

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

**B.STAT., STATISTICS COURSE STRUCTURE UNDER CBCS SYSTEM**

(For the candidates admitted from the year 2012-2013 onwards)

SEMESTER	COURSE	SUBJECT TITLE	SUBJECT CODE	INSTR. HOURS WEEK	CREDIT	EXAM HOURS	MARKS		TOTAL
							INT	ESE	
I	Tamil - I	Tamil – I	U11L1T1	6	3	3	25	75	100
	English - I	English - I	U11L1E1	6	3	3	25	75	100
	Core Course - I	Descriptive Statistics	U12ST1C1	6	5	3	25	75	100
	Core Course - II	Core Practical - I	-	3	-	-	-	-	-
	First Allied Course – I	Applied Mathematics –I	U11MM1A1	5	3	3	25	75	100
	First Allied Course - II	Applied Mathematics –II	-	2	-	-	-	-	-
	Environmental Studies	Environmental Studies	UES1	2	2	3	25	75	100
				<b>30</b>	<b>16</b>				<b>500</b>
II	Tamil - II	Tamil – II	U11L2T2	6	3	3	25	75	100
	English – II	English– II	U11L2E2	6	3	3	25	75	100
	Core Course – II	Core Practical - I	U12ST2C2P	3	4	3	25	75	100
	Core Course – III	Probability And Random Variables	U12ST2C3	6	5	3	25	75	100
	First Allied Course – II	Applied Mathematics –II	U11MM2A2	2	4	3	25	75	100
	First Allied Course – III	Applied Mathematics –III	U11MM2A3	5	3	3	25	75	100
	Value Education	Value Education	UVE2	2	2	3	25	75	100
				<b>30</b>	<b>24</b>				<b>700</b>
III	Tamil – III	Tamil –III	U11L3T3	6	3	3	25	75	100
	English – III	English –III	U11L3E3	6	3	3	25	75	100
	Core Course – IV	Distribution Theory	U12ST3C4	6	5	3	25	75	100
	Core Course – V	Core Practical – II		3	-	-	-	-	-
	Second Allied Course I	Programming in C	U12CS3A1	5	3	3	25	75	100
	Second Allied Course II	Allied Practical – I		2	-	-	-	-	-
	Non Core Elective I	Discrete Mathematical Structure	U11MM3N1	2	2	3	25	75	100
				<b>30</b>	<b>16</b>				<b>500</b>
IV	Tamil – IV	Tamil – IV	U11L4T4	6	3	3	25	75	100
	English – IV	English – IV	U11L4E4	6	3	3	25	75	100
	Core Course – V	Core Practical – II	U12ST4C5P	2	4	3	25	75	100
	Core Course – VI	Sampling Techniques	U12ST4C6	5	5	3	25	75	100
	Second Allied Course II	Allied Practical – I	U12CS4A2P	2	4	3	25	75	100
	Second Allied Course III	Programming in C++	U12CS4A3	5	3	3	25	75	100
	Skill Based Elective I	Organisation of Statistical Surveys	U12ST4S1	2	4	3	25	75	100
	Non Core Elective II	Formal Languages and Grammars	U11MM4N2	2	2	3	25	75	100
				<b>30</b>	<b>28</b>				<b>800</b>
V	Core Course – VII	Statistical Inference – I	U12ST5C7	5	5	3	25	75	100
	Core Course – VIII	Time Series And Index Numbers	U12ST5C8	5	4	3	25	75	100
	Core Course – IX	Statistical Quality Control	U12ST5C9	5	4	3	25	75	100
	Core Course - X	Practical - Based on CC VIII and IX	U12ST5C10P	6	4	3	25	75	100
	Core Elective I	Game Theory and Queuing Models	U12ST5E1	5	5	3	25	75	100
	Skill Based Elective II	Elementary Statistical Methods	U12ST5S2	2	4	3	25	75	100
	Skill Based Elective III	Statistical Data Analysis ( Lab Oriented)	U12ST5S3	2	4	3	25	75	100
				<b>30</b>	<b>30</b>				<b>700</b>
VI	Core Course – XI	Statistical Inference – II	U12ST6C11	6	5	3	25	75	100
	Core Course – XII	Analysis of Variance and Design of Experiments	U12ST6C12	6	5	3	25	75	100
	Core Course – XIII	Practical - Based on CC XI and XII	U12ST6C13P	6	5	3	25	75	100
	Core Elective - II	Vital Statistics	U12ST6E2	5	5	3	25	75	100
	Core Elective - III	Biostatistics	U12ST6E3	6	4	3	25	75	100
	Extension Activities	Extension Activities				1			
Gender Education		8UEA6		1	1	3	25	75	100
				<b>30</b>	<b>26</b>				<b>600</b>
<b>TOTAL</b>				<b>180</b>	<b>140</b>				<b>3800</b>

**CHAIRMAN  
BOARD OF STUDIES IN STATISTICS**

**CONTROLLER OF EXAMINATIONS**

Sl. No.:

Subject Code:

U12ST1CI

GOVERNMENT ARTS COLLEGE (AUTONOMOUS) KARUR-05

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

(For the candidates admitted from 2012 -13 onwards)

**DESCRIPTIVE STATISTICS**

**OBJECTIVE:**

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

**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-efficients – problems.

**Text Book**

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:

U12ST2C2P

GOVERNMENT ARTS COLLEGE (AUTONOMOUS) KARUR-05

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

(For the candidates admitted from 2012 -13 onwards)

**CORE PRACTICAL – I**

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

**Unit-I**

Tables-Calculation of Mean , Median, Mode, Geometric Mean and Harmonic Mean (Discrete and continuous series).

**Unit-II**

Calculation of Q.D. and co-efficients. M.D from Mean, Median and their co-efficients. Standard Deviation and co-efficients of variation (Discrete and continuous). Calculation of skewness- Karl Pearson and Bowleys co-efficient of skewness.

**Unit –III**

Computation of Karl-Pearson co-efficient of correlation and 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-efficients.

CHAIRMAN – BOS

COE

Sl. No.:

Subject Code:

U12ST2C3

GOVERNMENT ARTS COLLEGE (AUTONOMOUS) KARUR-05

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

(For the candidates admitted from 2012 -13 onwards)

**PROBABILITY AND RANDOM VARIABLES**

**OBJECTIVE:**

Enable the students to understand and study random phenomena mathematically

**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 - Independence of random variable.

**UNIT – III**

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 – IV**

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.

**UNIT – V**

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

**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.
3. A.M.Mood, F.A. Graybill and D.C. Boes (1974): Introduction to the theory of Statistics, International student ed. McGraw Hill.
- 4.Hogg.R.V. and Craig, A.T. (1998): Introduction to Mathematical Statistics, 4th ed. Academic Press.

CHAIRMAN – BOS

COE

Sl. No.:

Subject Code:

GOVERNMENT ARTS COLLEGE (AUTONOMOUS) KARUR-05

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

(For the candidates admitted from 2012 -13 onwards)

**DISTRIBUTION THEORY**

**Unit - I**

Discrete Probability Distributions - Uniform, Bernoulli, Binomial and Poisson Distribution - Their Properties - Moments - M.G.F - Characteristic Function - Cumulants - Mode - Additive Property - Recurrence relation for the Moments about Mean and Origin - Simple Problems.

**Unit - II**

Discrete Distributions - geometric, Hyper Geometric, and Negative Binomial Distributions - Mean, Variance M.G.F - moments - Continuous Distribution - Normal Distribution - Importance And Characteristics - M.G.F, Mode, Median, Mean Deviation about Mean - Cumulants, Moments - Simple Problems.

**Unit - III**

Continuous Probability Distributions - Uniform, Exponential, Cauchy Exponential, Gamma and Beta Distribution (I, II kind) - Mean, variance - m.g.f - Central L.T and liapounoff's C.L.T (Statement only) - Lindeberg - Levy theorem with proof.

**Unit - IV**

Exact sampling distributions -I: Chi - Square distribution - Derivation- M.G.F-cumulants-limiting form of chi-square distribution-characteristics function chi-square distribution-mode and Skewness of chi-square distribution-additive property of chi-square distribution- simple problems.

**Unit - V**

Exact sampling distributions -II: t distributions- derivation of student t-distribution-fisher t- constants of t distribution-limiting form of t distribution - Derivation of snedecor's F distribution-constants of F-distribution-mode of F distribution - Simple problems.

**Reference Books:**

1. S.C.GUPTA and V.K.KAPOOR (2004), Fundamentals of mathematical statistics, Sultan chand & Sons, New Delhi.

Sl. No.:

Subject Code:

U12CS3A1

GOVERNMENT ARTS COLLEGE (AUTONOMOUS) KARUR-05

**B.STAT., STATISTICS - III SEMESTER – SECOND ALLIED COURSE - I**

(For the candidates admitted from 2012 -13 onwards)

### **PROGRAMMING IN 'C'**

#### **Unit - I**

Introduction to "C", variables, data types-declarations, type conversions, increment and decrement, Bitwise, Logical and Assignment operators.

#### **Unit - II**

Expression and conditional expressions, control structures, If-Else, SWITCH, WHILE, FOR and DO WHILE loop structures. Break continue, GO and Lable statements. Function, function returning, Non-integers, Function arugements-Static 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 function.

#### **Unit - IV**

Structures and functions, Array 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, Unlike-Random Access-*seek* and *I seek*.

#### **Books for Study and Reference:**

1. Balagurusamy,E.(1997):ANSI 'C'Programming,Tata-McGraw Hill Publishers Ltd.
2. Yaswant Kanetkar(1997): Let Us 'C',BPB Publications, New Delhi.

Sl. No.:

Subject Code:

GOVERNMENT ARTS COLLEGE (AUTONOMOUS) KARUR-05

**III SEMESTER – NON CORE ELECTIVE - I**

(For the candidates admitted from 2012 -13 onwards)

**BIO - STATISTICS - I**

**Unit I**

Bio-statistics - definition - types of data - Quantitative, Qualitative data - Sources of data in life science - Limitation and uses of statistics.

**Unit II**

Collection of data - primary data, designing questionnaire and schedule - Secondary data - Methods of collection of data - classification of data - Tabulation and presentation of data

**Unit III**

Measures of Central Tendency - Mean, Median, Mode, Geometric Mean. Measures of dispersion - Standard deviation, Mean deviation, Quartile deviation, coefficient of variations - Problem.

**Unit IV**

Correlation - types of correlation - Scatter diagram -- Karl Pearson' s co-efficient of correlation - properties - Spearman's Rank correlation co-efficient.

**Unit V**

Linear Regression—regression lines - regression equation- properties of regression co-efficients - problems.

**Text Book:**

1. S.C.GUPTA and V.K. KAPOOR (2007). Fundamentals of Mathematical Statistics, Sultan Chand and Sons Publications, New Delhi.
2. S.C.GUPTA and V.K. KAPOOR (2007). Fundamentals of Applied Statistics, Sultan Chand and Sons Publications, New Delhi.

**CHAIRMAN – BOS**

**COE**

Sl. No.:

Subject Code:

U12ST4C5P

GOVERNMENT ARTS COLLEGE (AUTONOMOUS) KARUR-05

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

(For the candidates admitted from 2012 -13 onwards)

**CORE PRACTICAL - II**

**(Based on Core Paper III & IV)**

1. Problems of Discrete Distributions and Fitting of Binomial Distribution and Poisson Distribution.
2. Problems of Continuous Distributions and Fitting of Normal Distribution.
3. Problem of Chi - Square, t, F distributions.
4. Simple Random Sampling.
5. Stratified Random Sampling- Proportional and Optimum Allocation.
6. Systematic Sampling.
7. Ratio Estimator and Regression Estimator.

**CHAIRMAN – BOS**

**COE**



Sl. No.:

Subject Code:

GOVERNMENT ARTS COLLEGE (AUTONOMOUS) KARUR-05

**B.STAT., STATISTICS - IV SEMESTER –CORE COURSE -VI**

(For the candidates admitted from 2012 -13 onwards)

**SAMPLING TECHNIQUES**

**Unit - I**

Concept of sampling and population - parameters and statistics - sampling distributions - principal steps in a sample survey - sampling and 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 - SRS of attributes.

**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**

Ratio Estimators - Methods of estimation - The ratio estimator - Approximate variance of the ratio estimate - Estimate of the variance from a sample - confidence limits - Comparison of the ratio estimate with the mean per unit - Conditions under which the ratio estimator is a best linear unbiased estimator - bias of the ratio estimate. Regression Estimators - The linear regression estimate - Regression Estimates with preassigned b - Regression Estimates when b is computed from the sample - Sample estimate of variance.

**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, 4<sup>th</sup> edition (EEE) PHI learning private limited, New Delhi.

Sl. No.:

Subject Code:

GOVERNMENT ARTS COLLEGE (AUTONOMOUS) KARUR-05

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

(For the candidates admitted from 2012 -13 onwards)

**Allied Practical - I**  
**COMPUTER LAB FOR C**

1. Arranging a given set of n numbers in ascending order.
2. Arranging a given set of n numbers in descending order.
3. Program to compute  $nCr$
4. Solving a quadratic equation
5. Choosing the biggest value, smallest value and range of a given set of numbers.
6. Fitting Binomial and Poisson distributions.
7. Computation of coefficients of correlation and regression
8. Small sample tests based on t, F and  $\chi^2$
9. Large sample tests.
10. Solution of polynomial equation-Newton Rapson method.
11. Solution of system of simultaneous equation-Gauss elimination method.
12. Lagrange interpolation.
13. Numerical integration by Trapezoidal, Simpson's and Weddle's rules.
14. Matrix addition, multiplication, inverse, transpose, determinant of square matrix.
15. Solution of simultaneous equations by Iterative methods and by using inverse.

CHAIRMAN – BOS

COE

Sl. No.:

Subject Code:

GOVERNMENT ARTS COLLEGE (AUTONOMOUS) KARUR-05  
**B.STAT., STATISTICS - IV SEMESTER –SECOND ALLIED COURSE -III**  
(For the candidates admitted from 2012 -13 onwards)

**Programming in C++**

**Unit - I**

Object Oriented Programming: Software Evaluation - OOP paradigm - Concepts, Benefits, object oriented Language and Application.

**Unit - II**

Introduction to the Basic Concepts of C++ language - Tokens, Keywords, Identifiers, Data Types, Variables, Manipulators - Expressions and Control Structures - Functions: Main functions prototyping - Cell by Reference - Function Overloading - Friend and Inline functions.

**Unit - III**

Classes and Objects - constructors and destructors - Operator Overloading - Type - Car versions.

**Unit - IV**

Inheritance - simple inheritance - Multiple inheritance - hybrid inheritance.

**Unit -V**

Polymorphism - pointless - Virtual functions - Console input / output operations.

**Text Book:**

1. "OBJECT ORIENTED PROGRAMMING WITH C++" - E.Balagurusamy, Tata Mcgraw Hill Publishers Ltd., New Delhi 1995.

Sl. No.:

Subject Code:

GOVERNMENT ARTS COLLEGE (AUTONOMOUS) KARUR-05

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

(For the candidates admitted from 2012 -13 onwards)

**ORGANISATION OF STATISTICAL SURVEYS**

**Unit - I**

Organising a statistical survey- Planning the survey, Executing the survey - Drafting a effective questionnaire, difference between questionnaire and schedule.

**Unit - II**

Sampling - Census and Sample method - Methods of sampling- Probability sampling methods-Simple random sampling, Stratified random sampling, Systematic sampling, Multi-stage sampling-Non-probability sampling methods - Judgment sampling, Convenience sampling, Quota sampling. (No derivations required)

**Unit - III**

Collection of data: Primary data - methods of collecting primary data. Internet Survey, Telephone Survey - Secondary data: methods of collecting secondary data - precautions while using secondary data.

**Unit - IV**

Classification data: Chronological classification, Geographical classification, Quantitative classification, Qualitative classification. Formation of discrete frequency distribution, Formation of continuous frequency distribution.

**Unit - V**

Tabulation of data - Parts of a table, general rules of tabulation - Types of tables- simple and complex table, Machine tabulation. Cross tabulation.

**Text Book:**

1. Gupta. S.P, Statistical Methods , Sultan Chand & Sons, New Delhi.

Sl. No.:

Subject Code:

GOVERNMENT ARTS COLLEGE (AUTONOMOUS) KARUR-05

**IV SEMESTER – NON CORE ELECTIVE - II**

(For the candidates admitted from 2012 -13 onwards)

**BIO - STATISTICS - II**

**Unit - I**

Large Sample Tests: Means, difference of mean - single Proportion - difference Proportions - Problems.

**Unit - II**

Small Sample test: Test based on t statistic - Single mean, Difference of means, Paired t test, Correlation coefficient and Regression coefficient - Problems.

**Unit - III**

Test based on F statistic: Equality of two population variances - Problems.

**Unit - IV**

Test based on Chi - Square Statistic: test of goodness fit, test of independence of attributes - Problems.

**Unit - V**

Analysis of variance: One way Classification, Two ways Classification.

**Text Book:**

1. S.C.GUPTA and V.K. KAPOOR (2007). Fundamentals of Mathematical Statistics, Sultan Chand and Sons Publications, New Delhi.
2. S.C.GUPTA and V.K. KAPOOR (2007). Fundamentals of Applied Statistics, Sultan Chand and Sons Publications, New Delhi.

**CHAIRMAN – BOS**

**COE**

Sl. No.:

Subject Code:

GOVERNMENT ARTS COLLEGE (AUTONOMOUS) KARUR-05

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

(For the candidates admitted from 2012 -13 onwards)

**Statistical Inference -I**

**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.

**Unit -II**

Sufficiency - factorization theorem (Neymann) - Cramer-Rao inequality condition for the equality sign in Cramer-Rao inequality.

**Unit -III**

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

**Unit - IV**

Method of minimum variance - method of moments - method of least square - confidence interval and confidence limits.

**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, AM. 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, 3<sup>rd</sup> edition, Academic Press, USA.
3. Goon, A.M. Gupta, M.K., and Das Gupta, B. (1980): An outline of statistical theory, Vol.I, 6<sup>th</sup> 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:

U12ST5C8

GOVERNMENT ARTS COLLEGE (AUTONOMOUS) KARUR-05

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

(For the candidates admitted from 2012 -13 onwards)

**Time Series and Index Numbers**

**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).

**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. 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.

**Text Book:** 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

Sl. No.:

Subject Code:

U12ST5C9

GOVERNMENT ARTS COLLEGE (AUTONOMOUS) KARUR-05

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

(For the candidates admitted from 2012 -13 onwards)

**Statistical Quality Control**

**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  $\bar{X}$  charts and R charts - criterion for detecting lack of control in  $\bar{X}$  charts 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. 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. Double Sampling Plan. 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. Eugene L. Grant and Richard S. Leavenworth, Statistical Quality Control, Tata McGraw Hill Education Private Limited, New Delhi.
2. Douglas C. Montgomery, Statistical Quality Control : A Modern Introduction (Sixth Edition), John Wiley & Sons, New Delhi.
3. M.Mahajan (2001), Statistical Quality Control, Dhanpat Rai & co (p) Ltd., Delhi.
4. S.C.Gupta, V.K.Kapoor, (2007), Fundamentals of Applied Statistics, Sultan Chand & Sons, New Delhi.
5. A.J.Duncan, (1974), Quality control and industrial statistics, Irwin inc. Homewook
6. E.L.Grant and R.S.Leavenworth (1991), Statistical Quality Control, Mc-Graw-Hill, New york.



Sl. No.:

Subject Code:

U12ST5C10P

GOVERNMENT ARTS COLLEGE (AUTONOMOUS) KARUR-05

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

(For the candidates admitted from 2012 -13 onwards)

**Practical - Based on Core Course VIII and IX**

**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**

Control Charts for Variables =  $\bar{X}$ , R and standard deviation Charts.

**Unit - V**

Control charts for attributes – p chart and d chart: Control charts for number of defectives per unit (c – chart)

CHAIRMAN – BOS

COE

Sl. No.:

Subject Code:

U12ST5E1

GOVERNMENT ARTS COLLEGE (AUTONOMOUS) KARUR-05

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

(For the candidates admitted from 2012 -13 onwards)

**Game Theory and Queuing Models**

**Unit - I**

Introduction - definition - pay-off - types of games - the maximin - minimax principles - problems.

**Unit - II**

Games without saddle point - mixed strategies -  $2 \times 2$  games - graphical method for  $2 \times n$  or  $m \times 2$  games - dominance property - 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 - model1:  $\{(M/M/1): (/FIFO)\}$  - problems.

**Unit - V**

Model II:  $\{(M/M/1): (/SIRO)\}$  and Model III:  $\{(M/M/1): (N/FIFO)\}$ , Model IV: Generalized birth and death process - problems. Model V:  $\{(M/M/C): (/FIFO)\}$  - problems.

**Text Book:**

**1. For Unit I and Unit II.**

S.Kalavathy, Operation Research, Vikas Publishing Company, Fourth Edition, NOIDA. Fourth Edition. 2013.

**2. For Unit III, Unit IV and Unit V.**

Kanti Swarup, P.K.Gupta, ManMohan , Operations Research . Sultan Chand and Sons, New Delhi. Sixteenth Edition. 2013.

CHAIRMAN – BOS

COE

Sl. No.:

Subject Code:

U12ST5S2

GOVERNMENT ARTS COLLEGE (AUTONOMOUS) KARUR-05

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

(For the candidates admitted from 2012 -13 onwards)

**Elementary Statistical Methods**

**Unit - I**

Measures of central tendencies: Arithmetic Mean - Median, Mode, Geometric Mean and Harmonic Mean – properties. Numerical problems.

**Unit - II**

Measures of Dispersion: Range, Quartile Deviation, Mean Deviation about Mean, Median and Mode, Standard Deviation –absolute and relative measures. Numerical problems.

**Unit - III**

Correlation- Definition- types of correlation-Karl pearson correlation co-efficient and Spearman Rank correlation co-efficient . Numerical problems.

**Unit - IV**

Regression- linear regression – regression lines – X on Y and Y on X- properties - numerical problems.

**Unit - V**

Association of Attributes :Types of Association - Yule's Coefficient of Association – Coefficient of Colligation.

**Text Book:**

1. V.K.Kapoor and S.C.Gupta, Fundamentals of Mathematical Statistics, Sulthan Chand and Sons, New Delhi. Reprint 2010.

**Reference Books:**

1. Rohatgi, V.K. (1988), An introduction to Probability Theory and Mathematical Statistics, Wiley Eastern Ltd., New Delhi.
2. Lehmann, F.L.(1986), Testing of Statistical Hypothesis (Student edition).
3. Hogg, R.V. and Craig, A.T. (1978), Introduction to Mathematical Statistics, Fourth edition, Colliar Mac.Millan Publishers.
4. Mood,A.M., Graybill, F.F. and Boes, D.C.(1974), Introduction to the Theory of Statistics, Third Edition, Mcgraw Hill.
5. Rao, C.R. (1973), Linear Statistical Inference and its Applications, Revised edition, Wiley Eastern Ltd., New Delhi.

Sl. No.:

Subject Code:

GOVERNMENT ARTS COLLEGE (AUTONOMOUS) KARUR-05

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

(For the candidates admitted from 2012 -13 onwards)

**Statistical Data Analysis (Lab oriented) – Practical.**

To compute various statistical measures using Excel packages.

**Unit - I**      Diagrams and graphs

**Unit - II**      Measures of Central Tendencies and Measures of Dispersion.

**Unit - III**     Correlation and Regression.

**Unit- IV**     Large Sample Test.

**Unit- V**      Small sample test based on **t** and **F** test.

CHAIRMAN – BOS

COE

Sl. No.:

Subject Code:

GOVERNMENT ARTS COLLEGE (AUTONOMOUS) KARUR-05

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

(For the candidates admitted from 2012 -13 onwards)

**Statistical Inference – II**

**Unit – I**

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

**Unit – II**

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

**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 Books:**

1. Mood, AM. 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, 3<sup>rd</sup> edition, Academic Press, USA.
3. Goon, A.M. Gupta, M.K., and Das Gupta, B. (1980): An outline of statistical theory, Vol.I, 6<sup>th</sup> 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:

U12ST6C12

GOVERNMENT ARTS COLLEGE (AUTONOMOUS) KARUR-05

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

(For the candidates admitted from 2012 -13 onwards)

**Analysis of Variance and Design of Experiments**

**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**

Analysis of Covariance (ANOCOVA) - ANOCOVO for one way classification (CRD) - Missing plot Technique - meaning - Analysis of RBD and LSD with one 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 in factorial design - 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 – BOS

COE

Sl. No.:

Subject Code:

GOVERNMENT ARTS COLLEGE (AUTONOMOUS) KARUR-05

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

(For the candidates admitted from 2012 -13 onwards)

**Practical - Based on Core Course XI and XII**

**Unit - I**

Most Powerful test -

**Unit -II**

Non-Parametric and chi square Test.

**Unit - III**

ANOVA - one way, two way classification - CRD.

**Unit - IV**

RBD and LSD.

**Unit - V**

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

**CHAIRMAN – BOS**

**COE**

Sl. No.:

Subject Code:

U12ST6E2

GOVERNMENT ARTS COLLEGE (AUTONOMOUS) KARUR-05

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

(For the candidates admitted from 2012 -13 onwards)

**Vital Statistics**

**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**

Life Tables - Construction of life tables - uses of life tables - problems. Abridged life table - Reed - Merrell method - Greville's method - King method. (without derivation)

**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 Pearlé's vital index - Gross Reproduction Rate - Net Reproduction Rate - Graduation of mortality rates -Makham's Graduation on Formula and Gompertz Makeham formula for mortality (Concepts only) - 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 – BOS

COE



Sl. No.:

Subject Code:

U12ST6E3

GOVERNMENT ARTS COLLEGE (AUTONOMOUS) KARUR-05

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

(For the candidates admitted from 2012 -13 onwards)

**Biostatistics**

**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 - pictograms and cartogram.

**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-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 x2 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.

**CHAIRMAN – BOS**

**COE**