BHARATHIDASAN UNIVERSITY, TIRUCHIRAPPALLI – 620 024.

B.Sc. STATISTICS COURSE STRUCTURE UNDER CBCS

(For the candidates admitted from the academic year 2018-2019 onwards)

ELIGIBILITY : Should have studies Mathematics in 10 +2 (Regular stream)

Updated on 10.09.2018

Sem	Part	Course	Title	Inst. Hours/ Week	Credit	Exam Hours	Marks		Total
							Int	Ext	
I	I	Language Course–I (LC) – Tamil*/Other Languages ** #		6	3	3	25	75	100
	II	English Language Course - I (ELC)		6	3	3	25	75	100
	III	Core Course–I (CC)	Descriptive Statistics	6	6	3	25	75	100
		Core Practical – I (CP)	Practical-I	3	-	-	-	-	-
		First Allied Course–I (AC)	Mathematics – I	4	4	3	25	75	100
		First Allied Course–II (AC)	Mathematics – II	3	-	-	-	-	-
	IV	Value Education	Value Education	2	2	3	25	75	100
	Total			30	18				500
II	I	Language Course–II (LC)– Tamil*/Other Languages ** #		6	3	3	25	75	100
	II	English Language Course–II (ELC)		6	3	3	25	75	100
	III	Core Course–II (CC)	Probability Theory	6	6	3	25	75	100
		Core Practical – I (CP)	Practical – I	3	3	3	40	60	100
		First Allied Course–II (AC)	Mathematics – II	3	3	3	25	75	100
		First Allied Course–III (AC)	Mathematics – III	4	2	3	25	75	100
	IV	Environmental Studies	Environmental Studies	2	2	3	25	75	100
	Total			30	22				700
III	I	Language Course – III (LC)– Tamil*/Other Languages ** #		6	3	3	25	75	100
	II	English Language Course-III (ELC)		6	3	3	25	75	100
	III	Core Course – III (CC)	Theoretical Discrete Distributions	6	6	3	25	75	100
		Core Practical – II (CP)	Practical – II	3	-	-	-	-	-
		Second Allied Course – I (AC)	Programming in C	4	4	3	25	75	100
		Second Allied Course-II (AP)	C Programming Lab	3	-	-	-	-	-
	IV	Non Major Elective I - for those who studied Tamil under Part-I a) Basic Tamil for other language students b) Special Tamil for those who studied Tamil upto +2 but opt for other languages in degree programme	Statistics – I	2	2	3	25	75	100
	Total			30	18				500

IV	I	Language Course –IV (LC) - Tamil*/Other Languages ** #		6	3	3	25	75	100
	II	English Language Course – IV (ELC)		6	3	3	25	75	100
	III	Core Course – IV (CC)	Theoretical Continuous Distributions	5	5	3	25	75	100
		Core Practical – II (CP)	Practical – II	3	3	3	40	60	100
		Second Allied Course - II (AP)	C Programming Lab	3	3	3	40	60	100
		Second Allied Course - III	Principles of Information Technology	3	2	3	25	75	100
	IV	Non Major Elective II-for those who studied Tamil under Part I a) Basic Tamil for other language students b) Special Tamil for those who studied Tamil upto +2 but opt for other languages in degree programme	Statistics - II	2	2	3	25	75	100
		Skill Based Elective - I	Introduction To Office Management	2	2	3	25	75	100
	Total			30	23				800
V	III	Core Course – V (CC)	Sampling Theory	5	5	3	25	75	100
		Core Course – VI (CC)	Statistical Inference – I	5	5	3	25	75	100
		Core Course – VII (CC)	Design of Experiments	6	5	3	25	75	100
		Core Practical – III (CP)	Practical – III	3	3	3	40	60	100
		Major Based Elective – I	Numerical Methods	5	5	3	25	75	100
	IV	Skill Based Elective – II	Office Management Tools	2	2	3	25	75	100
		Skill Based Elective – III	Communication And Interpersonal Skills	2	2	3	25	75	100
		Soft Skills Development	Soft Skills Development	2	2	3	25	75	100
	Total			30	29				800
VI	III	Core Course – VIII (CC)	Statistical Inference – II	6	6	3	25	75	100
		Core Course – IX (CC)	Operations Research	6	6	3	25	75	100
		Core Practical – IV (CP)	Statistical Software Practical using R	5	4	3	40	60	100
		Major Based Elective II	Statistical Quality Control	6	6	3	25	75	100
		Major Based Elective III	Applied Statistics	6	6	3	25	75	100
	V	Extension Activities	Extension Activities	-	1	-	-	-	-
		Gender Studies	Gender Studies	1	1	3	25	75	100
	Total			30	30				600
Grand Total				180	140				3900

List of Allied Courses

Allied Course I
(First year)

Mathematics
(2016-17 Batch syllabus)

Allied Course II
(Second year)

Computer Science
(2016-17 Batch syllabus)

Language Part – I	-	4	
English Part –II	-	4	
Core Paper	-	9	
Core Practical	-	4	
Allied Paper	-	5	
Allied Practical	-	1	
Non-Major Elective	-	2	
Skill Based Elective	-	3	
Major Based Elective	-	3	
Environmental Studies	-	1	
Value Education	-	1	
Soft Skill Development	-	1	
Gender Studies	-	1	
Extension Activities	-	1	(Credit only)

* for those who studied Tamil upto 10th +2 (Regular Stream)

+ Syllabus for other Languages should be on par with Tamil at degree level

those who studied Tamil upto 10th +2 but opt for other languages in degree level under Part I should study special Tamil in Part IV

** Extension Activities shall be out side instruction hours

Non Major Elective I & II – for those who studied Tamil under Part I

a) Basic Tamil I & II for other language students
b) Special Tamil I & II for those who studied Tamil upto 10th or +2 but opt for other languages in degree programme

Note:

	Internal Marks	External Marks
1. Theory	25	75
2. Practical	40	60

3. Separate passing minimum is prescribed for Internal and External marks

FOR THEORY

The passing minimum for CIA shall be 40% out of 25 marks [i.e. 10 marks]
The passing minimum for University Examinations shall be 40% out of 75 marks [i.e. 30 marks]

FOR PRACTICAL

The passing minimum for CIA shall be 40% out of 40 marks [i.e. 16 marks]
The passing minimum for University Examinations shall be 40% out of 60 marks [i.e. 24 marks]

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CORE COURSE – I
DESCRIPTIVE STATISTICS

Unit - I

Meaning and definition of Statistics, importance and scope of statistics, functions of statistics and limitations of statistics.

Unit – II

Diagrammatic representations of data - Bar diagrams, simple, component, multiple and percentage, Pie diagrams. Graphical representations - Histogram, Frequency curve, frequency polygon and Ogives (Construction and uses).

Unit –III

Measures of Central Tendency – Arithmetic Mean, Median, Mode, Geometric Mean and Harmonic Mean - derivation of their properties, Merits and Demerits and problems.

Unit – IV

Measures of Dispersion - Range, Quartile deviation. Mean Deviation, Standard Deviation and Coefficient of variation. Skewness - concept, Measures of Skewness – Karl Pearson's and Bowley's coefficient of skewness. Moments – Raw and Central. Kurtosis - Concept and measures of Kurtosis and problems.

Unit – V

Correlation - Definitions, Types and Properties of correlation coefficient (statement and proof). Scatter diagrams, Karl Pearsons's Co-efficient of Correlation and Spearman's Rank Correlation. Regression lines and its properties, uses and problems.

Book for Study:

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

Book for Reference:

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

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CORE PRACTICAL – I

(PRACTICAL – I)

Unit – I

Measures of Central Tendency - Calculation of Arithmetic Mean, Median, Mode, Geometric Mean, Harmonic Mean for Raw and Grouped Data.

Unit – II

Measures of Dispersion – Calculation of Quartile Deviation, Mean Deviation, Standard Deviation and their co–efficients. Measures of Skewness - Calculation of Karl Pearson's and Bowley's Co – efficient of Skewness.

Unit –III

Calculation of Karl Person's co – efficient of correlation and Spearman's Rank Correlation co – efficient. Finding the two Regression Equations X on Y and Y on X and estimating unknown values of X and Y.

Unit – IV

Discrete and continuous random variables – Finding Probabilities, Distribution functions and moments.

Unit –V

Bivariate Distributions (Discrete Random Variables) – Finding Marginal Distributions, Conditional Distributions. Expectation of random variables,Conditional expectation, moments and correlation.

Book for Study:

Gupta.S.C. and Kapoor.V.K(2013), Fundamentals of Mathematical Statistics, Sultan Chand & Sons, New Delhi.

Book for Reference:

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

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FIRST ALLIED COURSE I – Mathematics I

CALCULUS, LAPLACE TRANSFORM AND FOURIER SERIES

Objects :

1. To train the students in basic calculus
2. To learn the basic ideas of Fourier Series

UNIT I

Maxima & Minima – Concavity , Convexity – Points of inflexion - Partial differentiation – Euler's Theorem - Total differential coefficients (proof not needed) –Simple problems only.

UNIT II

Evaluation of integrals of types

1] $\int \frac{px+q}{ax^2+bx+c}dx$ 2] $\int \frac{px+q}{\sqrt{ax^2+bx+c}}dx$ 3] $\int \frac{dx}{(x+p)\sqrt{ax^2+bx+c}}$

4] $\int \frac{dx}{a+b\cos x}$ 5] $\int \frac{dx}{a+b\sin x}$ 6] $\int \frac{(a\cos x+b\sin x+c)}{(p\cos x+q\sin x+r)}dx$

Evaluation using Integration by parts

Integration by trigonometric substitution and by parts of the integrals

1] $\int \sqrt{a^2-x^2}\,dx$ 2] $\int \sqrt{a^2+x^2}\,dx$ 3] $\int \sqrt{x^2-a^2}\,dx$

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UNIT III

General properties of definite integrals – Evaluation of definite integrals of types

1] $\int_a^b \frac{dx}{\sqrt{(x-a)(b-x)}}$ 2] $\int_a^b \sqrt{(x-a)(b-x)}dx$ 3] $\int_a^b \sqrt{\frac{x-a}{b-x}}dx$

Other simple problems. - Evaluation of Double and Triple integrals in simple cases Changing the order and evaluation of the double integration – Beta, Gamma functions.

UNIT IV

Laplace Transforms – Inverse Laplace Transforms –Application of Laplace Transform in Solving second order Ordinary differential equation with constant coefficients.

UNIT V

Definition of Fourier Series – Fourier Coefficients for a given periodic function with period 2π and with period 2ℓ - Use of Odd & Even functions in evaluating Fourier Coefficients– Half range sine & cosine series.

TEXT BOOK(S)

1. S. Narayanan, T.K. Manichavasagam Pillai, Calculus, Vol. II, S. Viswanathan Pvt Limited, 2003
2. S. Narayanan, T.K. Manicavachagam Pillai, Calculus, Vol. III, S. Viswanathan Pvt Limited, and Vijay Nicole Imprints Pvt Ltd, 2004.

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FIRST ALLIED COURSE II – Mathematics II

ALGEBRA

Objects :

1. To learn the basic ideas of vector spaces
2. To learn the basic ideas of rank and linear transformation

UNIT I

Binomial, Exponential and Logarithmic series (Formulae only) – summation and approximation related problems only.

UNIT II

Non-Singular , Symmetric , Skew symmetric, Orthogonal, Hermitian, Skew Hermitian and Unitary matrices – simple properties & problems –Inverse of a non-singular matrix using adjoint method

UNIT III

Rank of a Matrix – Consistency - Characteristic equation , eigen values ,eigen vectors – Cayley Hamilton's Theorem (proof not needed) –Simple applications only

UNIT IV

Vector spaces and its properties –linear independence –Basis & Dimension - Subspaces

UNIT V

Linear transformation and its properties –Rank & nullity .

TEXT BOOK(S)

1. T.K. Manichavasam Pillai, T. Natarajan, K.S. Ganapathy, Algebra, Vol. I, S. Viswanathan Pvt Limited, Chennai, 2004 (Unit 1)
2. A.R. Vasistha, Matrices, Krishna Prakeshan Mandir, 24th Edition, 1994-95 (Unit 2 & 3)
3. M.L.Santiago, Modern Algebra (Unit 4 & 5), Arul Publications, Madras, 1993.

REFERENCE(S)

1. Narayanan, T.K. Manicavachagam Pillai & Ramnath, Advanced Mathematics for Engineers & Scientists, S. Viswanathan Publishers Pvt. Ltc., 1994

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CORE COURSE – II

PROBABILITY THEORY

Unit-I

Concept 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 of probability – Conditional probability – Multiplication theorem – Baye's theorem – simple problems.

Unit-II

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

Unit-III

Bivariate distribution – Distribution function of bivariate random variable and its properties – joint probability function and joint probability density function - marginal and conditional distributions – Independence of random variable – simple problems.

Unit-IV

Mathematical expectation – discrete and continuous random variables – Properties – moments – variance – properties – covariance – simple problems.

Unit-V

Moment generating function – properties and uses – cumulants – characteristic functions – properties – simple examples – Inversion theorem and Uniqueness theorem – statement only.

Book for study :

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

Books for reference:

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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FIRST ALLIED COURSE III – Mathematics III

ANALYSIS AND THEORY OF EQUATIONS

Objects :

1. To learn the basic ideas of sequences
2. To learn the basic ideas of series

UNIT I

Theory of equations-formation of equations- irrational and imaginary roots – relation between Roots & coefficients –Reciprocal equations –Reducing roots by a number –multiplying roots by a number

UNIT II

Real Number system – Absolute value of a real number – definition of supremum (LUB) and Infimum (GLB) – Limit of a function .

UNIT III

Definition of a sequence – Convergence and divergence of a sequence – Bounded sequences –Monotonic sequence –Algebra of sequences.

UNIT IV

Convergence and divergence of a series –Geometric series –simple tests for convergence of a Series (Comparison tests, ratio test, root test, Leibnitz test) – conditional convergence and absolute convergence of alternating series – Simple problems.

UNIT V

Continuous function and its properties – (Simple theorems only) – Uniform Continuity – Rolle's Theorem – Mean Value Theorem – Taylor's Theorem – Maclaurin Series.

TEXT BOOK(S)

1. T.K. Manicavachagam Pillai, Analysis, S.V. Publications, Chennai, 1985 (Unit 1 & 2)
2. Malik S.C, Mathematical Analysis, Wiley Eastern, New Delhi, 1984.

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CORE COURSE - III

THEORETICAL DISCRETE DISTRIBUTIONS

Unit – I

Binomial distribution – Definition, Concept and Derivation of Moments, Moment Generating Function, Additive property, Characteristic function and Recurrence relation for moments. Fitting of Binomial distribution – Simple problems.

Unit – II

Poisson Distribution – Definition, Concept, Derivation of Moments, Moment Generating Function, Recurrence relation for moments and Poisson Distribution as a limiting case of Binomial Distribution, Fitting of Poisson Distribution – Simple problems.

Unit – III

Negative Binomial Distribution – Definition, Derivation of constants and Poisson Distribution as a limiting case of the Negative Binomial Distribution. Logarithmic Series Distribution(Concept only).

Unit – IV

Geometric Distribution – Definition, Moments, Derivation of Moment Generating Function and Lack of memory property. Power series distribution (Concept only).

Unit – V

Hyper Geometric Distribution – Definition, Derivation of Mean and Variance approximation to Binomial distribution and Recurrence relation. Multinomial Distribution(Concept only).

Book for Study:

Gupta,S.C & Kapoor, V.K (2013), Fundamentals of Mathematical Statistics, Sultan Chand & Sons, New Delhi.

Book for Reference:

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

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CORE PRACTICAL – II

(PRACTICAL – II)

List of Problems:

1. **Discrete Distributions**
    a. Binomial Distribution
    b. Poisson Distribution
    c. Negative Binomial Distribution
    d. Uniform Distribution
    e. Geometric Distribution
    f. Hypergeometric Distribution
2. **Continuous Distributions**
    a. Rectangular Distribution
    b. Normal Distribution
    c. Gamma Distribution
    d. Exponential Distribution
    e. Beta Distribution – First kind and Second kind.

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SECOND ALLIED COURSE I – COMPUTER SCIENCE

Programming in C

Objective: To impart basic knowledge of Programming Skills in C language.

Unit I

Introduction to Computers and their Applications. Computer System Characteristics – Hardware and Software – Types and Generations of Computers – Introduction to I/O and Storage Devices – Number Systems – Flowcharts – Algorithms.

Unit II

Evaluation and Applications of C Structure of a C programme - Data Types – Declarations – Operators – Expressions – Type Conversions – Built-in Functions – Data Input and Output Control Statements : IF, ELSE – IF, GOTO, SWITCH, WHILE – DO, DO – WHILE, FOR BREAK and CONTINUE.

Unit III

Functions – Defining and Accessing Functions – passing parameters to functions – Arguments – recursive functions – Storage Classes – Arrays : Arrays and functions – Arrays and Strings – String functions – String Manipulations.

Unit IV

Pointers – Pointer Declarations - operations on Pointers – pointers to functions –pointers and strings – pointers and arrays – array of pointers structures – structure and pointers – Unions.

Unit V

Data Files – Opening, Closing and Processing files – files with structures and unions- register variables – Bitwise operations – Macros Preprocessors.

Books for Study

1. Computer Today – S.K. Basandra – Galgotia Publications Unit II – V.
2. Programming in C – E.Balagurusamy – Tata McGraw Hill Publication.

Reference Books :

1. Programming with C - Byron S Gottfried – Schaum's Outline Series, Tata McGraw Hill Publications.
2. The Spirit of C – Mullish Cooper – Schaum's Outline Series – Tata McGraw Hill Publications.
3. Let Us C – Yeswant Kanetkar – BPB Publications.

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SECOND ALLIED COURSE II - – COMPUTER SCIENCE

C Programming Lab

1. Solution of a Quadratic Equation (all cases)
2. Sum of Series (sine, cosine, e^x)
3. Coversion of Number System (Decimal to Binary, Decimal to Octal)
4. Largest, Smallest among 'n' numbers (Also use it to find the number of occurrences of a given number)
5. Ascending and Descending order of numbers using Arrays.
6. Sorting of names in Alphabetical order
7. Matrix Operations (Addition, Subtraction, Multiplication – use Functions).
8. Finding factorials, generating Fibonacci Numbers using recursive functions.
9. String manipulations without using string functions

   (String length, String Comparison, String Concatenation, Palindrome Checking, Counting words and lines in String – use function Pointers).

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NON MAJOR ELECTIVE – I

STATISTICS - I

Unit – I

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

Unit – II

Sampling - Census and Sample method. Sampling and Non-sampling errors.

Unit - III

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

Unit – IV

Classification of data – Types of Classification - Chronological classification, Geographical classification, Quantitative classification and Qualitative classification. Formation of discrete frequency distribution and Formation of continuous frequency distribution.

Unit – V

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

Book for Study:

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

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CORE COURSE – IV

THEORETICAL CONTINUOUS DISTRIBUTIONS

Unit – I

Normal Distribution – Introduction, Limiting form of Binomial Distribution. Characteristics of Normal Distribution, and its curve. Derivation of Mean, Mode, Median, Moments and Moment Generating Function .

Unit – II

Derivation of Cumulant Generating Function, Additive property of Normal Distribution, Mean Deviation about Mean, and Points of Inflection of Normal curve. Importance of Normal Distribution – Fitting of normal distribution – simple problems.

Unit – III

Beta Distribution of First and Second Kind – Derivation of Moments, $\beta 1$, $\beta 2$ and Harmonic Mean. Gamma Distribution – Definition and Derivation of Moment Generating Function, Cumulant Generating function, Moments and Additive property of Gamma Distribution.

Unit – IV

Rectangular Distribution-Introduction and derivation of Moments, Moment Generating Function and Mean Deviation about Mean**.** Exponential Distribution – Definition, Derivation of Moment Generating Function and Lack of Memory property. Concept of Weibul Distribution, Cauchy Distribution and Bivariate Normal Distribution.

Unit – V

Sampling Distribution - Concept of 't', 'x^2' and 'F' Distributions – Derivation of these distributions, Constants and Moment Generating Function – Relationship between 't', 'x2' and 'F' Distribution.

Book for Study:

Gupta. S.C and Kapoor V.K (2013), Fundamental of Mathematical Statistics.

Book for Reference :

Johnson and Kotz, Discrete Distribution John Wiley Publication, New York.

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SECOND ALLIED COURSE III – COMPUTER SCIENCE

Principles of Information Technology

Objective : To Provide the Basic Concepts in Information Technology

Unit I

Introduction to Computer – Classification of Digital Computer System – Computer Architecture – Memory Units – Auxiliary Storage Devices – Input and Output Devices.

Unit II

Introduction to Computer Software – Operating System – Programming Languages – General Software Features and trends.

Unit III

Database Management Systems – Data Processing – Introduction to Database Management System – database design.

Unit IV

Introduction to Telecommunication – Networking – Commmunication System – Distributed System – Internet – Intranet.

Unit V

Multimedia tools – Virtual Reality – E-Commerce – Data warehousing – Data Mining – Applications; Geographical Information System – Computer in Business, Industry, Home, Education and Training.

Book for study :

1. Fundamentals of Information Technology, Alexis Leon And Mathews Leon, Vikas Publishing House Pvt. Ltd, 2009

Reference :

1. Henry C.Lucas, Jr., Information Technology for Management – McGraw Hill (Part – III).
2. Williams, Sawyer, Hutchinson, Using Information Technology – McGraw Hill.

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NON MAJOR ELECTIVE - II
STATISTICS - II

Unit – I

Diagrammatic Representation of Data **-** Introduction - General rules for construction of diagrams - Types of diagrams - Simple Bar diagram, Sub-divided bar diagram, Multiple bar diagram and Percentage bar diagram, Pie diagram, Pictogram and Cartogram.

Unit – II

Graphical Representation of Data - Introduction- Techniques of construction of Graphs- Graphs for frequency distributions: Histogram, Frequency Polygon, Frequency Curve and Ogive Curve- Determination of Median and Mode by graphical method.

Unit – III

Official Statistics: Definition – Growth of Indian Statistics – Statistical organizations of India: Central Statistical Organisation (CSO) – Divisions of Central Statistical Organisation – Functions – Publications.

Unit – IV

National Sample Survey Organisation (NSSO) – Divisions of NSSO – Functions of NSSO – Procedure for collection of information – Agriculture Statistics, Yield Statistics – Official series: Traditional method, Random Sampling Method – NSS Series – Forest Statistics, Fisheries Statistics – Defects in agricultural Statistics.

Unit – V

National income: Definition – Methods of estimating national income: The Income method, the Output method and the Expenditure method – Uses of National income estimates – Difficulties of estimation.

Book for Study:

R.S.N. Pillai and V. Bagavathi (1995), Statistics, Third Edition, S.Chand & Company, New Delhi – 110 055.

Books for Reference:

Central Statistical Organization (1979), Statistical Systems in India, Department of Statistics, Ministry of Planning, New Delhi.

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SKILL BASED ELECTIVE I (SEMESTER IV)

OFFICE MANAGEMENT (2016-17 Batch)

INTRODUCTION TO OFFICE MANAGEMENT

UNIT I

Office management – Meaning – Elements of office management – Functions of office management.

UNIT II

Office organization – Definition, Characteristics and Steps – Types of Organization – Functions of an Office administrator

UNIT III

Office record management – Importance – Filing essentials –Classification and arrangement of files-Modern methods of filing-Modern filing devices

UNIT IV

Office Communication – Correspondence and Report writing –Meaning of office communication & mailing

UNIT V

Form letters –Meaning, Principles, and Factors to be considered in designing office forms – Types of report writing

TEXT BOOKS RECOMMENDED:

1. Fundamentals of office management – by J.P.Mahajan,
2. OfficeManagement by S.P.Arrora
3. Office Management – R.S.N.Pillai & Bagavathi- S.Chand.

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CORE COURSE - V

SAMPLING THEORY

Unit – I

Basic concept of sample survey - Introduction, definitions and preliminaries, fields of application of sampling techniques and limitations, Census and sample surveys, their advantages and disadvantages, principles of sampling theory, principal steps in a sample survey. Probability and non-probability sampling, sampling unit, sampling frame, sampling and non-sampling errors.

Unit – II

Simple random sampling, procedures of selecting a random sample, estimation of population parameters, estimation of population proportion, Estimation of sample size.

Unit - III

Stratified random sampling – Introduction, principles of stratification, Advantages of stratification, Estimation of population mean and its variance. Estimation of variance, Allocation of sample size in different strata - Equal allocation, Neyman allocation, optimum allocation and proportional allocation. Relative precision of stratified random sampling with simple random sampling.

Unit - IV

Systematic sampling – Introduction, sample selection procedures, Advantages and Disadvantages, Estimation of mean and its sampling variance, comparison of simple random sampling and stratified random sampling with systematic sampling.

Unit – V

Ratio estimators-Introduction, definitions and notations, Bias of Ratio estimators, comparison of the ratio estimate with the mean per unit. Regression estimators – Introduction, difference estimator, regression estimator, comparison with the mean per unit and ratio estimators.

Book for study:

Daroga Singh and Choudry F.S(1986), Theory and Analysis of Sample Survey Design, Wiley Eastern Ltd: New Delhi.

Books for Reference:

1. Murthy M.N.(1976), Sampling theory and methods- statistical publishing society, Calcutta.
2. Cochran W.G. (1984), Sampling Techniques, Wiley Eastern Ltd.
3. Des Raj (1976): Sampling Theory, Tata-Mcgraw Hill.

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CORE COURSE – VI

STATISTICAL INFERENCE – I

Unit – I

Introduction to estimation theory – definition of parameter space, estimate and estimator. Characteristics of estimator – unbiasedness – definition and simple problems. Consistency – definition, problem based on Normal and Poisson distribution. Invariance property of consistency, sufficient condition for consistency.

Unit – II

Efficient estimators – definition of efficiency, most efficient estimator, minimum variance unbiased estimator. Sufficiency – definition, Rao Blackwell theorem, Crammer-Rao inequality, statement of Neymann factorization theorem, Invariance property of sufficient estimator (simple problems).

Unit – III

Methods of estimation : Method of Maximum likelihood estimation – definition of likelihood function and M.L.E., properties of M.L.E(simple problems). Statement of Crammer Rao theorem and Hazoor Bazar's theorem.

Unit – IV

Methods of minimum variance, Methods of moments and Methods of least squares- simple problems.

Unit – V

Interval estimation – definition of confidence limits, confidence co-efficient, confidence interval and Confidence intervals for large samples (simple problems).

Book for Study:

1. Gupta.S.C. and Kapoor V.K., "Fundamentals of Mathematical Statistics", Sultan Chand & Sons.
2. Rohatgi.V.L, "An introduction to probability theory and Mathematical Statistics", Wiley Eastern limited.

Book for Reference:

1. Radhakrishna Rao C., "Linear Statistical Inference and its Applications", Wiley Eastern limited.
2. Lehmann.E.L, Testing of Statistical Hypothesis, John Wiley.
3. Gibbons.J.D , Non – Parametric Statistical Inference, Duxbury.

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CORE COURSE - VII

DESIGN OF EXPERIMENTS

Unit – I

Analysis of Variance: Definition and assumptions. Cochran's theorems (statement only) ANOVA - One way and Two way classifications (with one observation per cell). Experimental error.

Unit – II

Design of Experiment: Need, terminology. Randomization, Replication and Local control; Completely Randomized Design (CRD), Randomized Block Design (RBD), Latin Square Design (LSD) - Estimation of missing values in RBD and LSD (one and two).

Unit - III

Factorial experiment - main effects and interactions; definitions of contrast and orthogonal contrast; Analysis of 2^2 and 2^3 experiments.

Unit - IV

Confounding in factorial design –Total Confounding and Partial confounding in 2^3 experiments.

Unit – V

Analysis of co-variance for a one way layout with one concomitant variable and RBD with one concomitant variable.

Book for Study:

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

Books for Reference:

1. 1.Douglas C.Montgomery (2010), Design and Analysis of experiment, Wiley International Edition, India.
2. 2.Cochran.W.G. & G.M.Cox(1957), Experimental designs, Wiley International edition, India.

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CORE PRACTICAL – III

(PRACTICAL – III)

Unit – I

Estimation of Mean and Variance of the population and variance of the estimator of the mean using Simple Random Sampling and stratified random sampling with proportional allocation and optimum allocation.

Unit – II

Estimation of mean and variance of population using Systematic Random sampling, Ratio estimator and Regression estimators.

Unit – III

Design of Experiment - Completely Randomized Design (CRD), Randomized Block Design (RBD), Latin Square Design (LSD).

Unit – IV

Estimation of missing values in RBD and LSD (one and two). Factorial experiment - Analysis of 2^2 and 2^3 experiments.

Unit – V

Methods of estimation – Maximum Likelihood Estimation, Method of Moments, Method of Minimum Variance and Method of Least Square. Interval estimation: Confidence interval for mean and proportions.

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MAJOR BASED ELECTIVE - I

NUMERICAL METHODS

Unit-I

Solution of algebraic and transecendental equations-Bisection method, Newton's Raphson method. Finite differences – Newton's forward and backward interpolation formula (Problems only)

Unit-II

Central differences interpolation formulae – Gauss forward, Gauss Backward, Stirlings formulae and Bessel's formula (Problems only).

Unit-III

Numerical differentiation - Newton's forward and Newton's Backward formulae (Upto2ndorder) - (Problems only).

Unit-IV

Numerical integration – Trapezoidal rule, Simpson's 1/3rd rule, Simpson's 3/8th rule (Problems only).

Unit-V

Numerical solution of Ordinary Differential Equation – Taylor series method, Modified Euler's method and Second and Fourth order Runge-Kutta method (Problems only).

Book for study:

A.Singaravel, 'Numerical method', Meenakshi publications, Chennai.

Books for Refernce:

1. S.S. Sastry (2000), Introduction methods of Numerical Analysis, Prentice-Hall of India Pvt- India III Editions.
2. P.Kandasamy, K. Thilagavathy, and K.Gunavathy (2005), Numerical Methods.
3. E. Balagurusamy (2004), Numerical Methods, Tata McGraw Hill Publishing Company Limited, New Delhi.

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SKILL BASED ELECTIVE II (SEMESTER V) - OFFICE MANAGEMENT

OFFICE MANAGEMENT TOOLS

UNIT I Computer Fundamentals

Computer and Operating system Fundamentals – Components of a computer system – Input and Output devices – Memory Handling – Storage Devices

UNIT II MS -Word

Introduction to MS-Word and User Utilities – Exploring Template and Formation of Documents – Table handling –Mail Merge and Print Process

UNIT III MS – Excel

Spreadsheet –workbook window –Formatting Cells / Worksheet – Working with Formula, Function and Charts – Filtering data and Printing a Presentation

UNIT IV MS – Power Point

Introduction to MS – Power Point –Creating Templates – Font and colour editing – Adding – Multimedia effects – Consolidating using MS-Power Point

UNIT V Officer Appliances

Accounting machine – Addressing machine – Envelope Sealing machine – Franking machine & other modern office gadgets

TEXT BOOKS RECOMMENDED:

1. Computer Application in Business –Dr.S.V.Srinivasa Vallabhan, Sultan Chand and Sons, New Delhi
2. MS-Office and Internet by Alexis Leon
3. Computer Application in Business – K.Mohan Kumar, Vijay Nicole imprints Private Limited Dr.S.Rajkumar –Chennai
4. Computer Basics – V.Rajaraman – PHI.
5. Office Management – R.S.N.Pillai & Bagavathi – S.Chand

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SKILL BASED ELECTIVE III (SEMESTER V) - OFFICE MANAGEMENT

COMMUNICATION AND INTERPERSONAL SKILLS

UNIT I Basic Communication

Communication – Meaning and Definition – Medium of Communication – Barriers to Communication

UNIT II Listening

Needs and Advantages of Listening – Active – Elements of active listening with reading - coherence of listening with reading and Speaking

UNIT III Speaking

Features of effective speech – Role play-Conversation building –Topic presentation – Group Discussions

UNIT IV Reading

Comprehensive of Technical and Non- Technical Material – Skimming Scanning – inferring Guessing

UNIT V Writing

Writing Effective Sentences – Cohesive writing – Clarity and Conciseness in writing –Resumes and job applications

TEXT BOOKS RECOMMENDED:

1. Basic Communication Skills by p.Kiranmani Dutt and Geetha Rajeevan
2. Business Scenarios by Heidi Schuttz Ph.D
3. Business Communication –Asha Kaul – PHI.
4. Business Communication – Sathya Swaroop Debasish & Bhagaban Das – PHI
5. Business Communication – NS Raghunathan & Santhanam – Marghum.

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CORE COURSE – VIII

STATISTICAL INFERENCE – II

Unit – I

Statistical hypothesis – simple and composite, Null and Alternative hypothesis, Critical region, Level of significance, type of errors and Power of test (simple problems). Steps involved in testing of hypothesis. Neymann Pearson Lemma (statement and proof).

Unit – II

Large sample test – Test for single proportion, difference between proportions, single mean, difference between means and difference between standard deviation.

Unit – III

Small sample test – student's 't' test – test for single mean, difference between means, paired 't' test and observed sample correlation co-efficient.

Unit –IV

Snedecor's F test – test for equality of two population variance – Testing the significance of an observed multiple correlation co-efficient, observed sample correlation ratio and linearity of regression (concepts only).

Unit – V

Non-parametric test - Chi-square test - Independence of attributes and goodness of fit. One sample tests – Sign test and Run test for randomness, Two sample tests – Sign, median and Mann Whitney U- test – Simple Problems.

Books for Study:

1. Gupta.S.C. and Kapoor V.K., Fundamentals of Mathematical Statistics, Sultan Chand & Sons.
2. Rohatgi.V.L, "An introduction to probability theory and Mathematical Statistics", Wiley Eastern limited.

Book for Reference:

1. Radhakrishna Rao C., "Linear Statistical Inference and its Applications", Wiley Eastern limited.
2. Lehmann.E.L, Testing of Statistical Hypothesis, John Wiley.
3. Gibbons.J.D , Non – Parametric Statistical Inference, Duxbury.

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CORE COURSE– IX

OPERATIONS RESEARCH

Unit – I

Operations Research – Meaning, Nature, History, Scope and Limitations. Linear Programming Problem(LPP) – General Form, Standard form and Canonical form, Basic Solution, Basic Feasible solution, Optimum solution. Assumption and Mathematical Formulation of LPP

Unit – II

Graphical Solution of LPP – Unique and special cases – Simplex Method and Big-M Method.

Unit –III

Transportation Problem (T.P.) – Meaning, Balanced and Unbalanced Transportation Problem. Initial Basic Feasible Solution (IBFS) – North-West Corner Rule(NWC), Least Cost Method(LCM) and Vogel's Approximation Method(VAM) and MODI method to solve an Transportation Problem. Maximization case in Transportation Problem.

Unit – IV

Assignment Problem(A.P.) – Meaning, Balanced and Unbalanced Assignment Problem – Hungarian method to solve an Assignment Problem. Maximization case in Assignment Problem.

Unit –V

Sequencing Problem – Meaning, Procedure for solving sequencing problems - Processing 'n' jobs through two machines, Processing 'n' jobs through 'm' machines and Processing of two jobs through 'm' machines.

Book for Study:

Kanti Swarup, Gupta,P.K. & Manmohan, Operations Research, Sultan Chand & Sons, NewDelhi.

Book for Reference:

Taha, H.A., An Introduction to Operations Research, Colliat Macmillan.

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CORE PRACTICAL - IV

STATISTICAL SOFTWARE PACKAGES USING R

LIST OF TOPICS

- Classification and Tabulation of data
- Diagrammatic representation
- Measures of central tendency
- Measures of Dispersion
- Measures of Skewness and Kurtosis
- Computation of Probabilities (Binomial, Poisson and Normal)
- Simple Correlation and Simple Regression
- Test of Significance (t test, F Test, Chisquare Test)
- Test of Significance (Z test)
- One Way ANOVA and Two Way ANOVA

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MAJOR BASED ELECTIVE - II

STATISTICAL QUALITY CONTROL

Unit – I

Introduction to SQC – Chance and Assignable Causes of Variation – Benefits of SQC – Process and Product Control – Tools for SQC- Control chart for Variables – X-Bar and R- Chart .

Unit – II

Control Chart for Attributes – Control Chart for Fraction Defective (p-Chart) – Control Chart for Number of Defectives (d-chart, for fixed and variable sample size) – Control Chart for Number of Defects per unit (c- Chart) – Natural Tolerance Limit and Specification Limits.

Unit –III

Acceptance sampling by Attributes – Acceptance Quality Level (A.Q.L) – Lot Tolerance Proportion or Percent Defective (LTPD) – Process Average Fraction Defective (p) – Consumer's Risk(β) – Producer's Risk(α) – Rectifying Inspection Plan – Average Outgoing Quality Level (AOQL)

Unit – IV

Operating Characteristic Curve (OC-curve) – Average Sample Number (ASN) – Average Amount of Total Inspection (ATI) – Single Sampling Plan – Determination of 'n' and 'c', AOQL, OC-curve – Double Sampling Plan – ASN and ATI of Double Sampling Plan – Single sampling Vs Double Sampling plan.

Unit –V

Sequential Sampling – Sequential Probability Ratio Test (SPRT) – ASN Function of Sequential Sampling Plan.

Book for Study:

Gupta,S.C. & Kapoor,V.K (2014), Fundamentals of Applied Statistics, 4th Edition, Sultan Chand & Sons, New Delhi.

Book for Reference:

Mahajan, M., Statistical Quality Control, Dhanpat Rai & Co.

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MAJOR BASED ELECTIVE – III

APPLIED STATISTICS

Unit – I

Analysis of Time Series – Its definition and uses, Additive and Multiplicative Models in Time Series, Components of Time Series - Secular Trend, Seasonal variation, Cyclic Variations and Irregular fluctuations- Definition and Concepts. Measurement of Trend – Graphic method, Method of Semi-Averages, Method of Moving Averages and Method of Least Squares. Fitting of Straight line trend.

Unit – II

Measurement of Seasonal Variations – Method of Simple Averages, Ratio to Moving Average method by additive and multiplicative model , Ratio to Trend Method and Link Relative Method - Simple Problems.

Unit – III

Index Numbers – Definition and Uses, Types of Index Numbers, Problems involved in the construction of Index Numbers. Construction of Simple Index Numbers. – Simple aggregate method and Simple average of Price Relatives using A.M & G.M. Construction of Weighted Index Numbers – Laspeyre's, Paasche's, Dorbish Bowley, Marshall Edge worth and Fisher's Ideal Index Numbers - Simple Problems.

Unit – IV

Definition of Deflation, Splicing, Inflation, and Real wages. Construction of Weighted Average of Price relatives Index Numbers using A.M & G.M. Fixed Base Index Numbers and Chain Base Index Numbers. Tests of adequacy of a good Index Number – Time Reversal Test, Factor Reversal Test, Unit test and Cyclic test - Simple Problems.

Unit – V

Demand Analysis: Introduction-Definition of Demand and Supply- Laws of Demand and Supply- Equilibrium Price-Giffen's Paradox. Price Elasticity of Demand and Price Elasticity of Supply: Definition, Interpretation and Simple problems.

Book for Study:

Gupta S,C and Kapoor V.K (1993): Fundamental of Applied Statistics. - Sultan Chand & Sons, New Delhi.

Books for Reference:

1. Gupta S.P (1995) , Statistical Methods, Sultan Chand & Sons, New Delhi.
2. Goon A.M, Gupta M.A and Das Gupta (1987) , Fundamentals of Statistics, Sultan Chand & Sons, New Delhi.

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