answer Any **Three** Questions (One question from each unit)

HOD

COE

Semester - VI

Code : S6ST9

(For students admitted from 2018 onwards)

CC12 - DESIGN OF EXPERIMENTS

Credits : 4

Medium of Instruction : English

Hours / Week: 5

Learning objective: To provide basic principles of experimentation and agriculture field

Unit I: Analysis of variance - Definition and assumptions Cochran's theorem (statement only) ANOVA - One way and Two way classification

Unit II: Design of Experiments - Terminology and principles of experiments Completely Randomized Design (CRD), Randomized Block Design (RBD) and Latin Square Design (LSD) Estimation of one and two missing values in RBD and LSD.

Unit III: Factorial Experiments - main effects and interactions, Definition of contrast and orthogonal contrast, Analysis of 2^2 , 2^3 and 3^2 factorial Experiments.

Unit IV: Confounding in Factorial design - Confounding in 2^2 and 2^3 Experiment, merits and demerits of confounding.

Unit V: Split - plot design - Analysis, advantages and disadvantages, Analysis of Covariance for a one - way layout with one concomitant variable and an RBD with one concomitant variable.

Learning Outcomes: To discuss the analysis of data relating to agriculture, biological sciences and industry.

Text Books and Reference

S.C. Gupta and V.K.Kapoor - Fundamentals of Applied Statistics, Sultan Chand and Sons New Delhi.

Goon A.M, Gupta M.A and Das Gupta.B - Fundamentals of Statistics.

Question Paper Pattern

Maximum Marks:75 Exam duration: Three Hours

Part A $10 \times 2 = 20$ Answer **All** Questions (Two questions from each unit)

Part B $5 \times 5 = 25$ Answer **All** Questions (Either or type-Two questions from each unit)

Part C $3 \times 10 = 30$ Answer Any **Three** Questions (One question from each unit)

HOD

COE

Semester - VI

Code : S6STP4

(For students admitted from 2018 onwards)
CC 13 - MAJOR PRACTICAL-IV
(Based on CC10, CC11 and CC12)

Credits : 4
Hours / Week: 3

Medium of Instruction : English

Learning objectives: Practiced to the realized concept of preliminary tools

Time series: Fitting of linear, Quadratic and Exponential trend by the least square method, Finding trend values by method of moving averages. Determination of seasonal variation by simple average method, moving average method (Additive and Multiplicative model) and Link relative method.

Index Numbers: Construction of fixed and chain base numbers, Laspeyre's, Paasche's, Bowley's, Fisher's and Marshall-Edgeworth index numbers.

Time Reversal Test - Factor Reversal Test Construction of Cost of living index numbers.

Construction of \bar{X} , R, p, c and np charts, OC curves for single sampling plan.

Analysis of one way and two way, CRD, RBD, LSD layouts. Missing plot techniques in RBD and LSD (one missing observations), Analysis of 2^2 and 2^3 factorial design.

Learning outcomes: The carryout three paper topics analyzed and practiced in real life situation.

Pattern of Practical

Practical Exam duration: Three Hours

Internal Marks: (Model Practical :25 + Observation :10 + Record Note: 5 = 40 Marks)

Practical Exam (Lab) : 4 X 15 = 60 Marks

HOD

COE

List of Major Elective Courses

1. Vital Statistics
2. Econometrics
3. Survival Analysis
4. Numerical Methods
5. Simulation and Inventory Control
6. Psychological and Educational Statistics
7. Computational Statistics
8. Programming in C
9. Actuarial Statistics

List of Non Major Elective Courses

1. Statistical Data Analysis
2. Biostatistics

Semester – V

Code : S5STEL1A

(For students admitted from 2018 onwards)

MEC1- VITAL STATISTICS

Credits : 4

Medium of Instruction : English

Hours / Week: 5

Unit I : Introduction – Definition of Vital statistics, Uses of Vital statistics, methods of obtaining Vital statistics. Registration method, Census enumeration - Analytical method.

Unit II: Measurement of Fertility - CBR (crude birth rate) - SFR (specific fertility rate) - ASFR (age specific fertility rate) - GFR (general fertility rate) - TFR (total fertility rate)

Unit III: Reproduction Rate - Gross Reproduction Rate - Net Reproduction Rate.

Unit IV: Measurement of Mortality - Specific death rate - Standardized death rate - Infant Mortality.

Unit V: Life Tables –definition– Construction of a life table, Uses of Life table (simple problems)

Text Books and Reference

S.C. Gupta and V.K.Kapoor - Fundamentals of Applied Statistics. Sultan Chand and Sons New Delhi.

Shyrock,H.S., Siegal, J.S. et. al(1976) : Studies in population , The Methods and Materials of Demography, Academic Press.

Bhende, A and T.Kanitkar (1988) : Principles of population studies , Himalaya publications, Bombay

S.P.Gupta -Statistical Methods, Sultan Chand and Sons New Delhi.

Question Paper Pattern

Maximum Marks:75 Exam duration: Three Hours

Part A 10 x 2 = 20 Answer **All** Questions (Two questions from each unit)

Part B 5 x 5 = 25 Answer **All** Questions (Either or type-Two questions from each unit)

Part C 3 x10 = 30 Answer Any **Three** Questions (One question from each unit)

HOD

COE

Semester – V

Code : S5STEL1B

(For students admitted from 2018 onwards)

MEC1 – ECONOMETRICS

Credits : 4

Medium of Instruction : English

Hours / Week: 4

Objective: To enrich the skills of students to understand the nature and functioning of economic systems.

Unit I: Econometrics – Introduction, methodology of Econometrics Interpretation on regression – statistical versus deterministic – nature and sources of data – Accuracy of data – Measurement of scales of variables – the role of computers.

Unit II: Two variate regression model: Concept of population regression function – the meaning of the term linear – stochastic specification of PRF - significance of the stochastic disturbance term – sample regression function.

Unit III: The method of least square – classical linear regression model properties of LS estimates – Gauss-Markov theorem (without proof) – C efficient of determination.

Unit IV: Regression analysis and analysis of variance – using application of Regression analysis, Prediction – reporting the results of Regression analysis – evaluating the results of Regression analysis.

Unit V: Regression through origin - Regression on standard variables - functional forms - log linear model - semi log models - reciprocal models - Choice of functional form.

Text Book and Reference

Gujarati, D.N. and Sangeetha(2008), Basic Econometrics , M cGraw Hill Co, New Delhi.

J.Johnston (1984),Economic methods , M cGraw Hill Co, New Delhi.

Ronald J. Wonnacott and Thomas H. Wonnacott (1979) Econometris, Wiley Series.

Question Paper Pattern

Maximum Marks:75 Exam duration: Three Hours

Part A 10 x 2 = 20 Answer **All** Questions (Two questions from each unit)

Part B 5 x 5 = 25 Answer **All** Questions (Either or type-Two questions from each unit)

Part C 3 x10 = 30 Answer Any **Three** Questions (One question from each unit)

HOD

COE

Semester – V

Code : S5STEL1C

(For students admitted from 2018 onwards)

MEC1 – SURVIVAL ANALYSIS

Credits : 4
Hours / Week: 4

Medium of Instruction : English

Unit I: Introduction to Survival concepts, Survival functions and hazard rates, concepts of Type I, Type II errors. Random and other types of censoring, likelihood in these cases.

Unit II: Life distributions-Exponential, Weibull, Gamma, Lognormal, Pareto distribution.

Unit III: Linear failure rate, estimation / testing under censoring setup. Life tables, failure rate, mean residual life and their elementary properties.

Unit IV: Estimation of survival functions-actuarial estimator, Product- limit (Kaplan- Meier) estimator, properties.

Unit V: Cox proportional hazards regression models with one and several covariates, exponential, Weibull, lognormal regression.

Text Book and Reference

Miller,R.G.(1981) : Survival analysis, John Wiley.

Cox, D.R. and Oakes, D.(1984) : Analysis of survival data, Chapman & Hall, New York.

Gross, A.J. and Clark, V.A.(1975) : Survival distribution: Reliability applications in the Biomedical sciences, John Wiley and Sons.

Elandt-Johnson,R.E. Johnson, N.L. : Survival models and data analysis, John Wiley & sons.

Kalbfleish, J.D. and Prentice R.L.(1980) : The statistical analysis of failure time data, John Wiley.

Question Paper Pattern

Maximum Marks:75 Exam duration: Three Hours

Part A 10 x 2 = 20 Answer **All** Questions (Two questions from each unit)

Part B 5 x 5 = 25 Answer **All** Questions (Either or type-Two questions from each unit)

Part C 3 x10 = 30 Answer Any **Three** Questions (One question from each unit)

HOD

COE

Semester – V

Code : S5STEL2A

(For students admitted from 2018 onwards)

MEC2 - NUMERICAL METHODS

Credits : 4

Medium of Instruction : English

Hours / Week: 4

Unit I:

Finite differences – Forward and Backward difference operators ‘E’ and ‘And’ their basic properties – Interpolation with equal intervals – Newton’s forward and backward difference formulae – simple problems.

Unit II:

Interpolation with unequal intervals – Divided differences and their properties – Newton’s divided difference formula – Lagrange’s formula - simple problems

Unit III:

Central difference interpolation formula – Gauss forward and backward differences formulae – Stirling’s, Bessel’s and Everett’s central difference formulae.

Unit IV:

Inverse interpolation – Lagrange’s method – Iteration of successive approximation method – simple problems. Numerical differentiation - Numerical differentiation up to second order only - simple problems.

Unit V:

Numerical integration – Trapezoidal rule – Simpson’s $1/3^{\text{rd}}$ and $3/8^{\text{th}}$ rules – Weddle’s rule – Euler’s summation formula – Numerical method of solution of ordinary differential equations – Taylor’s series method – Euler method and Runge Kutta up to second order - - simple problems only.

Text Books and Reference

Gupta P.P. and Malik G.S. Calculus of Finite Differences and Numerical Analysis.

Saxena.S.,Calculus of finite differences and Numerical Analysis, Chand&Co.

Question Paper Pattern

Maximum Marks:75 Exam duration: Three Hours

Part A $10 \times 2 = 20$ Answer **All** Questions (Two questions from each unit)

Part B $5 \times 5 = 25$ Answer **All** Questions (Either or type-Two questions from each unit)

Part C $3 \times 10 = 30$ Answer Any **Three** Questions (One question from each unit)

HOD

COE

Semester – V

Code : S5STEL2B

(For students admitted from 2018 onwards)

MEC2 - Simulation and Inventory Control

Credits : 4

Medium of Instruction : English

Hours / Week: 4

UNIT-I : Definition of inventory – objectives of an inventory model – Reasons for maintaining inventories-types of inventories- inventory cost-variables involved in the inventory – factors affecting inventory control.

UNIT-II: Deterministic inventory model (EOQ Model): Definition types. Model -I : Derivation of EOQ Model with uniform rate of demand infinite production rate ,no shortage & lead time is zero – simple problems .probabilistic inventory model –definition distinguish between deterministic model and probabilistic model.

UNIT-III: Model-II: Derivation of EOQ model with several productions runs of unequal length no shortage and lead time is zero – simple problems. Model-III: Derivation of EOQ model with uniform rate of demand, finite production rate, No shortage and lead time is zero-simple problems.

UNIT-IV : Model-IV : Derivation of EOQ model with infinite production and variable order cycle time, shortage allowed and lead time is zero-simple problems.

Model-v: Derivation of EOQ model with finite production, shortage allowed and lead time is zero –simple problems.

UNIT-V: Model-VI: Probabilistic model –single period model with uniform rate of demands without set-up cost (Discrete &continuous unit)-simple problems.

Model-VII: Probabilistic model-single period model with instantaneous demand without set up cost (Discrete & continuous units).

Text Books and Reference

Kanthi swarup, Gupta, P.K.&Manmohan: operations research –sultan and chand & sons – New Delhi.

Sundarresan.V, Ganapathy Subramanian K.S, Ganasen .k A.R.Publication Re-Print 2002

Question Paper Pattern

Maximum Marks:75 Exam duration: Three Hours

Part A 10 x 2 = 20 Answer **All** Questions (Two questions from each unit)

Part B 5 x 5 = 25 Answer **All** Questions (Either or type-Two questions from each unit)

Part C 3 x10 = 30 Answer Any **Three** Questions (One question from each unit)

HOD

COE

Semester - V

Code : S5STEL2C

(For students admitted from 2018 onwards)

MEC2 - Psychological and Educational Statistics

Credits : 4
Hours / Week: 4

Medium of Instruction : English

Unit- I: Psychological statistics- Definition – scaling individual test items in terms of difficulties(σ -scalling) – scaling of score on a test-Z (or σ) Score and Z (or σ)scalling-Standard scores.

Unit - II: Normalised Scores – Calculation of for a given frequency distribution – Uses of T- Scores – Comparison of T- Scores and Standard scores. Percentiles Scores – Definition – Advantages and disadvantages of Percentiles Scores.

Unit- III: Scaling of Rankings in term of Normal probability curve. Reliability of test scores. Reliability – Definition – error variance or standard error of measurement. Index reliability –Parallel tests – Method of determining test reliability – T test-Retest method- Alternate or Parallel forms method.

Unit- IV: Split-half method –Definition - Advantages and disadvantages-The Rulon method of estimating Reliability – Method of Rational equivalence or Kunder – Richardon method.

Unit -5: Effect of test length on Reliability of the test –Lengthening a test of attain desired Reliability – Effect of different ranges upon Reliability of a test. Validity of test Scores – Calculation of validity – validity and test length.

Text Books and Reference

S.C. Gupta and V.K.Kapoor - Fundamentals of Applied Statistics. Sultan Chand and Sons New Delhi.

Question Paper Pattern

Maximum Marks:75 Exam duration: Three Hours

Part A 10 x 2 = 20 Answer **All** Questions (Two questions from each unit)

Part B 5 x 5 = 25 Answer **All** Questions (Either or type-Two questions from each unit)

Part C 3 x10 = 30 Answer Any **Three** Questions (One question from each unit)

HOD

COE

Semester – VI

Code : S6STEL3A

(For students admitted from 2018 onwards)

MEC3 – Computational Statistics

Credits : 4

Medium of Instruction : English

Hours / Week: 4

Objective : To gain knowledge of MS-Office and MS-Excel package using various statistical measures.

Unit - I

Introduction to word processing, Applying basic formatting, Adding a table to document, Designing and reviewing a word document, Page margins, page orientation and page breaks. Spelling and grammar checks.

Unit - II

Introduction to MS-EXCEL, Applying basic formatting, Creating a table, Adding rows, columns of a table, Designing a table.

Unit - III

Diagrammatic Representation of Data - Simple bar diagram, Sub-divided bar diagram, Multiple bar diagram and Percentage bar diagram. Graphical representation of data - Histogram. Measures of central tendency - Arithmetic Mean, Median, Mode, Geometric mean and Harmonic mean.

Unit - IV

Measures of dispersion: Range, Quartile deviation, Mean deviation, Standard deviation, Co-efficient of Variation. Measure of Skewness: Karl-Pearson's Co-efficient of Skewness.

Unit - V

Correlation Analysis: Scatter diagram, Karl-Pearson's Co-efficient of Correlation, Spearman's Co-efficient of Correlation.

Text books:

1. Office 2010 in simple steps, Kogent solutions Team, DreamTech, 2010.
2. Statistics made simple, K.V.S.Sharma, PHI, 2006

Books for reference:

1. Carry N. Prague and Michael R.Irwin(1997): Access for Windows 95 Bible, Edition .
2. Katherine Murray. Mastering Power Point
3. John Walkenbach. Excel for Windows 95 Bible

Question Paper Pattern

Maximum Marks:75 Exam duration: Three Hours

Part A 10 x 2 = 20 Answer **All** Questions (Two questions from each unit)

Part B 5 x 5 = 25 Answer **All** Questions (Either or type-Two questions from each unit)

Part C 3 x10 = 30 Answer Any **Three** Questions (One question from each unit)

HOD

COE

Semester – VI

Code : S6STEL3B

(For students admitted from 2018 onwards)

MEC3 - Programming in C

Credits : 4

Medium of Instruction : English

Hours / Week: 4

Unit -I

Introduction to C, Characters set, Variables, Data types – Declaration, Type conversions, Increment And Decrement operators, Bitwise, logical and Assignment operators.

Unit -II

Expression and conditional expressions, Control structures If – Else, Switch, While, For, Do-While loop structures. Break, Continue, Go and label statement Functions, Function Returning, Non-integers, function argument State and register variables.

Unit -III

Arrays and strings – Array Declaration – Multi Dimensional arrays, Strings / Character Arrays, Array initialization – Pointers and addresses. Pointers and Arrays – Pointer to Functions

Unit -IV

Structures and Functions, Arrays of Structures, Fields Unions – type definition – standard input and output – formatted output – Output – Access to the standard library.

Unit -V

File access, File handling in C – File descriptions – Error handling – “Low level I / O – Read and Write”. Open, Create, Close, Unlink – Random Access – seek and I seek.

Text Books and Reference

E. Balagursamy – Programming in C. Tata McGraw-Hill Publishing Co.Ltd, New Delhi.

Question Paper Pattern

Maximum Marks:75 Exam duration: Three Hours

Part A 10 x 2 = 20 Answer **All** Questions (Two questions from each unit)

Part B 5 x 5 = 25 Answer **All** Questions (Either or type-Two questions from each unit)

Part C 3 x10 = 30 Answer Any **Three** Questions (One question from each unit)

HOD

COE

Semester – VI

Code : S6STEL3C

(For students admitted from 2018 onwards)

MEC3 – ACTUARIAL STATISTICS

Credits : 4

Medium of Instruction : English

Hours / Week: 4

Objectives: To impart basic concepts in Actuarial Studies and prepare students to take up a career in Actuarial Practice

Unit – I

Compound Interest – Accumulated Value – Present Value – Nominal and Effective Rates of Interest – Discount and Discount Value – Varying Rates of Interest (Lesson I) (Simple problems only).

Unit – II

Annuity – Classification of annuities – Present Value of an Immediate Annuity certain – Accumulated Value of Annuity – Present Value of a Deferred Annuity certain – Perpetuity – Variable annuities (Lesson II) (Simple problems only).

Unit – III

Redemption of loan: Redemption of loans by a Sinking fund – Lender’s Sinking fund – Capital Redemption policies – Office Premium (Lesson II) (Simple problems only).

Unit – IV

Life Assurance premiums: General considerations – Assurance benefits – Pure Endowment Assurance, Endowment Assurance, Temporary assurance, Whole life assurance – Commutation Functions D_x , C_x , M_x and R_x – Expressions for present values of Assurance benefits in terms of Commutation Functions. (Lesson IX) (Simple problems only)

Unit – V

Net Premiums for Assurance Plans – Natural Premiums – Level Annual Premium – Net Premium for Annuity Plans. (Lesson XI and XII) (Simple problems only).

Text book:

Mathematical basis of life assurance IC-81, Insurance institute of India.

Book for reference:

Donald, DWA (1975): Compound interest and annuities certain, Heinemann, London.

Question Paper Pattern

Maximum Marks:75 Exam duration: Three Hours

Part A $10 \times 2 = 20$ Answer **All** Questions (Two questions from each unit)

Part B $5 \times 5 = 25$ Answer **All** Questions (Either or type-Two questions from each unit)

Part C $3 \times 10 = 30$ Answer Any **Three** Questions (One question from each unit)

HOD

COE

Semester – V

Code : S5BCELO1

(For students admitted from 2018 onwards)

NMEC1 – STATISTICAL DATA ANALYSIS

(For B.Sc., Bio- chemistry)

Credits : 3

Medium of Instruction : English

Hours / Week: 4

Unit-I: Collection of Statistical data - Primary and Secondary – Methods -Preparation of Questionnaire and Schedules.

Unit -II: Classification and tabulation - Bar diagrams - Pie diagram – Histogram - Frequency polygon - Frequency Curve - Merits and Demerits.

Unit -III: Measures of central tendency-mean, median, mode-measures of dispersion-range, mean deviation, standard deviation and coefficient of variation.

Unit -IV: Measures of Skewness – Definition – types – methods – Karl Pearson’s Skewness, Bowley’s Skewness - Merits and Demerits. (Simple problems only)

Unit -V: Correlation analysis – Karl Pearson’s Coefficient of Correlation – Spearman’s Rank Correlation Coefficient. (Simple problems only)

Text Books and Reference

S.P.Gupta: Statistical Methods, Sultan chand and Sons, New Delhi.

Question Paper Pattern

Maximum Marks:75 Exam duration: Three Hours

Part A 10 x 2 = 20 Answer **All** Questions (Two questions from each unit)

Part B 5 x 5 = 25 Answer **All** Questions (Either or type-Two questions from each unit)

Part C 3 x10 = 30 Answer Any **Three** Questions (One question from each unit)

HOD

COE

Semester – VI

Code : S6BTELO2

(For students admitted from 2018 onwards)

NMEC2- BIO STATISTICS

(For B.Sc., Bio-Technology)

Credits : 3

Medium of Instruction : English

Hours / Week: 4

Unit-I: Bio statistics: definition – scale- function of statistics – characteristics of statistics – collection of data- primary and secondary data – sources – merits, demerits-uses and limitations of statistics.

Unit-II: Classification: definition- types of classification-uses- tabulation - definition- types of tabulation rules of construction of tabulation- Diagrammatic representation- bar diagram – Pie diagram. Advantages and Disadvantages

Unit-III: Frequency distribution: formation – discrete and continuous data – Graphical representation – Histogram- Frequency polygon – Frequency curve- Ogive curves – Merits and Demerits– Comparison of Diagrammatic and Graphical Representations.

Unit -IV: Measures of central tendency: Arithmetic mean – median – mode – Merits and Demerits. Measures of Dispersion: range, coefficient of range – standard deviation – coefficient of variation- Merits and Demerits (Simple Problems).

Unit-V: Correlation – definition and types of correlation, properties (Statement Only)- Methods –Scatter diagram- Karl Pearson’s coefficient of correlation and Spearman’s Rank Correlation coefficient – Merits and Demerits (Simple Problems).

Text Books and Reference

P.N.Arora,P.K.Malhan, Biostatistics,Himalaya PublishingHouse.RevisedEdition 2006.

W.W. Daniel – Bio Statistics Basic concepts and Methodology for health sciences 9th edition, Wiley India Pvt. Ltd.

S.P.Gupta: Statistical Methods, Sultan chand and Sons, New Delhi.

Question Paper Pattern

Maximum Marks:75 Exam duration: Three Hours

Part A 10 x 2 = 20 Answer **All** Questions (Two questions from each unit)

Part B 5 x 5 = 25 Answer **All** Questions (Either or type-Two questions from each unit)

Part C 3 x10 = 30 Answer Any **Three** Questions (One question from each unit)

HOD

COE

Semester -III

Code: S3AST1

(For students admitted from 2018 onwards)

Allied-II Paper - I Optimization Techniques - I

Credits : 4
Hours / Week: 5

Medium of Instruction : English

Unit - I: Introduction - Origin - Nature of OR - Structure - Characteristics - OR in Decision making - Models in OR - Uses and Limitations of OR - LPP - Mathematical formulation of LPP - Graphical Method.

Unit - II: LPP - Standard form of LPP - Maximization - Minimization - Simplex method - Artificial variable technique - Two-phase Method - Big-M method.

Unit - III: Transportation problem - Balanced, Unbalanced T.P. - Initial basic feasible solution - North West Corner Rule - Row Minima - Column Minima - Matrix Minima (LCM) - Vogel's Approximation method - Optimality Test - MODI Method.

Unit-IV: Assignment problem - Introduction - Balanced - Unbalanced - Maximization - Minimization - Hungarien Method.

Unit - V: Sequencing problems - Definition - Problems with n jobs through two machines - problems with n jobs through three machines problems with n jobs and K machines.

Text Books and Reference

Kanti Swarup, P.K.Gupta, and Manmohn (1980) - "Operations Research", Sultan Chand and sons, New Delhi.

J.K. Sharma (1997), "operations research" and application, mc. Millan and company, new delhi.

Nita H. Shah, Ravi M. Gor and Hardik Soni (2010) - "Operations Research", PHI Learning Private Limited, New Delhi.

Question Paper Pattern

Maximum Marks:75 Exam duration: Three Hours

Part A $10 \times 2 = 20$ Answer **All** Questions (Two questions from each unit)

Part B $5 \times 5 = 25$ Answer **All** Questions (Either or type-Two questions from each unit)

Part C $3 \times 10 = 30$ Answer Any **Three** Questions (One question from each unit)

Semester -IV

Code : S4ASTP

(For students admitted from 2018 onwards)

Allied-II

Paper-II - Practical

(Based on S3AST1 and S4AST3)

Credits : 4

Medium of Instruction : English

Hours / Week: 2

LIST OF EXPERIMENTS

- i. Graphical Method.
- ii. Simplex method.
- iii. Big-M method.
- iv. Transportation problem.
- v. Assignment problem.
- vi. Game Theory
- vii. Queueing Theory.
- viii. Network Problems.

Pattern of Practical

Practical Exam duration: Three Hours

Internal Marks: (Model Practical :25 + Observation :10 + Record Note: 5 = 40 Marks)

Practical Exam (Lab) : 4 X 15 = 60 Marks

HOD

COE

Semester -IV

Code : S4AST3

(For students admitted from 2018 onwards)

Allied -II Paper - III Optimization Techniques - III

Credits : 4
Hours / Week: 5

Medium of Instruction : English

OBJECTIVE: To train the students with Optimization techniques towards solving decision making problems based on deterministic and probabilistic models and to impart an insight of the applications of Operations Research in Management.

Unit - I: Introduction - definition - pay-off - types of games - the maximin - minimax principles Saddle Point - Game with Saddle Point - mixed strategies - 2x2 games - graphical method for 2 x n or m x 2 games - dominance property - Resolving games by L.P.P. - Simple problems.

Unit - II: Decision theory - Introduction - Types of Decision Making Environment - Decision Making under uncertainty - Maximin criterion - Maximax criterion - Minimax criterion Laplace criterion - Hurwitz criterion - Decision Making under risk - EMV - EOL - EVPI - Decision Tree Analysis - Concepts only - simple problems.

Unit - III : Queuing system - elements of queuing system - operating characteristics of a queue of a queuing systems - deterministic queuing system - probability distribution in queuing system.

Unit - IV: Classification of queuing models - definition of transient and steady states - Poisson queuing system - Model I: $\{(M/M/1): (/SIRO)\}$ - Simple problems.

Unit - V: Network analysis - Basic concepts - Constraints in network - Construction of network critical path method (CPM) - Program Evaluation Review Technique (PERT) - simple problems.

Text Books and Reference

Kanti Swarup, P.K. Gupta, and Manmohn (1980) - "Operations Research", sultan chand and sons, New delhi.

J.K. Sharma (1997), "Operations Research and Application", Mc. Millan and Company, New Delhi.

Nita H. Shah, Ravi M. Gor, and Hardik Soni (2010) - "Operations Research", PHI Learning Private Limited, New Delhi.

Question Paper Pattern

Maximum Marks:75 Exam duration: Three Hours

Part A 10 x 2 = 20 Answer **All** Questions (Two questions from each unit)

Part B 5 x 5 = 25 Answer **All** Questions (Either or type-Two questions from each unit)

Part C 3 x10 = 30 Answer Any **Three** Questions (One question from each unit)

Semester -I

Code : S1AS1

(For students admitted from 2018 onwards)

Allied-I - Paper - I

MATHEMATICAL STATISTICS - I

(for B.Sc., Mathematics students)

Credits : 4

Medium of Instruction : English

Hours / Week: 4

Unit -I: Measures of central tendency – Mean, Median, Mode, Geometric Mean, Harmonic Mean and Quartiles. Measures of Dispersion – Quartile deviations and Standard deviation. Measures of Skewness and Kurtosis.

Unit-II: Probability - Axiomatic and classical probability – Simple Problems. Addition multiplication theorem of Probability– Simple Problems.

Unit-III: Concept of random variable – discrete and continuous, distribution functions, probability mass function, probability density function, mathematical expectation and Moment generating functions.

Unit -IV: Bivariate Probability distribution – discrete and continuous, marginal and conditional distributions,

Unit-V: Correlation – Definition, Types of Correlation, Karl Pearson's Co-efficient of correlation, Rank Correlation Co-efficient – Linear Regression equations.

List of books for study / Reference

Gupta S.C. and V.K. Kapoor – Fundamentals of Mathematical Statistics, Sultan Chand and sons, New Delhi.

Learning outcomes:

Question Paper Pattern

Maximum Marks:75 Exam duration: Three Hours

Part A 10 x 2 = 20 Answer **All** Questions (Two questions from each unit)

Part B 5 x 5 = 25 Answer **All** Questions (Either or type-Two questions from each unit)

Part C 3 x10 = 30 Answer Any **Three** Questions (One question from each unit)

HOD

COE

Semester -II

Code : S2AS2

(For students admitted from 2018 onwards)

Allied - I - Paper - II Mathematical Statistics - II (For B.Sc., Mathematics Students)

Credits : 4

Medium of Instruction : English

Hours / Week: 4

Learning objectives:

Unit-I: Discrete Distributions – Binomial and Poisson Distributions – Constants and M.G.F. (Simple Problems).

Unit-II: Continuous Distributions – Normal, Exponential and Uniform Distributions – Constants and M.G.F.

Unit -III: Beta, Gamma – Definition, Mean and Variances. ‘t’, F and Chi-square distribution – (Definitions and Derivation of the distribution)

Unit-IV: Test of Significance for large Samples – Single mean, difference between mean, Single proportion and difference between proportion.

Unit-V: Test of Significance for Small Samples – ‘t’ test for Single mean, Difference between means, Paired ‘t’ test and Simple Correlation, Chi-square test for goodness of fit and independence of attributes.

List of books for study / Reference

Gupta S.C. and V.K. Kapoor – Fundamentals of Mathematical Statistics, Sultan Chand and sons, New Delhi.

Kapoor and Saxena – Mathematical Statistics, Chand & Co, New Delhi.

Question Paper Pattern

Maximum Marks:75 Exam duration: Three Hours

Part A 10 x 2 = 20 Answer **All** Questions (Two questions from each unit)

Part B 5 x 5 = 25 Answer **All** Questions (Either or type-Two questions from each unit)

Part C 3 x10 = 30 Answer Any **Three** Questions (One question from each unit)

HOD

COE

Semester –II

Code : S2ASP1

(For students admitted from 2018 onwards)

Allied-I Paper -III

Statistics Practical - I

(Based on S1AS1 and S2AS2)

(For B.Sc., Mathematics Students)

Credits : 4

Medium of Instruction : English

Hours / Week: 6

Arithmetic Mean, Median, Mode, Geometric Mean, Harmonic Mean and Quartiles.

M.D, S.D and Co-efficient of variation. Karl Pearson's and Bowley's Co-efficient of Skewness.

Karl Pearson's co-efficient of correlation, Spearman's rank correlation and Regression lines.

Fitting of Binomial and Poisson distributions. Fitting of Normal distribution

Test of significance based on Normal Distribution and Student's t – distribution for mean, proportions, and simple correlation. Chi-square test. Test of goodness of fit and test for independence of attributes.

Pattern of Practical

Practical Exam duration: Three Hours

Internal Marks: (Model Practical :25 + Observation :10 + Record Note: 5 = 40 Marks)

Practical Exam (Lab) : 4 X 15 = 60 Marks

HOD

COE

Semester -I

Code : S1ABA1

(For students admitted from 2018 onwards)

PAPER - I - STATISTICS FOR MANAGEMENT

(Allied for B.B.A., Degree Course)

Credits : 4

Medium of Instruction : English

Hours / Week: 6

Learning objectives: To introduce basic concepts of Statistics

Unit-I: Nature and scope of statistics: Uses of statistics in business; Statistical data – Primary and Secondary- Classification of data – frequency distribution – Histogram, frequency polygon and curve; Graphs and Diagrams, Pie diagram and Lorenz curve.

Unit-II: Measures of central tendencies – Arithmetic Mean, Median, Mode, Geometric Mean and Harmonic Mean –Uses of averages in Business; Measures of Dispersion – Range, Quartiles Deviation, Mean Deviation and Standard Deviation. Co-efficient of variation.

Unit-III: Simple Correlation – Karl Pearson’s and Spearman’s Rank Correlation; Regression lines. Index numbers - Cost of living index numbers.

Unit-IV: Elements of differential calculus: concept of Maxima and Minima, with simple applications. Matrices and its operations addition and subtraction

Unit-V: Multiplication of matrices, Transpose of Matrix; Elementary Operations, Inverse of matrix (simple problems).

Learning outcomes: To provide statistical techniques for business data analysis.

Text books and Reference

J.D.Gupta P.K.Gupta, Man Mohan (TMH) – Mathematics for business and Economics

Question Paper Pattern

Maximum Marks:75 Exam duration: Three Hours

Part A 10 x 2 = 20 Answer **All** Questions (Two questions from each unit)

Part B 5 x 5 = 25 Answer **All** Questions (Either or type-Two questions from each unit)

Part C 3 x10 = 30 Answer Any **Three** Questions (One question from each unit)

HOD

COE

Semester -II

Code : S2ACO3

(For students admitted from 2018 onwards)

PAPER - III - STATISTICAL METHODS

(Allied for B.Com., Degree Course)

Credits : 4

Medium of Instruction : English

Hours / Week: 5

Learning objectives: To introduce basic concepts of Statistics

Unit-I: Nature and scope of statistical methods in commerce. Collection, Classification and tabulation. Diagrams and Graphs. Measures of central tendencies - Arithmetic Mean, Median, Mode, Geometric Mean and Harmonic Mean.

Unit-II: Measures of Dispersion - Range, Quartiles, Deciles, Percentiles, Quartiles Deviation, Mean Deviation and Standard Deviation. Co-efficient of variation. Measurement of Skewness - Karl Pearson's & Bowley's methods.

Unit-III: Correlation- Simple Rank - Coefficient of concurrent deviation. Regression analysis - simple regression equations - X on Y and Y on X.

Unit-IV: Time series analysis-components- Fitting a straight line by the method of least square- Moving averages.

Unit-V: Index numbers - weighted and unweighted - Price index numbers - Laspeyre's, Paasche's and Fisher index numbers - Time and Factor Reversal test - Cost of living index numbers.

Learning outcomes: To provide statistical techniques for business data analysis.

Text books and Reference

Business statistics by **Prof. Navaneethan** - Anand publishers.

Statistics - Theory and practice by **RSN. Pillai and Bhagavathi**- S.Chand & co.

Statistical Methods BY **S.P.Gupta** - S.Chand & co.

Question Paper Pattern

Maximum Marks:75 Exam duration: Three Hours

Part A 10 x 2 = 20 Answer **All** Questions (Two questions from each unit)

Part B 5 x 5 = 25 Answer **All** Questions (Either or type-Two questions from each unit)

Part C 3 x10 = 30 Answer Any **Three** Questions (One question from each unit)

HOD

COE

PART IV - PAPERS

Semester	Course	Sub. Code	Title
I	VE	S1VE	Value Education
II	ES	S1ES	Environmental Studies
V	SS	S5SSD	Soft Skill Development
VI	GS	S6GS	Gender Studies

Skill Based Papers

Semester	Course	Sub. Code	Title
III	SB	S3SB1E	Food and Nutrition
IV	SB	S4SB2E	Herbs and Drug Action
V	SB	S5SB3F	Stress Management through Yoga

Semester -III

Code : S3SB1E

(For students admitted from 2018 onwards)

Skill Based Elective

FOOD AND NUTRITION

Credits : 2

Medium of Instruction : English

Hours / Week: 2

OBJECTIVES To learn the importance of food and nutrition. To know the chemical composition and importance of balanced diet. To learn the food adulterants and identification of them.

UNIT I : FOOD, NUTRITION AND HEALTH The meaning of food, nutrition, nutritional care and health-nutritional problems in India

UNIT II: BIOLOGICAL IMPORTANCE OF FOOD Nutritional classification of food-nutrients as body constituents-digestion and absorption of food. Types of food, caloric content and dieting

UNIT III: BASIC CHEMICAL CONSTITUENTS OF FOOD Biological functions of carbohydrates, proteins, fats, vitamins, minerals and water

UNIT IV: FOOD ADULTERATION TESTING Common adulterants in food-testing methods of all food adulterants (Ghee, Chilli powder, Oil, Milk, Turmeric powder)

UNIT V: HEALTH PROBLEMS OF FOOD ADULTERATION Principal adulterants and its effect on health.

REFERENCES

1. Alex Ramani V, Food Chemistry, MJP Publishers, Triplicane, Chennai, 2009
2. Thangamma Jacob, Food adulteration, Macmillan company of India limited, New Delhi, 1976
3. Jeyaraman J, Laboratory manual in biochemistry, Wiley Eastern limited, New Delhi, 1981 *

Question Paper Pattern

Maximum Marks:50 Exam duration: Three Hours

Part A 5 x 4 = 20 (one question from each unit- five out of seven)

Part B 3 x10 = 30 (one question from each unit- Three out of Five)

HOD

COE

Semester -IV

Code : S4SB2E

(For students admitted from 2018 onwards)

Skill Based Elective

HERBS AND DRUG ACTION

Credits : 2

Medium of Instruction : English

Hours / Week: 2

Unit I : Terminologies - Definitions - Classification of medicinal plants based on their effects with special reference to India.

Unit II : Allergens - types - sources - active principles - Chemical nature - Cell modifiers - Lectins - mutagens, teratogens - Allergic reactions with known examples.

Unit III : Drugs acting on brain and nervous system - Rheumatic arthritis - Psychoactive drugs - Depressants, Stimulants, hallucinogens - sources, effects, basic mechanism of action.

Unit IV : Cardiovascular diseases - blood pressure - cardiac drugs of plant origins - alkaloids, anticoagulants - basic mechanism of action. Pulmonary / respiratory disorders - asthma - bronchitis - common cold - allergy - Remedy from plants.

Unit V : Drugs for urinogenital disorders - roots of *Withania somnifera* - Memory stimulants - *Centella asiatica* - Drugs for dissolving kidney stones - *Musa paradisiaca* (pseudostem) - Antiinflammatory drugs - *Cardiospermum* - Anticancer drugs - *Catharanthus roseus*.

References

Kumar, N.C., An Introduction to Medical botany and Pharmacognosy. Emkay Publications, New Delhi. 1993 Rao, A.P. Herbs that heal. Diamond Pocket Books (P) Ltd., New Delhi, 1999

Question Paper Pattern

Maximum Marks:50 Exam duration: Three Hours

Part A 5 x 4 = 20 (one question from each unit- five out of seven)

Part B 3 x10 = 30 (one question from each unit- Three out of Five)

HOD

COE

Semester -V

Code : S5SB3F

(For students admitted from 2018 onwards)

Skill Based Elective

STRESS MANAGEMENT THROUGH YOGA

Credits : 2

Medium of Instruction : English

Hours / Week: 2

Unit I : Meaning and Definition of Stress. Types: Eutress, Distress, Anticipatory Anxiety, Intense Anxiety and Depression. Meaning of Management – Stress Management.

Unit II : Concept of Stress according to Yoga: Patanjali aphorism (PYS II - 3) Avidya Asmita. Bhagavad – Gita (Gita II 62-63) Dhayato Visayam Punsah Yoga Vasistha and Upanishad.

Unit III : Physiology of Stress on: Autonomic Nervous System (ANS), Endocrine System, Hypothalamus, Cerebral Cortex and Neurohumours.

Unit IV : Mechanism of Stress related diseases: Psychic, Psychosomatic, Somatic and Organic phase. Role of Meditation & Pranayama on stress – physiological aspect of Meditation. Constant stress & strain, anxiety, conflicts resulting in fatigue among Executive. Contribution of Yoga to solve the stress related problems of Executive.

Unit V : Meaning and definition of Health – various dimensions of health (Physical, Mental, Social and Spiritual) – Yoga and health – Yoga as therapy. Physical fitness. Stress control exercise – Sitting meditation, Walking meditation, Progressive muscular relaxation, Gentle stretches and Massage.

Reference: Andrews, Linda Wasmer., (2005). Stress Control for peace of Mind. London: Greenwich Editions Lalvani, Vimla., (1998). Yoga for stress. London: Hamlyn Nagendra, H.R., and Nagarathana, R., (2004). Yoga perspective in stress management. Bangalore: Swami Vivekananda Yoga Prakashana. Nagendra, H.R., and Nagarathana, R., (2004). Yoga practices for anxiety & depression. Bangalore: Swami Sukhabodhanandha Yoga Prakashana. Sukhabodhanandha, Swami., (2002). Stress Management. Bangalore: Prasanna trust. Udupa, K.N., (1996). Stress management by Yoga. NewDelhi: Motilal Banaridass Publishers Private Limited.

Question Paper Pattern

Maximum Marks:50 Exam duration: Three Hours

Part A 5 x 4 = 20 (one question from each unit- five out of seven)

Part B 3 x10 = 30 (one question from each unit- Three out of Five)

HOD

COE