



**GOVERNMENT ARTS COLLEGE (AUTONOMOUS),
KARUR – 639 005.**

(Reaccredited with A Grade status by NAAC)
(Affiliated to Bharathidasan University, Tiruchirappalli.)

DEPARTMENT OF STATISTICS

B.Sc., Statistics

➤ **Program Outcomes:**

- ❖ To develop students to learn about the basic concepts and analytical skills, problem solving skills about the statistics course
- ❖ Creating atmosphere to learn by self, by team and to get train in soft-skills and to know about the importance of social, environmental.
- ❖ Motivation given to identify themselves, to identify their talent, and to choose their carrier.

➤ **Program Specific Outcomes:**

- ❖ Self-regulation
- ❖ Creative Thinking
- ❖ Analytical thinking, Interpretation
- ❖ Problem-solving.
- ❖ Software skills
- ❖ Group Discussion
- ❖ Social Responsibility
- ❖ Knowledge

GOVERNMENT ARTS COLLEGE (AUTONOMOUS), KARUR – 639 005

B.STAT., STATISTICS COURSE STRUCTURE UNDER CBCS SYSTEM

(For the candidates admitted from the year 2016-2017 onwards)

SEMESTER	COURSE	SUBJECT TITLE	SUBJECT CODE	INSTR. HOURS WEEK	CREDIT	EXAM HOURS	MARKS		TOTAL
							INT	ESE	
I	Tamil - I	Tamil – I	U16L1T1	6	3	3	25	75	100
	English - I	English – I	U16L1E1	6	3	3	25	75	100
	Core Course - I	Descriptive Statistics	U16ST1C1	6	5	3	25	75	100
	Core Course - II	Core Practical – I	-	3	-	-	-	-	-
	First Allied Course – I	Mathematics for Statistics – I	U16ST1A1	5	3	3	25	75	100
	First Allied Course - II	Mathematics for Statistics – II	-	2	-	-	-	-	-
	Value Education	Value Education	U16VE1	2	2	3	25	75	100
				30	16				500
II	Tamil - II	Tamil – II	U16L2T2	6	3	3	25	75	100
	English – II	English – II	U16L2E2	6	3	3	25	75	100
	Core Course – II	Core Practical – I	U16ST2C2P	3	4	3	25	75	100
	Core Course – III	Probability and Random Variables	U16ST2C3	6	5	3	25	75	100
	First Allied Course – II	Mathematics for Statistics – II	U16ST2A2	2	4	3	25	75	100
	First Allied Course – III	Mathematics for Statistics – III	U16ST2A3	5	3	3	25	75	100
	Environmental Studies	Environmental Studies	U16ES2	2	2	3	25	75	100
				30	24				700
III	Tamil – III	Tamil – III	U16L3T3	6	3	3	25	75	100
	English – III	English – III	U16L3E3	6	3	3	25	75	100
	Core Course – IV	Theoretical Discrete Distribution	U16ST3C4	6	5	3	25	75	100
	Core Course – V	Core Practical – II		3	-	-	-	-	-
	Second Allied Course I	Operations Research - I	U16ST3A1	5	3	3	25	75	100
	Second Allied Course II	Allied Practical – I		2	-	-	-	-	-
	Non Core Elective I	Fuzzy Set Theory	U16MM3N3	2	2	3	25	75	100
				30	16				500
IV	Tamil – IV	Tamil – IV	U16L4T4	6	3	3	25	75	100
	English – IV	English – IV	U16L4E4	6	3	3	25	75	100
	Core Course – V	Core Practical - II	U16ST4C5P	2	4	3	25	75	100
	Core Course – VI	Theoretical Continuous Distribution	U16ST4C6	5	5	3	25	75	100
	Second Allied Course II	Allied Practical – I	U16ST4A2P	2	4	3	25	75	100
	Second Allied Course III	Operations Research - II	U16ST4A3	5	3	3	25	75	100
	Skill Based Elective I	Quantitative Aptitude - I	U16ST4S1	2	4	3	25	75	100
	Non Core Elective II	Discrete Mathematical Structure	U16MM4N4	2	2	3	25	75	100
			30	28				800	
V	Core Course – VII	Statistical Inference – I	U16ST5C7	5	5	3	25	75	100
	Core Course – VIII	Applied Statistics	U16ST5C8	5	4	3	25	75	100
	Core Course – IX	Sampling Techniques	U16ST5C9	4	3	3	25	75	100
	Core Course - X	Core Practical – III (Based on CC VIII & IX)	U16ST5C10P	6	4	3	25	75	100
	Core Elective - I	Statistical Quality Control	U16ST5E1	4	4	3	25	75	100
	Skill Based Elective II	Quantitative Aptitude - II	U16ST5S2	2	4	3	25	75	100
	Skill Based Elective III	Statistical Data Analysis – Lab	U16ST5S3P	2	4	3	25	75	100
	Soft Skill Development	Soft Skill Development	U16SSD3	2	2	3	25	75	100
			30	30				800	
VI	Core Course – XI	Statistical Inference – II	U16ST6C11	6	5	3	25	75	100
	Core Course – XII	Design of Experiment	U16ST6C12	6	5	3	25	75	100
	Core Course – XIII	Core Practical – IV (Based on CC XI & XII)	U16ST6C13P	6	5	3	25	75	100
	Core Elective - II	Vital Statistics	U16ST6E2	5	5	3	25	75	100
	Core Elective - III	Bio – Statistics	U16ST6E3	6	4	3	25	75	100
	Extension Activities	Extension Activities			1				
		Gender Education	U16EA4	1	1	3	25	75	100
			30	26				600	
TOTAL				180	140				3900

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BOARD OF STUDIES IN STATISTICS

CONTROLLER OF EXAMINATIONS

Sl. No.:

Subject Code:

U16ST1CI

GOVERNMENT ARTS COLLEGE (AUTONOMOUS) KARUR-05

B.STAT., STATISTICS - I SEMESTER – CORE COURSE - I

(For the candidates admitted from the year 2016-2017 onwards)

DESCRIPTIVE STATISTICS

OBJECTIVE:

To enable the students understand and apply descriptive measures in Statistics.

COURSE OUTCOMES

On the completion of this course the students will be able

- ❖ To know basic statistics and apply in real life
- ❖ To know how diagrammatic representation can reach common man
- ❖ To learn about measures of central tendency this describes about data
- ❖ To learn about measures of dispersion this describes about scatter of data
- ❖ To Analyse the Bivariate data in real life problems

UNIT - I

Statistics - Definition, Nature, Characteristics Limitations and Scope. Primary and Secondary data – Sources and collections. Formation of frequency distribution – Discrete and Continuous. Classification – Definition and Types - Tabulation – Definition, Types and Rules for constructions of tables.

UNIT – II

Diagrammatic representation of Data- Bar diagram- Simple, Multiple, Component and Percentage Bar Diagram- Pie diagram. Graphic representation of data – Histogram, frequency polygon, frequency curve and OGIVE.

UNIT – III

Measures of Central Tendency – Arithmetic Mean, Median, Mode, Geometric mean, Harmonic mean –Weighted A.M – properties of a good Average.

UNIT – IV

Measures of dispersion – Range, Quartile Deviation, Mean Deviation and Standard Deviation and their co-efficients. Mean deviation about Mean and Median. Skewness – definition and types. Measures of skewness – Karl Pearson's coefficient of skewness – Bowley's co-efficient of Skewness. Kurtosis - definition and measures. Moments –first four raw moments and Central moments – Relation between raw and central moments (formula and problems only).

UNIT – V

Correlation – definition and types of correlation – measures of correlation – Karl Pearson's co-efficient of correlation – Spearman's Rank correlation co-efficient - Correlation co-efficient for bivariate data. Regression—regression lines – regression equation- properties of regression co-efficient – problems.

Text Book:

1. **S.P.GUPTA.**, (2001). “**STATISTICAL METHODS**”, Sultan Chand & Sons, New Delhi.

Reference Books:

1. **GUPTA S.C.**, and **KAPOOR V.K.**, (2004). “**FUNDAMENTAL OF MATHEMATICAL STATISTICS**” (11th –edition), Sultan Chand & Sons, New Delhi.
2. **GOON GUPTA A.M** and **DAS GUPTA**, (1994). “**FUNDAMENTALS OF STATISTICS**”, the World Press Private Limited, Calcutta.

Sl. No.:

Subject Code:

GOVERNMENT ARTS COLLEGE (AUTONOMOUS) KARUR-05

B.STAT. STATISTICS - I SEMESTER – ALLIED COURSE - I

(For the candidates admitted from the year 2016-2017 onwards)

MATHEMATICS FOR STATISTICS – I (ALGEBRA AND CALCULUS)

OBJECTIVE:

To Explore the Fundamental Concepts of Mathematics.

COURSE OUTCOMES

On the completion of this course the students will be able

- ❖ To explore the basic concepts of Mathematics.
- ❖ To understand the basics of Matrix, Theory of Equation, differentiation, Differential Equation.
- ❖ To apply the basic Mathematics and problem solving methods.

UNIT – I

Theory of Equation: Relation between roots and coefficients -

Transformation of Equation - Diminishing , Increasing & Multiplying the roots by a constant – Forming equations with the given roots – Rolle’s theorem, Descartes rule of signs (statement only) - Simple problems.

UNIT - II

Singular matrices – Inverse of a non – Singular matrix using Adjoint method

- Rank of a matrix - Consistency – Characteristic equation – Eigen values , Eigen Vectors – Cayley Hamilton theorem (Proof not needed) - Simple applications only.

UNIT - III

Differentiation – Maxima & Minima - Concavity – Convexity – Points of

inflexion - Partial differentiation – Euler’s theorem - Total Differential coefficient (proof not needed) - Simple problems only.

UNIT - IV

Evaluation using integration by parts - Properties of definite integrals –

Fourier series in the range $(0, 2\pi)$ & $(-\pi, \pi)$ - odd & Even functions - Fourier Half Range Sine and Cosine series.

UNIT - V

Differential equations: Variables Separable - Linear Equations - Second order

of types $aD^2 + bD + cy = F(X)$ where a, b, c are constants and F(X) is one of the following types (i) e^{kx} (ii) $\sin kx$ (or) $\cos kx$ (iii) x^n , n being an integer (iv) $e^{kx} f(x)$

Text Book:

1. **T.K.MANICKAVASAGAM PILLAI** & Others, “**ALGEBRA – Volume I**”, S.V. Publications , 1985 Revised Edition (Units I, II)
2. **S.NARAYANAN, T.K.MANICKAVASAGAM PILLAI**, “**CALCULUS – Volume II**”, S.V. Publications , 2003 (Units III, IV, V)

Reference Book:

1. **M.L. KHANNA.**, “**DIFFERENTIAL CALCULUS**”, Jaiprakashnath and Co. Meerut – 2004.

Sl. No.:

Subject Code:

GOVERNMENT ARTS COLLEGE (AUTONOMOUS) KARUR-05

B.STAT. STATISTICS - II SEMESTER – CORE COURSE - II

(For the candidates admitted from the year 2016-2017 onwards)

CORE PRACTICAL - I

Practical I: (Based on core paper 1 and 2)

COURSE OUTCOMES

On the completion of this course the students will be able

- **To develop problem solving skills in Descriptive Statistics.**
- **To know how practically descriptive statistics are used, applied and solved in real life.**

Unit-I

Graphs and Diagrams -Calculation of Mean, Median, Mode, Geometric Mean and Harmonic Mean.

Unit-II

Calculation of Quartile Deviation and its co-efficients. Mean Deviation about Mean, Median and their co-efficients. Standard Deviation and Co-efficients of Variation. Calculation of skewness- Karl Pearson and Bowleys co-efficient of skewness.

Unit –III

Computation of Karl-Pearson co-efficient of correlation – Bivariate data - Spearman's Rank correlation - finding regression equation of X on Y and Y on X.

Unit- IV

Discrete and Continuous Probability Distribution - Finding of Mean and Variance.

Unit – V

Bivariate distribution - Discrete and Continuous Random Variable - Mathematical Expectation – Conditional Expectations- Calculation of Variance, Co - variance and Correlation Co - efficient.

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GOVERNMENT ARTS COLLEGE (AUTONOMOUS) KARUR-05

B.STAT. STATISTICS - II SEMESTER – CORE COURSE - III

(For the candidates admitted from the year 2016-2017 onwards)

PROBABILITY AND RANDOM VARIABLES

OBJECTIVE:

Enable the students to understand and study random phenomena mathematically.

COURSE OUTCOMES

On the completion of this course the students will be able

- ❖ To enable the students to understand and study random phenomena mathematically.
- ❖ To understand the concepts of probability, random variables and their applications in real life
- ❖ To understand the independence, dependence of happening of event, inverse probability with examples.
- ❖ To understand expectation on both discrete and continuous random variables
- ❖ To understand the applications of Moment Generating Functions, Characteristics Function, Uniqueness and Inversion theorems.

UNIT – I

Concepts of Random experiment – Trial – Sample point – Sample space, Event, Algebra of Events, Mutually Exclusive – Exhaustive events. Definition of probability, classical, statistical and Axiomatic approach – Properties of Probability, Theorems on Probability – Addition theorem on probability – Conditional probability – Multiplication theorem – Baye's theorem – simple problems.

UNIT – II

Concept of Random Variables – Discrete random variable, continuous random variables, probability mass function – Probability density function. Distribution function – Properties of distribution function-simple problems.

UNIT – III

Bivariate distribution – Distribution functions of bivariate random variable and its properties – probability mass and density function, marginal and conditional distributions – Independence of random variable -Conditional expectation – covariance and correlation- simple problems.

UNIT – IV

Mathematical expectation of random variables- discrete and continuous - Properties of mathematical expectation - moments – Raw moments, central moments. Mean, Median, Standard Deviation and Variance of random variable.- simple problems.

UNIT – V

Moment Generating Function of a random variable – their properties and its uses – cumulants – Characteristic functions – Properties of characteristic function – simple examples – Inversion theorem and Uniqueness theorem –statement only.

Text Book:

1. **S.C.GUPTA** and **V.K. KAPOOR** (2007). “**FUNDAMENTALS OF MATHEMATICAL STATISTICS**”, Sultan Chand and Sons Publications, New Delhi.

Reference Books:

1. **J. N. KAPUR** and **H. C. SAXENA** (1989). “**MATHEMATICAL STATISTICS**” – S. Chand and Company Ltd., New Delhi.
2. **MAREK. FISZ**, (1961). “**PROBABILITY THEORY AND MATHEMATICAL STATISTICS**”, John Wiley and Sons.

Sl. No.:

Subject Code:

GOVERNMENT ARTS COLLEGE (AUTONOMOUS) KARUR-05

B.STAT. STATISTICS - II SEMESTER – ALLIED COURSE - II

(For the candidates admitted from the year 2016-2017 onwards)

MATHEMATICS FOR STATISTICS – II (NUMERICAL METHOD)

OBJECTIVE

To enable the students to establish mathematical functions using numerical data and to estimate functional relationship, interpolate and extrapolate the value of dependent variable.

COURSE OUTCOMES

On the completion of this course the students will be able

- ❖ To enable the students to establish mathematical functions using numerical data and to estimate functional relationship, interpolate and extrapolate the value of dependent variable.
- ❖ To learn the uses and application of interpolation
- ❖ To learn the usage of numerical differentiation and integration.
- ❖ To learn the importance of Numerical Solutions of ODE

UNIT – I

Solution of Algebraic and Transcendental Equations: Bisection method – Regular false method – Newton Raphson Method – Iteration Method – Simple Problems.

(Ch 3: § 3.1 - 3.4)

UNIT – II

Solution of Simultaneous linear Algebraic Equations : Gauss - Elimination Method – Gauss - Jordan Method – Gauss - Jacobi method – Gauss - Seidal Method .

(Ch 4: § 4.1 - 4.4, 4.8, 4.9)

UNIT – III

Interpolations: linear interpolation – Gregory – Newton forward and backward interpolation formula – Lagrange interpolation formula(for unequal intervals).

(Ch 6: § 6.1 - 6.3 & Ch 8: § 8.1 -8.7)

UNIT – IV

Numerical differentiation and Integration: Newton's formula to compute derivative – Numerical Integration – A General Quadrature formula – Trapezoidal Rule - Simpson's 1/3 Rule – Simpson's 3/8 rule.

(Ch 9: § 9.1 to 9.3, 9.7 - 9.9, 9.13, 9.14)

UNIT – V

Numerical Solutions of ODE – Taylor's series Method – Euler Method – Second order and fourth order Runge – kutta Methods - Predictor and corrector methods – Milne's predictor – corrector formula.

(Ch 11: § 11.6, 11.7, 11.9, 11.12 - 11.17)

Text Book:

1. **P.K.KANDASAMY, K.THILAGAVATHI & K.GUNAVATHI, “NUMERICAL METHODS”** S. Chand & Co Ltd., II Revised Edition 2003.

Reference Books:

1. **S.S.SARSTRY, “INTRODUCTORY METHODS OF NUMERICAL ANALYSIS”** Prentice Hall of India Pvt. Ltd, New Delhi, Third Edition, 2002.

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GOVERNMENT ARTS COLLEGE (AUTONOMOUS) KARUR-05

B.STAT. STATISTICS - II SEMESTER – FIRST ALLIED COURSE - II

(For the candidates admitted from 2016-2017 onwards)

MATHEMATICS FOR STATISTICS – III (SERIES, ALGEBRA AND MATHEMATICS OF FINANCE)

OBJECTIVE:

To enable the students gain knowledge about sequences, series and Mathematical Finance.

COURSE OUTCOMES

On the completion of this course the students will be able

- ❖ To facilitate the students to gain knowledge about sequences, series and Mathematical Finance
- ❖ To know the norm and application different interest rate and this will be useful in their real life and for their jobs in finance sector.
- ❖ To know about the usage of depreciation and discounts and this will shape them for their carrier in finance sector.

UNIT – I

Series: Sequence and Series - types of Series – Arithmetic Progression – Formula for the sum of the first n terms of an A.P – Formula for the Sum of Natural Numbers – Arithmetic means – Geometric Progression - Formula for the sum of the first n terms of an G.P – Geometric Means – Harmonic Progression – Harmonic Means.

UNIT – II

Algebra: Binomial, Exponential and Logarithmic series (Formulae only)-
Summation and approximation related problems.

UNIT – III

Mathematics of Finance: Basic Concepts – Simple Interest and Compound Interest– Effective rate and Normal Rate of Interest. (Formulas and Problems)

UNIT – IV

Annuities: Depreciation – Annuities - Present Value of an Immediate Annuity – Present Value of an Annuity Due – Amount of an Immediate Annuity – Amount of an Annuity Due – Sinking Fund – Amortisation Table. (Formulas and Problems)

UNIT – V

Discounting: Bill of Exchange – Due Date or Date of Maturity – Legally Due Date – Discount Period – Face Value – True Discount – Banker’s Discount – Cash Value or Exchange Value – Banker’s Gain – Actual Rate of Interest of a Banker – Equated Due Date. (Formulas and Problems)

Text Book:

1. **PA.NAVNITHAM**, “**BUSINESS MATHEMATICS AND STATISTICS**”, Jai Publishers, Trichy. Apr. 2012. (Unit –I, III, IV, V)
2. **P. KANDASAMY, K. THILAGAVATHY**, “**ALLIED MATHEMATICS**” Volume – 1, S. Chand & Company LTD, New Delhi. (2010) – (Unit – II)

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GOVERNMENT ARTS COLLEGE (AUTONOMOUS) KARUR-05

B.STAT. STATISTICS - III SEMESTER – CORE COURSE - IV

(For the candidates admitted from the year 2016-2017 onwards)

THEORETICAL DISCRETE DISTRIBUTION

OBJECTIVE:

To introduce the different Discrete Distributions and their Applications.

COURSE OUTCOMES

On the completion of this course the students will be able

- ❖ To introduce the different discrete distributions and their applications.
- ❖ To impart essential knowledge in discrete distributions
- ❖ To expose the real-life applications of discrete distribution

Unit – I

Discrete distribution – Bernoulli distribution – Binomial Distribution – Moments, Recurrence relation, factorial moments, Mean Deviation about mean, mode, MGF, Additive property, characteristic function and cumulants – numerical problems.

Unit – II

Poisson distribution – Constants and their properties – MGF – Recurrence relation – limiting case of Poisson distribution – Numerical Problems.

Unit – III

Negative Binomial Distribution – Constants – Poisson distribution as a limiting case of the negative binomial distribution – recurrence relation.

Unit –IV

Geometric distribution – Lack of memory property – moments –MGF – Discrete Uniform distribution and their properties, Multinomial distribution. (Definition Only)

Unit – V

Hyper Geometric distribution: Mean and Variance – Factorial moments – approximation to binomial distribution- recurrence relation – power series (definition only).

Text Book:

1. **GUPTA S.C.** and **KAPOOR V.K.** (2001), “**FUNDAMENTALS OF MATHEMATICAL STATISTICS**”. (Chapters: 4, 5.1, 5.2, 5.3, 5.5, 6.1 to 6.12, 7.1 to 7.8)

Reference Books:

- 1 **J.N.KAPUR** and **H.C.SAXENA** (1989). “**MATHEMATICAL STATISTICS**” – S.Chand and Company Ltd., New Delhi.
- 2 **MAREK. FISZ**, (1961). “**PROBABILITY THEORY AND MATHEMATICAL STATISTICS**”, John Wiley and Sons.

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GOVERNMENT ARTS COLLEGE (AUTONOMOUS) KARUR-05
B.STAT. STATISTICS - III SEMESTER – SECOND ALLIED COURSE - I
(For the candidates admitted from the year 2016-2017 onwards)

OPERATIONS RESEARCH – I
(LINEAR PROGRAMMING AND ITS APPLICATIONS)

OBJECTIVE:

To enable the students gain knowledge about various optimization techniques.

COURSE OUTCOMES

On the completion of this course the students will be able

- ❖ To enable the students gain knowledge about various optimization techniques
- ❖ To learn to construct a real life problem to Linear Programming Problem.
- ❖ To learn to solve the LPP by various techniques.
- ❖ To know how larger constraints are solved by dual way that is useful in economic point of view.
- ❖ To understand various methods of transportation problem that helps the company or industry to minimize the cost of transportation.
- ❖ To understand how a job or work can be assigned to various people so as to reduce the cost in the companies or industries.

Unit – I

Introduction – Origin – Nature of OR – Structure – Characteristics – OR in Decision making – Models in OR – Phase of 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

Duality in LPP – Formulation of Dual LPP – Primal – Dual relationship – Solving LPP using Dual concepts – Dual Simplex Method.

Unit – IV

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 – V

Assignment problem – Introduction – Balanced – Unbalanced – Maximization – Minimization – Hungarien Method.

Text Books:

1. **KANTI SWARUP, P.K.GUPTA, and MANMOHN** (1980) – “**OPERATIONS RESEARCH**”, Sultan Chand and sons, New Delhi.

Reference Books:

1. **J. K. SHARMA** (1997), “**OPERATIONS RESEARCH**” and Application, Mc.Millan and Company, New Delhi.
2. **NITA H. SHAH, RAVI M. GOR and HARDIK SONI** (2010) -“**OPERATIONS RESEARCH**”, PHI Learning Private Limited, New Delhi.

Sl. No.:

Subject Code:

GOVERNMENT ARTS COLLEGE (AUTONOMOUS) KARUR-05

B.Sc., - III SEMESTER – NON CORE ELECTIVE – I (FOR STATISTICS MAJOR)

(For the candidates admitted from 2016-2017 onwards)

FUZZY SET THEORY

Course Outcomes

On successful completion of the course, the students will be able to

- ❖ Understand basic knowledge of fuzzy sets and fuzzy logic
- ❖ Apply basic fuzzy inference and approximate reasoning
- ❖ Apply basic fuzzy system modelling methods

UNIT 1: FROM CLASSICAL (CRISP) SETS TO FUZZY SETS: Introduction – Crisp sets: An overview – Fuzzy sets: Basic Types. (Ch. 1: § 1.1 – 1.3)

UNIT 2: FUZZY SETS: Basic concepts – Characteristics and significance of the paradigm shift – Additional properties of α -cuts. (Ch. 1: § 1.4, 1.5 & Ch. 2: § 2.1)

UNIT 3: FUZZY SETS VERSUS CRISP SETS: Representations of Fuzzy sets – Extension principle for Fuzzy sets – Types of operations. (Ch. 2: §2.2, 2.3 & Ch. 3: § 3.1)

UNIT 4: OPERATIONS ON FUZZY SETS: Fuzzy complements – Fuzzy Intersections: t-norms- Fuzzy unions; t- conorms. (Ch. 3: §3.2 – 3.4)

UNIT 5: Combinations of operations – Aggregation operations. (Ch. 3: §3.5, 3.6)

TEXT BOOK:

George J. Klir / Bo Yuan, “**Fuzzy Sets and Fuzzy Logic Theory and Application**”, Prentice Hall of India Private Ltd., New Delhi, 2008.

REFERENCE BOOK:

S. Nanda, & N.R. Das, “**Fuzzy Mathematical Concepts**”, Narosa Publishing House, New Delhi.

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Subject Code:

GOVERNMENT ARTS COLLEGE (AUTONOMOUS) KARUR-05

B.STAT. STATISTICS - IV SEMESTER – CORE COURSE - V

(For the candidates admitted from the year 2016-2017 onwards)

CORE PRACTICAL – II
(Based on Core Papers III & IV)

COURSE OUTCOMES

On the completion of this course the students will be able

- To develop problem solving skills in Discrete and continuous distribution.
- To know how practically Discrete and continuous distribution are used, applied and solved in real life.

List of Problems:

1. DISCRETE DISTRIBUTIONS

- i. Poisson distribution.
- ii. Binomial Distribution.
- iii. Negative Binomial Distribution.
- iv. Uniform distribution.
- v. Geometric distribution.
- vi. Hyper Geometric distribution.

2. CONTINUOUS DISTRIBUTION

- i. Rectangular Distribution.
- ii. Normal Distribution.
- iii. Gamma Distribution.
- iv. Exponential Distribution.
- v. Beta Distribution – First Kind and Second.

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GOVERNMENT ARTS COLLEGE (AUTONOMOUS) KARUR-05**B.STAT. STATISTICS - IV SEMESTER – CORE COURSE - VI**

(For the candidates admitted from the year 2016-2017 onwards)

THEORETICAL CONTINUOUS DISTRIBUTION**OBJECTIVE:**

To introduce the different Continuous Distributions and their Applications.

COURSE OUTCOMES

On the completion of this course the students will be able

- ❖ To introduce the different Continuous Distributions and their Applications.
- ❖ To impart essential knowledge in continuous distributions
- ❖ To expose the real-life applications of continuous distribution

Unit – I**Rectangular Distribution** – Moments – MGF – Characteristic Function – Mean Deviation about Mean.**Unit – II****Normal Distribution** – Characteristics of Normal Distribution – Mode, Median – Moment Generating Function – Cumulative Generating Function - Moments**Unit – III**

Additive Property of Normal Distribution – Mean Deviation about Mean – importance of Normal Distribution – Simple problems.

Unit – IV**Gamma Distribution** – M.G.F. – C.G.f – Additive Property of Gamma Distribution – **Beta Distribution – First Kind and Second Kind** – Constants of Beta Distribution.**Unit –V****Exponential Distribution** – M.G.F – Memory Less Property of **Exponential Distribution** – **Weibull Distribution** – Moments – Characterisation – **Cauchy Distribution** – Characteristic Function- moments of Cauchy Distribution.**Text Book:**

1. **GUPTA S.C** and **KAPOOR V.K** (2001), “**FUNDAMENTALS OF MATHEMATICAL STATISTICS**”.

Reference Books:

1. **J. N. KAPUR** and **H .C. SAXENA** (1989). “**MATHEMATICAL STATISTICS**” – S. Chand and Company Ltd., New Delhi.
2. **MAREK. FISZ**, (1961). “**PROBABILITY THEORY AND MATHEMATICAL STATISTICS**”, John Wiley and Sons.

Sl. No.:

Subject Code:

U16ST4A2P

GOVERNMENT ARTS COLLEGE (AUTONOMOUS) KARUR-05

B.STAT. STATISTICS - IV SEMESTER – SECOND ALLIED COURSE - II

(For the candidates admitted from 2016-2017 onwards)

ALLIED PRACTICAL – I
(Based on Second Allied Papers I & III)

COURSE OUTCOMES

On the completion of this course the students will be able

- **To develop problem solving skills in Operations Research.**
- **To know how practically Operations Research are used, applied and solved in real life.**

LIST OF PROBLEMS:

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

CHAIRMAN

COE

Sl. No.:

Subject Code:

U16ST4A3

GOVERNMENT ARTS COLLEGE (AUTONOMOUS) KARUR-05

B.STAT. STATISTICS - IV SEMESTER – SECOND ALLIED COURSE - III

(For the candidates admitted from the year 2016-2017 onwards)

OPERATIONS RESEARCH – II

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.

COURSE OUTCOMES

On the completion of this course the students will be able

- ❖ 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.
- ❖ To study how various game theory techniques can be applied in business situations
- ❖ To understand how a decision can be made in business situations
- ❖ To understand the concept of Queue and their mechanism.
- ❖ To study about waiting time and waiting persons in real life queue.
- ❖ To understand probable ways of completing a project.

Unit – I

Introduction – definition – pay-off – types of games – the maximin – minimax principles Saddle Point – Game with Saddle Point – without saddle point – mixed strategies - 2 x 2 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 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): (/FIFO)} and Model II: {(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:

1. **KANTI SWARUP, P.K.GUPTA,** and **MANMOHN** (1980) – “**OPERATIONS RESEARCH**”, Sultan Chand and sons, New Delhi.

Reference Books:

1. **J. K.SHARMA** (1997), “**OPERATIONS RESEARCH AND APPLICATION**”, Mc.Millan and Company, New Delhi.
2. **NITA H.SHAH,RAVI M. GOR,** and **HARDIKSONI** (2010) - “**OPERATIONS RESEARCH**”, PHI Learning Private Limited, New Delhi.

CHAIRMAN

COE

Sl. No.:

Subject Code:

GOVERNMENT ARTS COLLEGE (AUTONOMOUS) KARUR-05

B.STAT. STATISTICS - IV SEMESTER – SKILL BASED ELECTIVE - I

(For the candidates admitted from the year 2016-2017 onwards)

QUANTITATIVE APTITUDE - I

OBJECTIVE:

To concentrate on basic concepts of arithmetic and to equip the students with the skills required to succeed in any competitive examination.

COURSE OUTCOME

On the completion of this course the students will be able to concentrate on the basic concepts of arithmetic and to equip the students with the skills required to succeed in any competitive examination

Unit – I

Numbers – HCF – LCM – Problems on numbers – Formulae – Simple Problems.
(Chapters 1, 2 & 7)

Unit – II

Decimal Fractions and Simplification – Formulae – Simple Problems.
(Chapter 3 & 4)

Unit – III

Surds and Indices – Percentage – Formulae – Simple Problems.
(Chapters 9, 10 & 11)

Unit – IV

Ratio and Proportion – Formulae – Simple Problems.
(Chapters 12, 13 & 20)

Unit – V

Average – Problems on Age – Formulae – Simple Problems.
(Chapters 6 & 8)

Text Book:

1. Scope and treatment as in “**QUANTITATIVE APTITUDE**” by **R.S.AGGARWAL**, S.Chand & Company Ltd., Ram Nagar, New Delhi (2007).

Reference Book:

1. “**QUANTITATIVE APTITUDE**” for Competitive Examinations by **ABHIJIT GUHA**, Tata McGraw – Hill Publishing Company Ltd., New Delhi (2008).

CHAIRMAN

COE

Sl. No.:

Subject Code:

U16MM4N4

GOVERNMENT ARTS COLLEGE (AUTONOMOUS) KARUR-05

B. Sc., – IV SEMESTER – NON CORE ELECTIVE – II (FOR STATISTICS MAJOR)

(For the candidates admitted from the year 2016-2017 onwards)

DISCRETE MATHEMATICAL STRUCTURE

COURSE OUTCOMES

On the completion of this course the students will be able to

- ❖ Able to manipulate basic mathematical object such as sets, functions and relations will also be able to verify simple mathematical properties.
- ❖ Able to skill full in expressing mathematical properties formally via the formal language of propositional logic.
- ❖ Able to described computer programs in a formal mathematical manner.
- ❖ To understanding the relations like homomorphism, endomorphism and epimorphism.

UNIT 1: Propositional Logic: Statements and Notation, Truth Tables Negation – Conjunction – Disjunction and Other Connectives. (Ch 1: § 1.1, 1.2)

UNIT 2: Propositional Logic: Tautologies – Normal Forms – Disjunctive Normal Forms – Conjunctive Normal Forms – Pcnf and Pdnf. (Ch 1: §1.2.8,1.5)

UNIT 3: Semi Groups and Monoids: Definition and Examples – Homomorphism of semi groups – Sub Semi groups and Semimonoids. (Ch 3: §3.2, 3.2.1, 3.2.2, 3.2.3)

UNIT 4: Lattices: Partially Ordered Sets – Some Properties of Lattices – Lattices as Algebraic Systems. (Ch 4: § 4.1, 4.1.2, 4.1.3)

UNIT 5: Lattice Homomorphism: Homomorphism of Lattices – Some Special Lattices – Complete, Complemented and Distributive Lattices. . (Ch 4: § 4.1.4, 4.1.5)

TEXT BOOK:

1. J. P. Trembley and R. Manohar, “Discrete Mathematical Structures with Application to Computer Science”, Tata McGraw Hill Publishing Company Ltd., 2010.

REFERENCE BOOKS:

1. J. L. Gersting, “Mathematical Structures for a Computer Science”, 3rd Edition, Computer Science press, New York.
2. G. Liu, “Elements of Discrete Mathematics”, McGraw Hill Book Co, 1985.

CHAIRMAN
BOARD OF STUDIES

COE

Sl. No.:

Subject Code:

U16ST5C7

GOVERNMENT ARTS COLLEGE (AUTONOMOUS) KARUR-05

B.STAT. STATISTICS - V SEMESTER – CORE COURSE - VII

(For the candidates admitted from the year 2016-2017 onwards)

STATISTICAL INFERENCE – I

OBJECTIVE:

To enable the students to understand and apply various estimation procedures.

COURSE OUTCOMES

On the completion of this course the students will be able to

- ❖ To enable the students to understand and apply various estimation procedures.
- ❖ To understand the estimator and how an estimator is good estimator
- ❖ To know the importance of cramer- rao inequality and factorization theorem
- ❖ To understand the various methods of estimation
- ❖ To understand the concept of interval estimation
- ❖ To understand how interval estimation can be applied in mean and proportion population

Unit – I

Statistical Inference – Characteristics of estimators – unbiasedness, consistency and efficiency – invariance property of consistent estimators – sufficient conditions for consistency – efficiency of estimators – most efficient estimators of minimum variance unbiased estimators – Simple Problems.

Unit –II

Sufficiency – factorization theorem (Neymann – With Proof) – Cramer-Rao inequality condition for the equality sign in Cramer-Rao inequality (With proof)
– Simple Problems.

Unit –III

Minimum Variance Unbiased (MVU) and Blackwellisation – Rao-Blackwell theorem – Methods of estimation – method of maximum likelihood estimation – properties – Simple Problems.

Unit – IV

Method of minimum variance – method of moments – method of least square – confidence interval and confidence limits – Simple Problems.

Unit – V

Interval estimation – confidence interval for single proportion – difference between proportions – single mean – difference of means - Simple Problems.

Text Book:

1. **V.K.KAPOOR** and **S.C.GUPTA**, “**FUNDAMENTALS OF MATHEMATICAL STATISTICS**”, Sulthan Chand and Sons, New Delhi. Reprint 2010.

Reference Book:

1. **MOOD A. M., GRAYBILL F.A., and BOES, D.C.** (1974): “**INTRODUCTION TO THE THEORY OF STATISTICS**”, Mc Graw Hill.
2. **HOGG R.V. and CRAIG, A.T.** (1972): “**INTRODUCTION TO MATHEMATICAL STATISTICS**”, 3rd edition, Academic Press, USA.
3. **GOON, A.M. GUPTA, M.K., and DAS GUPTA, B.** (1980): “**AN OUTLINE OF STATISTICAL THEORY**”, Vol.I, 6th revised ed. World Press Limited, Calcutta.
4. **ROHATGI, V.K.** (1984): “**AN INTRODUCTION TO PROBABILITY THEORY AND MATHEMATICAL STATISTICS**”, Wiley Eastern.

Sl. No.:

Subject Code:

U16ST5C8

GOVERNMENT ARTS COLLEGE (AUTONOMOUS) KARUR-05

B.STAT. STATISTICS - V SEMESTER – CORE COURSE - VIII

(For the candidates admitted from the year 2016-2017 onwards)

APPLIED STATISTICS (TIME SERIES AND INDEX NUMBERS)

OBJECTIVE:

This course introduces the basic Statistical tools in time related Variables, economic variables. To enable the students understand index numbers and other Statistical tools applied to demographic and chronological data.

COURSE OUTCOMES

On the completion of this course the students will be able

- ❖ To know the basic Statistical tools in time related variables, economic variables.
- ❖ To enable the students understand index numbers and other Statistical tools applied to demographic and chronological data.

Unit – I Time Series: Definition- Components of time series – uses of time series – mathematical models– Measurement of Trend: Graphical Method, Semi-Average Method – Method of Moving Average and Method of Least Square. (Straight line, Second Degree Parabola and Exponential Curve) – Simple Problems.

Unit – II

Seasonal Variation – Measurement of Seasonal Variations – Method of Simple Averages, Ratio-to-Trend Method, Ratio-to-Moving Average Method and Link Relative Method - Simple Problems. Concepts of Cyclical Variations and Random Variations.

Unit – III

Index Numbers: Meaning and definition – uses and limitations of Index Numbers – Basic problems involved in the constructions of Index Number – Construction of Index Numbers – Unweighted Index Number – simple aggregative and simple average price relative method – problems.

Unit – IV

Weighted Index Numbers – Types – Laspeyre, Paasches, Drobish Bowley, Marshal Edgeworth, Walsch, Kellys and Irving Fisher Index Numbers – Chain Base Index Number and Fixed Base Index Numbers – problems.

Unit – V

The criteria of a good Index Number: Unit test, Factor Reversal Test, Time Reversal Test and Circular Test – Cost of living Index Numbers (CLI)- Construction of CLI – Aggregate Expenditure and Family Budget Methods – Uses of CLI – Problems.

Text Book:

1. **V. K. KAPOOR** and **S. C. GUPTA**, “**FUNDAMENTALS OF APPLIED STATISTICS**”, Sulthan Chand and Sons, New Delhi. Reprint 2013.

Reference Books:

1. **GUPTA S.P.** (1999): “**STATISTICAL METHODS**”, Sultan & Sons, New Delhi.
2. **CROXTON F.E.** & **COWDON D.J.** (1973): “**APPLIED GENERAL STATISTICS**”, Prentice Hall.

CHAIRMAN

COE

Sl. No.:

Subject Code:

U16ST5C9

GOVERNMENT ARTS COLLEGE (AUTONOMOUS) KARUR-05

B.STAT. STATISTICS - V SEMESTER – CORE COURSE - IX

(For the candidates admitted from the year 2016-2017 onwards)

SAMPLING TECHNIQUES

OBJECTIVE:

To enable the students to understand and apply the sampling procedures to different situations.

COURSE OUTCOMES

On the completion of this course the students will be able

- ❖ To enable the students to understand and apply the sampling procedures to different situations.
- ❖ To equip the students with sampling techniques used in conducting sample surveys.
- ❖ To compare the efficiency of various estimation strategies resulting from different sampling techniques.

Unit – I

Concept of sampling and population - parameters and statistics - sampling distributions - principal steps in a sample survey - sampling and non sampling errors - uses and limitations.

Unit – II

Simple random sampling - Notations and terminology - SRS with and without replacement - unbiased estimate of mean and variance - merits and demerits of SRS.

Unit – III

Stratified random sampling - Notations and terminology - unbiased estimate of population mean and its variance - allocation of sample size - proportional and optimum allocation - cost function - relative precision of stratified random sampling and simple random sampling.

Unity – IV

Systematic sampling - Notations and terminology - unbiased estimate of mean and variance – comparison of SRS, stratified random sampling and systematic sampling – Merits and Demerits of systematic samplings.

Unit – V

Concepts of Multistage Sampling – cluster sampling – Quota Sampling – Problems related to simple random sampling – systematic and stratified random sampling.

Text Book:

1. **S.C.GUPTA** and **V. K. KAPOOR** (2004), “**FUNDAMENTALS OF APPLIED STATISTICS**”, Sultan chand & Sons, New Delhi.

Reference Books:

1. **W.G. COCHRAN** (1985): “**SAMPLING TECHNIQUES**”, Wiley Eastern Ltd, New delhi.
2. **PARIMAL MUKHOPADHYAY** (2012). “**THEORY AND METHOD OF SURVEY SAMPLING**”, 4th edition (EEE) PHI learning private limited, New Delhi.

CHAIRMAN

COE

Sl. No.:

Subject Code:

U16ST5C10P

GOVERNMENT ARTS COLLEGE (AUTONOMOUS) KARUR-05

B.STAT. STATISTICS - V SEMESTER – CORE COURSE - X

(For the candidates admitted from the year 2016-2017 onwards)

CORE PRACTICAL - III
(Based on Core Papers VIII and XI)

COURSE OUTCOMES

On the completion of this course the students will be able

- To develop problem solving skills in Business Statistics and Sampling techniques.
- To know how practically Business Statistics and Sampling techniques are used, applied and solved in real life.

Unit – I

Time Series: Measurement of Trend: Semi-Average Method – Method of Moving Average and Method of Least Square. (Straight line, Second Degree Parabola and Exponential Curve).

Unit – II

Seasonal Variation – Measurement of Seasonal Variations – Method of Simple Averages, Ratio-to-Trend Method, Ratio-to-Moving Average Method and Link Relative Method.

Unit – III

Index Numbers: Weighted Index Numbers – Types – Laspeyre, Paasches, Drobish Bowley, Marshal Edgeworth, Walsch, Kellys and Irving Fisher Index Numbers – Chain Bases Index Number – Factor Reversal Test, Time Reversal Test – Cost of living Index Numbers (CLI)- Construction of CLI – Aggregate Expenditure and Family Budget Methods.

Unit – IV

Simple Random Sampling (SRS)

Unit – V

Stratified Random Sampling and Systematic Sampling – Proportional and Optimum Allocation.

CHAIRMAN

COE

Sl. No.:

Subject Code:

U16ST5E1

GOVERNMENT ARTS COLLEGE (AUTONOMOUS) KARUR-05

B.STAT. STATISTICS - V SEMESTER – ELECTIVE COURSE - I

(For the candidates admitted from the year 2016-2017 onwards)

STATISTICAL QUALITY CONTROL

OBJECTIVE:

To enable the students to know the concepts of process control and product control.

COURSE OUTCOMES

On the completion of this course the students will be able to

- ❖ To enable the students to know the concepts of process control and product control.
- ❖ To know the usage of statistical quality control in industries.
- ❖ To enable the students to know the concepts of process control and product control
- ❖ To interpret the quality control using various charts
- ❖ To know various sampling Inspection plans for quality control
- ❖ To understand producer risk, consumer risk on defective items.

Unit –I

Statistical Quality Control (SQC) – definition – classification – basis of SQC – Chance and Assignable Causes – Benefits of SQC – Process and Product Control – Control Charts - 3 control limits – tools for SQC.

Unit – II

Control Charts for Variables – steps for \bar{X} and R Charts - control limits for charts and R charts – criterion for detecting lack of control in charts \bar{X} and R charts. Interpretation of \bar{X} charts and R charts. Control charts for standard deviation. Problems.

Unit –III

Control charts for attributes – types – p chart and d chart – definition, mean and variance. Three methods of p and d charts for variable sample size. Interpretation of p chart.

Unit – IV

Control charts for number of defectives per unit (c – chart) – definition –limits, mean and variance, c chart for variable sample size or u – chart – application of c – chart – Natural Tolerance Limits and specification limits – interpretation – modified control limits – acceptance sampling by attributes. Concepts of AQL, LTPD, Process Average Fraction Defective (p), consumer's risk, producer's risk and AOQL.

Unit – V

O.C. curve, ASN – definition, Sampling Inspection Plan for Attributes – Single Sampling Plan, determination of n and c . Concepts of Double Sampling Plan - procedures and flow chart. Single Sampling Plan VS Double Sampling Plan.

Text Book:

1. **V.K.KAPOOR** and **S.C.GUPTA**, “**FUNDAMENTALS OF APPLIED STATISTICS**”, Sulthan Chand and Sons, New Delhi. Reprint 2013.

Reference Books:

1. **M.MAHAJAN** (2001), “**STATISTICAL QUALITY CONTROL**”, Dhanpat Rai & co (p) Ltd., Delhi.
2. **EUGENE L. GRANT** and **RICHARD S. LEAVENWORTH**, “**STATISTICAL QUALITY CONTROL**”, Tata McGraw Hill Education Private Limited, New Delhi.
3. **DOUGLAS C. MONTGOMERY**: “**STATISTICAL QUALITY CONTROL: A MODERN INTRODUCTION**” (Sixth Edition), John Wiley & Sons, New Delhi.

Sl. No.:

Subject Code:

U16ST5S2

GOVERNMENT ARTS COLLEGE (AUTONOMOUS) KARUR-05

B.STAT., STATISTICS - V SEMESTER – SKILL BASED ELECTIVE - II

(For the candidates admitted from the year 2016-2017 onwards)

QUANTITATIVE APTITUDE – II

OBJECTIVE:

To enable the students to learn various techniques for quantitative decision making. On successful completion of this course the students will have the ability to handle financial data more scientifically.

COURSE OUTCOMES

On the completion of this course the students will be able

- ❖ To enable the students to learn various techniques for quantitative decision making.
- ❖ To handle financial data more scientifically.

Unit – I

Profit and Loss – Formulae and Simple problems.

(Chapters 11)

Unit – II

Chain Rule – Time – Work and Wages – Formulae and Simple Problems.

(Chapters 14, 15)

Unit – III

Time and Distance – Trains – Formulae and Simple Problems.

(Chapters 17, 18)

Unit – IV

Simple Interest – Compound Interest – Formulae and Simple Problems.

(Chapters 21, 22)

Unit – V

Area – Volume and Surface Area of Solid Figures – Formulae and Simple Problems

(Chapters 24, 25)

Text Book:

1. Scope and treatment as in “**QUANTITATIVE APTITUDE**” by **R.S.AGGARWAL**, S.Chand & Company Ltd., Ram Nagar, New Delhi (2007).

Reference Book:

1. “**QUANTITATIVE APTITUDE**” for Competitive Examinations by “**ABHIJIT GUHA**”, Tata McGraw – Hill Publishing Company Ltd., New Delhi (2008).

CHAIRMAN

COE

Sl. No.:

Subject Code:

U16ST5S3P

GOVERNMENT ARTS COLLEGE (AUTONOMOUS) KARUR-05

B.STAT., STATISTICS - V SEMESTER – SKILL BASED ELECTIVE - III

(For the candidates admitted from the year 2016-2017 onwards)

**STATISTICAL DATA ANALYSIS
(LAB ORIENTED – PRACTICAL)**

OBJECTIVE:

To compute the various statistical measures using EXCEL package.

COURSE OUTCOMES

On the completion of this course the students will be able to compute the various statistical measures using EXCEL package.

Unit – I

Graphs and diagrams.

Unit – II

Descriptive Statistics.

Unit – III

Correlation Co – efficient and Regression Co – efficient.

Unit - IV

Large Sample Tests: Means, Variances and Proportions – Goodness of fit tests – Test of Independence. Test based on t statistic: Single men, Difference of means, Paired t test. Test based on F statistic: Equality of two population variances

Unit - V

Non-parametric tests: Sign test, Wilcoxon test, Mann-Whitney U test, Median test, Run test.

CHAIRMAN

COE

Sl. No.:

Subject Code:

U16ST6C11

GOVERNMENT ARTS COLLEGE (AUTONOMOUS) KARUR-05

B.STAT., STATISTICS - VI SEMESTER – CORE COURSE - XI

(For the candidates admitted from the year 2016-2017 onwards)

STATISTICAL INFERENCE – II

OBJECTIVE:

To give detailed idea of estimation, testing of hypothesis and Non-Parametric Tests to the under graduate students.

COURSE OUTCOMES

On the completion of this course the students will be able

- ❖ To give a detailed idea of estimation, testing of hypothesis and Non-Parametric Tests to the under graduate students.
- ❖ To understand the testing of hypothesis
- ❖ To learn various powerful tests and importance of Neyman-person –lemma
- ❖ To understand how Hypothesis is tested in for large and small samples.
- ❖ To learn about various parametric and non-parametric tests

Unit – I

Introduction – statistical hypothesis – types of errors – level of significance- power of the test – steps involved in testing of hypothesis.

Unit – II

Most Powerful test – uniformly most powerful test – Neyman Pearson (NP) lemma – unbiased test and unbiased critical region – UMP critical region.

Unit – III

Large Sample Tests – Test for the mean of a normal population – test for the equality of means of two normal populations – test for the variance of a normal population – test for the equality of variances of two normal populations - simple problems.

Unit – IV

Small Sample Tests : t-Test - single mean –difference of means –paired t-test- observed sample correlation -F –test for equality of two population variances- simple problems.

Unit – V

Non-Parametric methods - advantages and drawbacks of NP methods over parametric methods – Wold –Wolfowitz Run test – Test for Randomness – Median Test – Sign Test – Mann Whitney – Wilcoxon U Test – simple problems.

Text Book:

1. **V.K.KAPOOR** and **S.C.GUPTA**, “**FUNDAMENTALS OF MATHEMATICAL STATISTICS**”, Sulthan Chand and Sons, New Delhi. Reprint 2010.

Reference Book:

1. **MOOD A. M., GRAYBILL F.A., and BOES, D.C.** (1974): “**INTRODUCTION TO THE THEORY OF STATISTICS**”, Mc Graw Hill.
2. **HOGG R.V.** and **CRAIG, A.T.** (1972): “**INTRODUCTION TO MATHEMATICAL STATISTICS**”, 3rd edition, Academic Press, USA.
3. **GOON, A.M. GUPTA, M.K., and DAS GUPTA, B.** (1980): “**AN OUTLINE OF STATISTICAL THEORY**”, Vol.I, 6th revised ed. World Press Limited, Calcutta.
4. **ROHATGI, V.K.** (1984): “**AN INTRODUCTION TO PROBABILITY THEORY AND MATHEMATICAL STATISTICS**”, Wiley Eastern.

Sl. No.:

Subject Code:

U16ST6C12

GOVERNMENT ARTS COLLEGE (AUTONOMOUS) KARUR-05

B.STAT., STATISTICS - VI SEMESTER – CORE COURSE - XII

(For the candidates admitted from the year 2016-2017 onwards)

DESIGN OF EXPERIMENTS

OBJECTIVE:

To focus on the design and analysis of variance techniques in the statistical field experiments.

COURSE OUTCOMES

On the completion of this course the students will be able

- ❖ To focus on the design and analysis of various techniques in the statistical field experiments.
- ❖ To provide basic principles of experimentation
- ❖ To discuss the analysis of data relating to agriculture, biological sciences and industry

Unit – I

Analysis of Variance – meaning – one way classification two way classification (without derivation) – problems.

Unit – II

Design of Experiment – meaning - terminology in experimental design – principles – completely randomized Design (CRD) – analysis – problems.

Unit – III

Randomized Block Design (RBD) –analysis – estimating missing value in RBD – Latin Square Design (LSD) – analysis – efficiency of a LSD relative to RBD and CRD- missing value in LSD – problems.

Unit –IV

Missing plot Technique – meaning – Analysis of RBD and LSD with one and two missing observation – problems.

Unit – V

Factorial Experiment – Definition – 2^2 , 2^3 , and 3^2 factorial experiments – main effects and interaction – analysis – confounding –partial confounding (concepts only) – advantages and disadvantages of confounding.

Text Book:

1. **V.K.KAPOOR** and **S.C.GUPTA**, “**FUNDAMENTALS OF APPLIED STATISTICS**”, Sulthan Chand and Sons, New Delhi. Reprint. 2013.

Reference Books:

1. **MONTGOMERY. D** (1972): “**DESIGN OF EXPERIMENTS**”, John Wiley and Sons.

CHAIRMAN

COE

Sl. No.:

Subject Code:

U16ST6C13P

GOVERNMENT ARTS COLLEGE (AUTONOMOUS) KARUR-05

B.STAT., STATISTICS - VI SEMESTER – CORE COURSE - XIII

(For the candidates admitted from the year 2016-2017 onwards)

Core practical – IV
(Based on Core Course XI and XII)

COURSE OUTCOMES

On the completion of this course the students will be able

- To develop problem solving skills in Statistical Inference and in Design of Experiment.
- To know how practically Statistical Inference and in Design of Experiment are used, applied and solved in real life.

Unit – I

Large Sample Test – Difference of Means – standard deviation - Proportion.

Unit –II

Small Sample Test – Difference of Means – Paired t – test – F – test – Chi – Square Test.

Unit – III

Non – Parametric test – Run test – Test for Randomness – Median Test – Sign Test – Mann Whitney – Wilcoxon U Test

Unit – IV

ANOVA – one way, two way classification – CRD, RBD and LSD.

Unit – V

Factorial Experiment - 2^2 , 2^3 , and 3^2 factorial experiments.

CHAIRMAN

COE

Sl. No.:

Subject Code:

U16ST6E2

GOVERNMENT ARTS COLLEGE (AUTONOMOUS) KARUR-05

B.STAT., STATISTICS - VI SEMESTER – ELECTIVE COURSE - II

(For the candidates admitted from the year 2016-2017 onwards)

VITAL STATISTICS

OBJECTIVES:

This course introduces the concepts, methods and analysis of data relating to vital events such as births, deaths... marriage... migration....

COURSE OUTCOME

On the completion of this course the students will be able to know the concepts, methods and analysis of data relating to vital events such as births, deaths... marriage... migration....

Unit – I

Vital statistics – meaning - – uses of vital statistics – methods of obtaining vital statistics – measurement of population – rates and ratios of vital events – Mortality – meaning - measurement of mortality.

Unit – II

Mortality table or life table – Theorems – Stationary and Stable population – Lotka and Dublin’s model for stable population – Central Mortality Rate – Force of Mortality.

Unit – III

Concepts of Life Tables - Construction of life tables – uses of life tables – problems.

Unit – IV

Fertility Rates – Crude Birth Rate – General Fertility Rate – Specific Fertility Rate – Age Specific Fertility Rate – Total Fertility Rate. Problems.

Unit – V

Measurement of population growth – Crude rate of natural increase and Pearle’s vital index – Gross Reproduction Rate – Net Reproduction Rate – problems.

Text Book:

1. **V.K.KAPOOR** and **S.C.GUPTA**, “*FUNDAMENTALS OF APPLIED STATISTICS*”, Sulthan Chand and Sons, New Delhi. Reprint 2013.

Reference Books:

1. **SRIVASTAVA O.S** (1983): “**A TEXT BOOK DEMOGRAPHY**”, Vikas Publishing.
2. **BOGUE, DONALD. J**: “**PRINCIPLES OF DEMOGRAPHY**”, (1976), John Wiley, New York.

CHAIRMAN

COE

Sl. No.:

Subject Code:

U16ST6E3

GOVERNMENT ARTS COLLEGE (AUTONOMOUS) KARUR-05

B.STAT., STATISTICS - VI SEMESTER – ELECTIVE COURSE - III

(For the candidates admitted from 2016-2017 onwards)

BIO – STATISTICS

OBJECTIVES:

To imbibe statistical techniques applicable in biological sciences and to demonstrate the applications of statistical methods in real-life situations.

COURSE OUTCOMES

On the completion of this course the students will be able

- ❖ To imbibe statistical techniques applicable in biological sciences and to demonstrate the applications of statistical methods in real-life situations.
- ❖ To learn statistical applications used in biological sciences
- ❖ To understand descriptive statistics applications in biological sciences.
- ❖ To interpret statistical significance of biological, medical real-life data problems.

Unit – I

Bio-statistics and biometry - meaning - descriptive biostatistics – sample statistics history statistical terms – limitations of statistical methods – aims of biostatistics – applications of biostatistics – role of biostatistics – parametric and non-parametric.

Unit –II

Presentation of biometric data – graphic presentation of data – types of graphs – line -histogram- frequency polygon – kite diagram –stem and leaf displays - frequency curve or OGIVE – scatter or dot diagram –diagrammatic presentation of data – bar diagram – pie chart – pareto charts.

Unit – III

Measures of central tendency – standard score or Z score – percentiles - Quartiles – Deciles – Measures of dispersion.

Unit –IV

Analysis of Variance (ANOVA) - assumption – test of ANOVA - computation of analysis of variance – F test -problems. Statistical inference – test of significance – procedure: types of hypothesis- critical region – two tailed and one tailed test – computation of test of significance – standard error –problems.

Unit – V

Students ‘t’ test – assumptions – types of t-Test – t- test for single mean, difference of two sample means, grouped data. Chi-square test – definition – distribution - characteristics – working rule for chi-square test – 2 x 2 contingency table – calculation of probability value-problems.

(Note: All examples and problem to be related to Medical Statistical data only.)

Text Book:

1. **VEER BALA RASTOGI**, “**FUNDAMENTALS OF BIOSTATISTICS**”, Anu Books Pvt. Ltd. New Delhi. 2009.

Reference Books:

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