DEPARTMENT OF STATISTICS

U.G. PROGRAMME

SYLLABUS

Effective from the Academic Year 2016-2017

Loyola College (Autonomous)

PG and Research Department of Statistics

Chennai- 600 034

DEPARTMENT OF STATISTICS (UG)

Semester	Category	Title	Hours
I	MC	STATISTICAL METHODS	5
I	MC	PROBABILITY AND RANDOM VARIABLES	4
I	AR	MATHEMATICS FOR STATISTICS - I	6
II	MC	CONTINUOUS DISTRIBUTIONS	6
II	MC	DISCRETE DISTRIBUTIONS	3
II	AR	MATHEMATICS FOR STATISTICS - II	6
II	AR	BUSINESS STATISTICS(Offered to Other Dept)	6
III	MC	SAMPLING THEORY	6
III	MC	ESTIMATION THEORY	6
III	AR	BUSINESS PROCESS MANAGEMENT	6
III	AR	MATHEMATICAL STATISTICS - I (Offered to Other Dept)	6
IV	MC	TESTING OF HYPOTHESES	6
IV	AR	BIOINFORMATICS	6
IV	ES	DATA ANALYSIS USING MS EXCEL	6
IV	ES	DATABASE MANAGEMENT SYSTEM	6
IV	AR	MATHEMATICAL STATISTICS - II (Offered to Other Dept)	6
V	MC	APPLIED STOCHASTIC PROCESSES	6
V	MC	REGRESSION ANALYSIS	6
V	MC	APPLIED STATISTICS	6
V	ES	ACTUARIAL STATISTICS	6
V	ES	BIO-STATISTICS AND SURVIVAL ANALYSIS	6
V	SK	STATISTICAL DATA ANALYSIS USING SPSS	6
VI	MC	OPERATIONS RESEARCH	6
VI	MC	DESIGN AND ANALYSIS OF EXPERIMENTS	6
VI	MC	STATISTICAL QUALITY CONTROL	6
VI	MC	R - LANGUAGE	6
VI	MS	SURVEY PRACTICE AND REPORTING	6

16UST1MC01 STATISTICAL METHODS

UG

Semester : I **Category : MC**

Hours/Week : 5 **Credits :**

Objectives: 1) To introduce the basic concepts in Statistics

2) To develop data reduction techniques

Unit - 1 Definition - Scope and limitations of Statistics - Collection of data - Census. Sampling surveys - Classification and tabulation - diagrammatic and graphical representation of data - Nominal, ordinal and interval scaling.

Unit - 2 Measures of central tendency - Measures of dispersion and Coefficient of variation - Problems based on raw data and grouped data - Moments - raw and central - Measures of skewness - Measures of Kurtosis and their applications.

Unit - 3 Curve fitting - Principle of least squares - linear, nonlinear, exponential and growth curves.

Unit - 4 Correlation - Rank Correlation - Regression analysis - Problems based on raw data and grouped data.

Unit - 5 Association of attributes - Notations - Classes and class frequencies - Consistency of data - Independence of attributes - Yule's coefficient of association - coefficient of colligation.

Books for Study:

1. Bansilal and Arora (1989). New Mathematical Statistics, Satya Prakashan, New Delhi.
2. Gupta. S.C. & Kapoor,V.K. (2002) . Fundamentals of Mathematical Statistics , Sultan Chand & Sons Pvt. Ltd. New Delhi.

Books for Reference:

1. Goon A.M. Gupta. A.K. & Das Gupta, B (1987) . Fundamentals of Statistics, Vol.2, World Press Pvt. Ltd., Calcutta.
2. Kapoor, J.N. & Saxena, H.C. (1976) . Mathematical Statistics , Sultan Chand and Sons Pvt. Ltd, New Delhi.

16UST1MC02 PROBABILITY AND RANDOM VARIABLES

UG			STATISTICS
Semester	**: I**		**Category : MC**
Hours/Week	**: 4**		**Credits :**

Objectives: 1) To introduce probability theory as a foundation for Statistics.

2) To help students understand the basic notions about random variables.

Unit 1 Introductory Notions of Probability- Random Experiments – Sample Space and Events. Axiomatic Approach to Probability – Addition Law – Problems in Axiomatic Approach.

Unit 2 Combinatorics and Classical Probability Elements of Combinatorics. Classical Definition of Probability. Problems in Classical approach.

Unit 3 Conditional Probability – Occupancy Problems. Stochastic Independence and related concepts - Independence of events – Pairwise and Mutual Independence.

Unit 4.Multiplication Law, Law of Total Probability, Baye's Theorem. Bernoulli Trials – Problems.

Unit 5 Introductory notions on Random Variables - Random Variables – Discrete and Continuous Random Variables – p.g.f, p.m.f. and p.d.f. – c.d.f. Mathematical Expectation and Variance of a random variables. Chebyshev's Inequality.

Books for Study :

1. Gupta, S.C. and Kapoor, V.K. (2002). Fundamentals of Mathematical Statistics. Sultan chand and Sons. New Delhi
2. Parzen, E.(1960). Modern Probability Theory. John Wiley & Sons, New York

Books for Reference:

1. Hogg, R.V. and Craig, A.T. (2002). Introduction to Mathematical Statistics. Pearson Education India

MATHEMATICS FOR STATISTICS – I

UG | Offered to: STATISTICS
Category: AR | Credits:
Semester: I | Hrs/Wk: 6

Objectives:

1. To get a good exposure to the basic concepts of Mathematics.
2. To introduce the mathematical concepts required to learn theoretical statistics.

Unit 1: Matrix Algebra – Some special types of matrices – Determinants –Properties of Determinants - Rank of a Matrix and related problems. (2+14+2 hrs)

Unit 2: Adjoint and Inverse of a matrix – solution of linear equations – homogeneous and non-homogeneous system of equations using cramer's rule and matrix inverse method – characteristic roots and vectors – Verification of Cayley Hamilton theorem – Computation of the inverse by Cayley Hamilton theorem. (2+14+2 hrs)

Unit 3: Differentiation of $sinx, \cos x, e^x, x^n, logx, tanx$ - Product Rule – Quotient Rule – Function of function (exclude hyperbolic function)- Logarithmic differentiation – Implicit functions – Differentiation of one function with respect to another function.

(2+14+2 hrs)

Unit 4: Successive differentiation – Leibnitz theorem (statement only) and simple problems – Meaning of the derivative – Maxima and Minima of functions of one variable (exclude rate of change, acceleration, velocity) – Concavity and Convexity, points of inflexion – Partial Differentiation – Maxima and Minima of functions of two variables.

. (2+14+2 hrs)

Unit 5: Integration – simple problems – rational algebraic function, irrational functions – properties of definite integrals – integration by parts (exclude inverse function) – reduction formula. .

(2+14+2 hrs)

Books for Study:

1. P.K. Mittal, Matrices, Vrinda Publications (P) Ltd., 2007.
   Unit 1- Chapter 1: 1.1, 1.2; Chapter 2: 2.1, 2.3 – 2.8, 2.10 – 2.15; Chapter 3: 3.1 – 3.5; Chapter 6: 6.1 – 6.3.
   Unit 2 - Chapter 3: 3.10 – 3.12; Chapter 4: 4.1, 4.3; Chapter 7: 7.1 – 7.3, 7.5; Chapter 9: 9.1,9.3,9.4.
2. Narayanan, S. and Manickavachagam Pillai, T.K., Calculus Vol. I, S. Viswanathan Printers & Publishers, 1996.
   Unit 3 - Chapter 2: 1, 2.1 – 2.6, 3.1 – 3.8, 4.1,4.2, 5, 7
   Unit 4 - Chapter 3: 1.1 – 1.4, 2.1, 2.2; Chapter 4: 2.2; Chapter 5: 1.1 – 1.5, 2; Chapter 8: 1.1, 1.2, 1.6, 4, 4.1
3. Narayanan, S. and Manickavachagam Pillai, T.K., Calculus Vol. II, S. Viswanathan Printers & Publishers, 1996.
   Unit 5 - Chapter 1: 2 – 4, 6.2 – 6.6, 7.3, 7.4, 8 (case i & ii), 11, 12, 13.1 – 13.6

Books for Reference:

1. Graybill, F.A., Matrices with applications in statistics, second edition, Wads Worth, 1983.
2. Narayanan, S. and Manickavachagam Pillai, T.K., Ancillary Mathematics Vol II, S. Viswanathan Printers & Publishers, 1996.
3. Shanthi Narayanan, A textbook of matrices, S. Chand & Co., 1959.
4. Singaravelu, A., Allied Mathematics, A.R.S. Publications, 2014.
5. Vittal, P.R, Allied Mathematics, Margham Publications, 2015.

CONTINUOUS DISTRIBUTIONS

UG STATISTICS

Semester II **Category: MC**

Hours/Week : 6 **Credits : 6**

Objective: 1) To impart essential knowledge in continuous distributions

2) To expose the real-life applications of continuous distribution

Unit 1: Joint - Marginal and Conditional distributions – Conditional Expectation – Conditional Variance- Stochastic Independence, Uniform Distribution – Mean – Variance – M.G.F - Distribution Function

Unit 2: Normal Distribution – Properties – M.G.F – Linear Combinations of Normal Variate – Reproductive Property, Bivariate Normal – Mean – Variance.

Unit 3: Beta, Gamma, Cauchy, Exponential – Properties – M.G.F – Distribution Function – Properties

Unit 4: Functions of Random Variable – Transformation of Variables – Chi-square, t and F distribution – Properties, Random samples from Normal – Distribution of sample mean, sample variance and their independence

Unit 5: Order Statistics and their distributions. Limiting Distribution – Stochastic Convergence – Lindberg – Levy Central Limit Theorem

Books for Study

1. Hogg, R.V. & Craig, A.T. (2002):- Introduction to Mathematical Statistics. Pearson Education India
2. Rohatgi, V.K. and Saleh, A. K. Md. E (2002) :- An Introduction to Probability and Statistics. John Wiley & Sons, New York.

Books for Reference

1. Goon, A.M., Gupta, M.K., &DasGupta, B. (1988):- An Introduction to Statistical Theory.
2. Gupta, S.C. & Kapoor, V.K. (2002): Fundamentals of Mathematical Statistics, Sultan chand & Sons, New Delhi
3. Sanjay Arora & Bansilal (1989):- New Mathematical Statistics.

DISCRETE DISTRIBUTIONS

UG STATISTICS

Semester II **Category: MC**

Hours/Week : 3 **Credits : 3**

Objective: 1**)** To impart essential knowledge in Discrete distributions

2) To expose the real-life applications of Discrete distribution

Unit 1: Joint - Marginal and Conditional distributions – Conditional Expectation – Conditional Variance- Stochastic Independence – Correlation Coefficient ,Generating functions.

Unit 2: Uniform Distribution –Properties– M.G.F – P.G.F , Bernoulli distribution – Properties – M.G.F – P.G.F - Binomial distributions – Properties – Recurrence Formula – Additive Property – Limiting Property

Unit 3: Poisson Distribution – Properties – Mode – M.G.F – P.G.F – Characteristic Function – Recurrence formula – Additive Property – Poisson Approximation to Binomial.

Unit 4: Geometric Distribution – Properties – Recurrence Formula – Memory less property- M.G.F – P.G.F, Negative Binomial Distribution – Properties – M.G.F – Recurrence Formula – P.G.F – Reproductive Property

Unit 5: Hyper geometric distribution – Properties – M.G.F – Characteristic function, Multinomial Distribution – Mean – Variance – Marginal and Conditional distribution – Additive Property.

Books for Study :

1. Hogg, R.V. & Craig, A.T. (2002):- Introduction to Mathematical Statistics. Pearson Education India
2. Rohatgi, V.K. (1975):- An Introduction to the Theory of Probability and Mathematical Statistics.

Books for Reference:

1. Goon, A.M., Gupta, M.K., &DasGupta, B. (1988):- An Introduction to Statistical Theory.
2. Gupta, S.C. &Kapoor, V.K. (2002): Fundamentals of Mathematical Statistics, Sultanchand& Sons, New Delhi
3. Sanjay Arora&Bansilal (1989):- New Mathematical Statistics.

MATHEMATICS FOR STATISTICS – II

UG Offered to: **STATISTICS**
Category: **AR** Credits:
Semester: **II** Hrs/Wk: **6**

Objectives:

1. To introduce the mathematical concepts required to learn theoretical statistics.
2. To develop analytical skills.

Unit 1: Sets and elements – Operations on sets – least upper bounds – Sequence of real numbers –Definition of sequence and sub sequence – Limit of a sequence - Convergent sequence – Bounded sequence –Monotone sequence – Operations on convergent sequence. (2+14+2 hrs)

Unit 2: Series of real numbers – Convergence and divergence – Series with non negative terms – Alternating series – Conditional convergence and absolute convergence – Tests for absolute convergence. (2+14+2 hrs)

Unit 3: Functions continuous at a point on the real line – The Derivative – Rolle's theorem - Mean value theorem – Taylor's theorem – Maclaurin theorem – simple problems. (2+14+2 hrs)

Unit 4: Riemann Integrability – Upper and Lower sums – Upper and Lower integral – The Riemann integral – Riemann criterion for integrability – Fundamental theorem of calculus – Improper integral – simple problems. (2+14+2 hrs)

Unit 5: Laplace transform – Laplace transform of $t, sinat, \cos at, e^{at}$ - Inverse Laplace transform to the above standard functions – Applications to ordinary differential equation. (2+14+2 hrs)

Books for Study:

1. Bartle, R.G., & Shebert, Introduction to Real Analysis, Wiley Eastern & Sons, 1982.
   Unit 3: Chapter 6: 6.1.1 – 6.1.5, 6.2.3 – 6.2.7, 6.4.1 – 6.4.3
   Unit4: Chapter 7: 7.1.1 – 7.1.10, 7.3.1 – 7.3.6, 7.4.7 – 7.4.10
2. Gold berg, R.R., Methods of Real Analysis, Oxford and IBH, 1970.
   Unit 1: Chapter 1: 1.1, 1.2, 1.7; Chapter 2: 2.1 – 2.3, 2.5 – 2.7
   Unit 2: Chapter 3: 3.1 – 3.4, 3.6
   Unit 3: Chapter 5: 5.1
3. Narayanan, S. and Manickavachagam Pillai, T.K., Ancillary Mathematics Vol II, S. Viswanathan Printers & Publishers, 1996.
   Unit 5: Chapter 7: 1 - 6

Books for Reference:

1. Apostol, T.M., Mathematical Analysis, Narosa Publications, 1985.
2. Singaravelu, A., Allied Mathematics, A.R.S. Publications, 2014.
3. Vittal, P.R, Allied Mathematics, Margham Publications, 2015.

BUSINESS STATISTICS

(for Commerce Students)

Semester II **Category: AR**

Hours/Week : 6 **Credits : 4**

Objectives: 1) To introduce basic concepts of Statistics
2)To provide statistical techniques for business data analysis.

Unit 1 Measures of Central tendency: Simple averages – mean, median and mode –Geometric mean and Harmonic mean – weighted arithmetic mean. Measures of Dispersion: Range – Quartile deviation – mean deviation – Standard deviation – coefficient of variation – Combined mean and standard Deviation. Skewness: Karl Pearson and Bowley's Coefficient of skewness – Moments – Kurtosis.

Unit 2 Curve fitting: Fitting a straight line and second degree parabola. Correlation: Scatter diagram – Limits of correlation coefficient – Spearman's Rank correlation coefficient
– Simple problems. Regression: Properties of regression coefficients and regression lines.

Unit 3 Time Series: Components of time series-Additive and multiplicative models – Measurement of trend – Graphical method-Semi-average method-moving average method-least squares method. Measurement of Seasonal Variation –Method of Simple averages – ratio-to trend method – ratio to moving average method-method of link relatives.

Unit 4 Elements of Operation Research: Linear Programming – Solving L.P.P. by Graphical method – Transportation problems – North-West corner rule – Least cost method - Vogel's Approximation Method – Optimal solution using Modi method

Unit 5 Game Theory : Introduction – Two-Person Zero-Sum Games – Pure Strategies – Mixed Strategies.

Books for study:

1. Vittal, P.R.(2010) Business Statistics. Margham Publications, Madras
2. Gupta, S.P. (2011), Statistical Methods-Sultan Chand and Sons Publishers. New Delhi.
3. Yule and Kendall (1993).Introduction totheory of Statistics. Universal Book Stall, New Delhi.

Books for reference:

1. Croxton and Cowden (1956).Applied General Statistics.Sir Isaac Pitman and Sons. Ltd., London.
2. Gupta,S.C. and Kapoor,V.K. (2002). Fundamentals of Mathematical Statistics. Sultanchand and Sons. New Delhi
3. Taha,H.A. (1997). Operations Research. Macmillan Publishing Housing Co., New Delhi.
4. Kanti Swarup, Gupta, P.K. and Man Mohan (1996), Sultan Chand and Sons (P) Ltd., New Delhi.

SAMPLING THEORY

UG STATISTICS
Semester III **Category: MC**
Hours/Week : 6 **Credits : 6**

Objectives: 1) To equip students with Sampling Techniques used in conducting sample surveys.

2) To compare the efficiency of various estimation strategies resulting from different sampling techniques.

Unit 1 Preliminaries: Sampling Vs Census - Basic concepts of sampling - Population - Parameter - Statistic - Unbiasedness - Mean square error - simple problems.

Unit 2 Simple Random Sampling: Simple random sampling with and without replacement - Estimation of population mean - Variance of estimators - Simple problems.

Unit 3 Stratified Sampling: Estimation of total ,mean - Its variance - Allocation problems - Simple problems.

Unit 4 Systematic Sampling: Linear, Circular. Comparisons for populations with one-dimensional linear trend.

Unit 5 Use of Auxiliary Information. Ratio Estimation. Regression Estimation.

Book for study:

1. Cochran,W.G.(2009), Sampling Techniques, Wiley Eastern Company Ltd.

Books for Reference:

1. Murthy,M.N.(1983), Sampling theory and methods, Statistical publishing society, Calcutta.
2. Sampath,S.(2000), Sampling theory and methods, Narosa publishing house.

ESTIMATION THEORY

UG STATISTICS
Semester III **Category: MC**
Hours/Week : 6 **Credits :**

Objective: 1) To equip the students with the theory essential for estimation of unknown parameters.

2) To expose the students to its real-life applications.

Unit 1 Unbiasedness, Consistency - Efficiency - Cramer - Rao inequality - Chapman - Robbin's inequality. Examples.

Unit 2 Sufficiency - Factorization theorem - UMVUE - Properties- Completeness.Rao-Blackwell theorem, Lehmann - Scheffe theorem - Examples.

Unit 3 Methods of estimation: Method of moments - Method of maximum likelihood - Method of minimum chi-square, Method of modified minimum chi-square, Properties of MLE(without proof) - Method of least squares - Examples.

Unit 4 Elements of Baye's estimation - Prior and Posterior distributions - Examples.

Unit 5 Confidence intervals for mean when S.D is known and S.D is unknown when the sample is drawn from Normal Population , Confidence interval for Proportion, Confidence interval for difference in means, difference in proportions, Confidence interval of variance and ratio of variances.

Books for study:

1. Hogg, R.V. and Craig, A.T.(2002), Introduction to Mathematical Statistics, Pearson Education(P.Ltd, Singapore).
2. Mood, A.M. Graybill, F.A. and Boes, D.C.(1988), Introduction to the Theory of Statistics, New York; McGraw Hill.
3. Rohatgi.V.K.andSaleh, A.K.Md.E. (2002), An Introduction to Probability and Statistics, John Wiley and Sons, New York.

Books for Reference:

1. Casella, G and Berger,R.L. (1990), Statistical Inference, Wadworth, Inc., Belmont, California.
2. Goon,A.M., Gupta, M.K. amdGupta,B.D.(1987) An outline of Statistical Thoery, Vol.II, The World Press Pvt. Ltd., Calcutta.
3. Kale, B.K.1999, A First Course on Parametric Inference, Narosa Publishing House.
4. Silvey, S.D.(1970), Statistical Inference, Chapmans Hall, London.

BUSINESS PROCESS MANAGEMENT

SEMESTER: III **CREDITS : 4**

CATEGORY: AR to Department of Statistics **NO. OF HOURS / WEEK : 6**

Course Objectives

1. To understand the basics of management concepts and its various dimensions to support the business process
2. To identify the functional areas of human resource management and its importance in the overall organizational development
3. To familiarize the various aspects involved in business processes, and its integration with ERP modules, and control devices

Unit 1 – Management in the context of Enterprise Resource Planning (ERP)

Concepts of Material Management, Sales and Marketing Management, Quality Management, Asset Management, Financial Management, Resources Management, Time Management and Change Management - Functional currencies of business units / groups

Unit 2 –Human Resources Management (HRM)

Types of organizations at different levels – Peoples Management (managing employees, applicants, contingent/contractors and beneficiaries) – Maintaining records – Definitions of job, position, grade, grade rates and pay roll elements – Competencies, career program and Talent management

Unit 3 – Enterprise Resource Planning (ERP) suite

Trading Community Architecture (TCA) Suppliers, customers, employees, items/goods and services – ERP sub-ledgers, purchases, payables, receivables, inventory and assets

Unit 4 – ERP integration

Integrating ERP to the general ledger (finance) – General ledger concepts – types of journals – budgeting organizations – budgeting control – Financial statements

Unit 5 – Control aspects in ERP

Cash control – Mass allocation - Foreign exchange reconciliation, translation and consolidation – Inventory control – ABC analysis, serial control, LOT control, revision control – levels of inventory controls

Recommended Books:

1. Maheswari S.N, and Gupta C.B, **Business Management,** Sultan Chand & Sons, New Delhi, 2010
2. Varma Naresh, **Business Process Management**, Global India Publications Pvt Ltd. New Delhi, 2010
3. **Oracle Financial Statements** Study Material, Oracle Corporation

MATHEMATICAL STATISTICS – I

UG MATHEMATICS
Semester III **Category: AR**
Hours/Week : 6 **Credits :**

Objective: To impart the statistical concepts and results with rigorous mathematical treatment.

UNIT – 1: Sample space – Events, Probability – Axiomatic, Classical, Statistical definition - Addition - Multiplication laws of probability – Independence – Conditional probability – Bayes theorem – Examples

UNIT – 2: Random Variables (Discrete and continuous), Distribution function – Expectation and moments – Moment generating function – probability generating function – Examples. Chebychev's inequality Bivariate Distribution – Marginal – Conditional distribution – Correlation Coefficient.

UNIT – 3: Binomial, Poisson, Hyper geometric, Normal and Uniform distributions – Geometric, Exponential, Gamma and Beta distributions, Transformation of random variables.

UNIT – 4: Order Statistics – Sampling distributions t, χ^2, F - Sample mean – Sample variance – distributions.

UNIT – 5: Convergence in probability – convergence in distribution – Central limit theorem – Examples.

Books for study :

1. Hogg R. V. & Craig A. T. 1988) : Introduction to Mathematical Statistics, Mcmillan.
2. Bansilal and Arora (1989).New Mathematical Statistics, Satya Prakashan, New Delhi.

Books for reference:

1. Gupta. S.C. & Kapoor,V.K. (2002) . Fundamentals of Mathematical Statistics , Sultan Chand & Sons Pvt. Ltd. New Delhi
2. Mood A. M & Graybill F. A & Boes D. G (1974) : Introduction to theory of Statistics, Mcgraw Hill.

TESTING OF HYPOTHESES

UG STATISTICS
Semester IV **Category: MC**
Hours/Week : 6 **Credits :**

Objective: (i)To introduce the concepts of hypothesis testing
(ii) To illustrate the concepts with various numerical examples.

Unit – 1 Statistical hypotheses- simple null hypothesis against simple alternative - Best Critical Region. Neyman -Pearson Lemma – Most powerful randomized tests - examples.

Unit - 2 One parameter exponential family - Families with monotone likelihood ratio property - UMP tests for one-sided hypotheses (without proof) - examples.

Unit - 3 Elements of SPRT - Likelihood ratio tests - examples.

Unit - 4 Tests of significance - tests based on normal, t, chi - square and F distributions

Unit - 5 Non-parametric methods - Run test for randomness - sign test for location - Median test - Mann-Whitney - Wilcoxon test - Kolmogorov-Smirnov test - one and two sample problems.

Books for Study:

1. Hogg, R.V. and Craig, A.T.(2002), Introduction to Mathematical Statistics, Pearson Education(P.Ltd, Singapore).
2. Beaumont, G. P. (1980). Intermediate Mathematical Statistics, Chapman and Hall, New York.
3. Gibbons, J. D. (1971). Non-parametric Statistical Inference, McGraw-Hill Kogakusha Ltd., New Delhi.

Books for Reference:

1. Rohatgi.V.K.andSaleh, A.K.Md.E. (2002), An Introduction to Probability and Statistics, John Wiley and Sons, New York.
2. Hogg, R. V. andTanis, E. A. (1983). Probability and Statistical Inference, Maxwell Macmillan international edition, New York.
3. Mood, A. M., Graybill, F. A. and Boes, D. C. (1983). Introduction to the Theory of Statistics, McGraw-Hill, New Delhi.

BIOINFORMATICS

UG Offered to: STATISTICS

SEMESTER : IV **CREDIT:**

CATEGORY : AR **NO. OF HOURS / WEEK : 06**

Objective: *To provide biologically important predictions from annotated data and transformation of these data for genome / gene / DNA analyses.*

UNIT I: INTRODUCTION TO BIOINFORMATICS

History of Bioinformatics and Pharmaceutical Industry - Bioinformatics in Business – scope of Bioinformatics, Tools and techniques of bioinformatics.

UNIT II: COMPUTATIONAL MOLECULAR BIOLOGY

Data mining and Sequence Analysis - Database Similarity Searches - Practical Aspects of Multiple Sequence Alignment - Phylogenetic Analysis – Recent trend in bioinformatics.

UNIT III: INTERNET AND BIOINFORMATICS

Data mining in Bioinformatics- Knowledge discovery - Problems faced in Bioinformatics -Human Genome Project - Influence areas - Bioinformatics in India

UNIT IV: BIOLOGICAL DATABASE AND THEIR MANAGEMENT

Database concepts - Introduction of SQL - Biological Database - Sequence Database- DNA sequence data bases, specialized database, secondary protein sequence data bases –and composite protein sequence data bases.

UNIT V: DATABASE AND TOOLS

Predictive Methods Using Nucleic acid and Protein Sequences Submitting DNA Sequences to the Database - Internet & Data mining - Programming in C.

TEXT BOOKS

1. Rastogi, S. C. 2003, Bioinformatics (Concepts, Skills and Applications) CBS, New Delhi.
2. Setubal, J. and J. Meidanis, 1997, Introduction to Computational Molecular Biology, PWS, Boston.
3. Stephen A. K. and Womble, D.D., 2003, Introduction to Bioinformatics: A Theoretical and Practical Approach, Humana Press, New Jersey.
4. Zhumur, G and Bibekanand, M. 2008. Bioinformatics (principles and applications) Oxford University press, New Delhi.

REFERENCE BOOKS

1. David, M. 2001, Bioinformatics: Sequence and Genome Analysis Cold spring harbor laboratory Press.
2. Gibas C and P. Jambeck, 2000, Developing Bioinformatics Skills, O' Reilly and Associates, California.
3. Rashidi, H. and Lukas K. Buehler, 1999, Bioinformatics Basics Applications in Biological Science and Medicine, CRC press.

DATA ANALYSIS USING MS EXCEL

UG STATISTICS
Semester IV **Category: ES(Practical)**
Hours/Week : 6 Credits:

Objective:

i) To develop the Data Processing skill in MS Excel
ii) To develop the Data Analysis and Data Visualization skill

UNIT I Introduction to MS Excel - MS Excel Options – Ribbon - Sheets - Saving Excel File as PDF, CSV and Older versions - Using Excel Shortcuts - Copy, Cut, Paste, Hide, Unhide, and Link the Data in Rows, Columns and Sheet - Using Paste Special Options - Formatting Cells, Rows, Columns and Sheets - Protecting & Unprotecting Cells, Rows, Columns and Sheets with or without Password - Page Layout and Printer Properties

UNIT II

Functions: - Logical Functions - Date and Time Functions - Information Functions -Math and Trigonometry Functions - Statistical Functions - Text Functions - Charts:- Simple Bar Chart – Multiple Bar Chart – Subdivided Bar Chart – Pie Chart – Donut Chart - Line Chart – Histogram – Scatter Plot - Radar Chart – Bubble Chart – Bi-Axis chart – Plotting Density Function and Distribution Function.

UNIT III

Vlookup, Hlookup, Index, Address, Match, Offset, Transpose - Conditional Formatting - Data Sorting and Filtering - Pivot Tables - Chart Templates – Adding Add-Ins in Excel - Solver – Goal Seek.

UNIT IV

Statistical measures – Mean, Variance, Percentiles, Quatlies - Pearson correlation – Spearman's Rank correlation – Parametric tests – test for single population mean , equality of mean for two independent sample , paired t test, testing correlation coefficient, Non parametric tests – Mann Whitney U test, Wilcoxon signed rank test – Kruskall Wallis test – One way ANOVA – Simple and Multiple Linear regression

UNIT V

- VBA Macro - Introduction to VBA Macro -Recording Macro & Understanding Code Behind - Editing, Writing VBA Code and Saving as Macro .

Books for Study:

1. Microsoft Excel 2016 Step by Step by Curtis Frye
2. Microsoft Excel Functions & Formulas by Bernd Held

Books for Reference:

1. Excel Functions and Formulas Paperback by Bernd Held
2. Microsoft Excel 2010 Data Analysis and Business Modeling Paperback by Winston

DATABASE MANAGEMENT SYSTEM

UG STATISTICS
Semester IV **Category: ES(Practical)**
Hours/Week : 6 Credits:

Objective: To impart the knowledge of data creation, storage, modify and extract information from database

Unit 1: Database Basics - Retrieving Data -The Select Statement -Retrieving Individual Columns -Retrieving Multiple Columns -Retrieving All Columns -Retrieving Distinct Rows - Limiting Results - Comments

Unit 2 : Sorting Retrieved Data -Sorting Data-Sorting by Multiple Columns -Sorting by Column Position - Specifying Sort Direction --Filtering Data -Where Clause - Where Clause Operators - Advanced Data Filtering -Combining Where Clauses - the In Operator - the Not Operator - Wildcard Filtering - Like Operator

Unit 3: Creating Calculated Fields-Concatenating Fields-Performing Mathematical Calculations-Data Manipulation Functions- Summarizing Data - Aggregate Functions - Aggregates on Distinct Values -Combining Aggregate Functions - Grouping Data -Creating Groups -Filtering Groups -Grouping and Sorting -Select Clause

Unit 4

Ordering - Working with Subqueries - Understanding Subqueries -Filtering by Subquery-Subqueries as Calculated Fields - Joining Tables – Equi-join - Non Equi Join - Left outer join - Right outer joins - Full Outer Join.

Unit 5

Inserting Data -Copying from One Table to Another - Updating and Deleting Data-Updating Data -Deleting Data -Creating and Manipulating Tables -Creating Tables-Updating Tables Deleting Tables-Renaming Tables - Creating Views - Working with Stored Procedures - Executing Stored Procedures - Creating Stored Procedures – Understanding Cursors and Triggers

Books for Reference:

1. DBMS – Complete Practical Approach by Sharad Maheshwari, Ruchin Jain – Firewall Media(Lakshmi Publication)
2. SQL in 10 Minutes, Sams Teach Yourself By Ben Forta - Sams Publishing

MATHEMATICAL STATISTICS – II

UG MATHEMATICS
Semester IV **Category: AR**
Hours/Week : 6 **Credits :**

Objective: 1) To impart the statistical concepts and results with rigorous mathematical treatment.

2) To enable the real-life applications of Statistics

UNIT – 1 : Point estimation - Unbiasedness, consistency, and sufficiency – Factorisation theorem(without proof) -Methods of estimation : Maximum likelihood – Method of moments

UNIT – 2: Cramer Rao inequality - Efficiency - Rao Blackwell theorem, UMVUE, Interval estimation – Confidence intervals.

UNIT – 3: Tests of Hypothesis – Type I and Type II Errors – power – Best critical region – Neyman Pearson lemma – Applications. Monotone likelihood ratio property – applications – Likelihood ratio tests.

UNIT – 4 : Tests for significance – one sample - two sample problems - mean proportion – variance – contingency tables – one way ANOVA – Two way ANOVA – Non parametric method – Wilcoxon Mann Whitney

UNIT – 5 : Simple linear regression: The least squares method – Multiple linear regression (without proof) Sampling – simple random – stratified sampling – systematic sampling(without proof)

Books for study :

1. Hogg R. V. & Craig A. T. 1988) : Introduction to Mathematical Statistics, Mcmillan.
2. Bansilal and Arora (1989).New Mathematical Statistics, SatyaPrakashan, New Delhi.

Books for reference:

1. Gupta. S.C. & Kapoor,V.K. (2002) . Fundamentals of Mathematical Statistics, Sultan Chand & Sons Pvt. Ltd. New Delhi
2. Mood A. M & Graybill F. A & Boes D. G (1974) : Introduction to theory of Statistics, Mcgraw Hill.

APPLIED STOCHASTIC PROCESSES

UG | STATISTICS
Category: MC | Credit:
Semester: V | Hours/Week: 6

Objective: To Equip Students with Elements of Stochastic Models and It's Applications.

Unit I: Stochastic Process – Definitions-Examples- Classification-Different Types of Stochastic Processes an Introduction.

Unit II: Markov Chains – Definitions – Examples- Recurrent, Transient States, Periodicity, Irreducible Chains – Examples. First Step Analysis.

Unit III: Regular Chain- Applications Of Basic Limit Theorem- Stationary Distribution-Existence Methods Of Obtaining Stationary Distribution-Examples.

Unit IV: Continuous Time Markov Chains- Poisson Process – Properties- Pure Birth Process-Yule's Process- Birth And Death Process- Applications.

Unit V: Branching Process- Examples-Extinction Probabilities – Generating Function – Mean And Variance – Illustrations.

Book For Study:

Karlin, S And Taylor, H.M (1975) : A First Course In Stochastic Processes, Academic Press, New York.

Howard M. Taylor, Samuel Karlin (1998) : In Introsuction To Stochastic Modeling, Academic Press, New York.

Books For Reference:

Medhi, J (1994): Stochastic Processes, Wiley Eastern Lts, New Delhi.

Ross, S.M (1983): Stochastic Processes, John Wiley And Sons, New York.

REGRESSION ANALYSIS

UG STATISTICS
Category: MC **Credits :**
Semester V **Hours/Week : 6**

Objective: 1) To introduce the vital area of regression models applicable in a wide variety of situations.

2) To expose the students to the wide areas of its applications.

Unit 1: Introduction to Regression – Mathematical and Statistical Equation – Meaning of Intercept and Slope – Error term – Measure for Model Fit –R^2 – MAE – MAPE – Testing Significance of Model Coefficients, Confidence interval for model coefficients.

Unit 2: Model diagnostics - Mean predicted value, Testing normality of error term, QQ-plot, PP-plot, Anderson Darling, Kolmogrov Smirnov

Unit 3: Introduction to Multiple Linear Regression Model, Partial Regression Coefficients, Testing Significance overall significance of Overall fit of the model, Testing for Individual Regression Coefficients, Estimating R^2, MAE and MAPE

Unit 4: Dummy Variable trap, Study of Interaction Effects, Varying Intercept and Slope using dummy variable, Detection and Removal of Outliers

Unit 5: Study of Normality of Error Term using graphical and testing procedures, Testing for Multicollinearity using VIF, Testing for assumption of Homoscedasticity

Books for Study:

1. Gujarati, D.(2004): Introduction to Econometrics. McGraw Hill, New Delhi.

Books for Reference:

1. Montgomery,D.C. ,Peck E.A, & Vining G.G.(2003). Introduction to Linear Regression Analysis. John Wiley and Sons,Inc.NY

APPLIED STATISTICS

UG STATISTICS
Category: MC **Credits :**
Semester V **Hours/Week : 6**

Objective: 1) To expose statistics students to wide genre of study
2) To bring out its significant role in various areas of study

Unit 1: Index Numbers :-Basic problems in construction of index numbers. Methods – Simple and Weighted Aggregate methods, Average of Price Relatives, Chain Base method .Criteria of goodness – Unit test, Time Reversal, Factor Reversal & Circular tests. Base shifting, Splicing & Deflating index numbers. Wholesale Price index& Consumer price index numbers. Index of industrial production.

Unit 2: Educational & Psychological Statistics

Scaling procedures – Scaling of individual test items, of scores, of rankings & of ratings. Reliability of test scores – Index of reliability, Parallel tests, Methods for determining test reliability, Effect of test length & ranges on reliability.

Unit 3: Vital Statistics

Uses and Methods of obtaining vital statistics. Rates & Ratios. Measurement of Mortality – Crude, Specific & Standardized death rates. Life Table – Stationary & Stable population, Construction of life tables. Fertility – Crude, General, Specific & total fertility rates

Unit 4: Time Series – Trend Component :-

Components of Time Series, Mathematical models of time series. Measurement of Trend Component : Graphic, Semi-Averages, Moving Averages. Least-squares – Straight Line, Second Degree Parabola, Exponential Curve, Modified Exponential Curve, Gompertz Curve, Logistic Curve.

Unit 5: Time Series – Other Components:

Measurement of Seasonal Variations – Simple averages, Ratio-to-trend, Ratio-to Moving average, Link Relative. Deseasonalisation of data. Measurement of Cyclic variations.

Book for Study:

1. Gupta, S.C. &Kapoor, V.K (2007). Fundamentals of Applied Statistics, Sultan Chand & Sons, New Delhi.

Book for Reference:

1. Gupta, S.P. (2011), Statistical Methods. Sultan Chand and Sons Publishers. New Delhi.

ACTUARIAL STATISTICS

UG STATISTICS
Category: ES **Credits :**
Semester V **Hours/Week : 6**

Objectives: 1) To impart basic concepts in actuarial studies

2) To prepare students to take up a career in Actuarial Practice

Unit –1 Effective Rate of Interest i - Nominal Rate of Interest $i^{(m)}$ - Force of Interest δ - Relationships between different rates of interest - Expression for δ by use of calculus - Present values - Effective rate of discount d - Nominal rate of discount $d^{(m)}$.

Unit - 2 Annuities - Immediate Annuity - Annuity-due - Perpetuity - Accumulation and Present values of Annuities - Increasing and Decreasing annuities - Annuities and interest rates with different frequencies - Continuous Annuities.

Unit - 3 Analysis of Annuity payments - Capital and Interest elements included in the Annuity payments - Loan outstanding after t payments - Purchase price of Annuities - Annuities involving income tax - Purchase price of an annuity net of tax.

Unit - 4 Stochastic Interest rates - Independent annual interest rates - The definition of S_n - Mean and variance of S_n - Definition of A_n - Mean and variance of A_n - Simple problems.

Unit - 5 Probabilities of living and dying - The force of mortality μ_x - Estimation of μ_x - Uniform Distribution of deaths - Select and Ultimate rates.

Books for study :

1. Dixit, S.P., Modi, C.S. & Joshi, R.V. (2002) Mathematical Basics of Life Assurance. Insurance Institute of India, Mumbai.
2. Donald, D.W.A.(1975). Compound Interest and Annuities certain .Heinemann, London.
3. Frank Ayres, J.R. (1983). Theory and problems of mathematics of finance. Schaum's outline series, Mc Graw Hill, Singapore.

Books for reference:

1. McCutcheon J.J. and Scott.(1989). Mathematics of Finance. Heinemann, London. Neill, A (1977). Life Contingencies. Heinemann, London.

BIO-STATISTICS AND SURVIVAL ANALYSIS

UG	STATISTICS
Category:	Credits:
Semester: V	Hours: 6

Objective: To introduce the applications of Bio-Statistics to the students.

UNIT I : Introduction To Study Designs- Different Types Of Observational Studies – Experimental Studies. Epidemiology – Odds- Odds Ratio- Confidence Interval For Odds Ratio- Control Event Rate – Experimental Event Rate – Relative Risk.

UNIT II : Research Questions About One Sample And Two Sample Problems For Means, Proportions. Both Parameteric And Non-Parametric Methods. Confidence Intervals. Independence Of Attributes By Contingency Tables.

UNIT III: General Information On Drug Discovery Including Louis Pasteur (Rabies, Small Pox) Ronald Ross (Malaria), Alexander Fleming (Penicillin) Jonas Salk (Polio) , Cholera, Asthma , Diabetes, Blood Pressure, Heart Attack, Arthrities. Phases of Clinical Trials – Purpose – Duration Cost , Etc- Drug Regulatory Bodies – ICH , Etc.

UNIT IV: Survival Time, Survival Distributions- Hazard Function- Exponential – Gamma – Weibull – Log Normal – Type I , Type II Censoring, Progressive Censoring – Estimation Of Parameters With Numerical Examples.

UNIT V: Estimating Survival Function And Variance Using Actuarial And Kaplan Meier Methods - Comparison Of Survival Distribution – Log Rank Test For Comparing 2 Groups.

Books For Study:

1. Dawson, Beth & Robert, G (2001) ; Basic & Clinical Biostatistics, Mcgraw-Hill
2. Ellisa T.Lee (1992): Statistical Methods For Survival Data Analysis
3. Steven Diantadosi (2000): Clinical Trials – A Methodological Perspective , John Willey.
4. Stephan Sann (2000) : Statistical Issues In Drug Development, John Wiley
5. Friedman, L.M, Forbes, C.D, And Demats, D.L(TT): Fundamental Of Clinica Trials, Springer.

Book For Reference:

1. David G. Kleinbawn (1996) : Survival Analysis, Springer.
2. Mathews, J.N.S. (2006) : Introducing To Randomized Controlled Clinical Trials, Chapman And Hall.

STATISTICAL DATA ANALYSIS USING SPSS

UG
Category: SK **Credits :**
Semester V **Hours/Week : 6**
Objective: 1) To train students in SPSS Software
2) To expose the students to the analysis of statistical data

Unit 1: Data handling: open SPSS data file – save – import from other data source – data entry – labeling for dummy numbers - recode in to same variable – recode in to different variable – transpose of data – insert variables and cases – merge variables and cases.

Unit 2: Data handling: Split – select cases – compute total scores – table looks – Changing column - font style and sizes

Unit 3: Diagrammatic representation: Simple Bar diagram – Multiple bar diagram – Sub-divided Bar diagram - Percentage diagram - Pie Diagram – Frequency Table – Histogram – Scatter diagram – Box plot.

Unit 4: Descriptive Statistics - Mean, Median, Mode, SD- Skewness- Kurtosis. Correlation – Karl Pearson's and Spearman's Rank Correlation , Regression analysis: Simple and Multiple Regression Analysis [Enter and stepwise methods]

Unit 5: Testing of Hypothesis: Parametric – One sample – Two sample Independent t – test – Paired t – test. Non – parametric: One sample KS test- Mann-Whitney U test – Wilcoxon Signed Rank test - Kruskal Wallis test – Friedman test- Chi- square test. Analysis of variance: One way and Two way ANOVA.

Books for Study:

1. Clifford E.Lunneborg (2000). Data analysis by resampling: concepts and applications. Dusbury Thomson learning. Australia.
2. Everitt, B.S and Dunn, G (2001). Applied multivariate data analysis. Arnold London.

Books for reference:

1. Jeremy J. Foster (2001). Data analysis using SPSS for windows. New edition. Versions 8-10. Sage publications. London.
2. Michael S. Louis – Beck (1995). Data analysis an introduction, Series: quantitative applications in the social sciences. Sage. Publications. London.

OPERATIONS RESEARCH

UG STATISTICS
Category: MC **Credits :**
Semester VI **Hours/Week : 6**

Objectives: 1) making problems based on deterministic and probabilistic models.

2) To impart an insight of the applications of Operations Research in Management

Unit 1 Introduction to OR - Linear programming problem - Formulation - Graphical method - Basic solution - Optimum solution - Simplex method - Various cases - Unbounded solution - Unrestricted variables, alternative optimum.

Unit 2 Need for artificial variables - Two phase method - Big M method - Primal, Dual relationship - Dual simplex method.

Unit 3 Transportation problem- North-west corner rule – least cost method- Vogel's Approximation Method – Modified Method, Assignment problem.

Unit 4 Networks - CPM and PERT - problems.

Unit 5 Decision under uncertainty - Laplace criterion - Minimax criterion - Savage criterion - Hurvitz theorem - Games - Two person zero sum games - Saddle point - Solving by graphical method - solving by LPP.

Books for study

1. Don T. Philips, Ravindran, A, James J. Solberg (2007), Operations Research: Principles and Practices, John Wiley & sons.
2. Hadley (2006), Linear Programming, Addison - Wesley publishers.
3. Hamdy A. Taha (2008) Operations Research - An Introduction (fourth edition), Macmillan publishers.

Books for reference:

1. Hillier, F.S. and Lieberman, G.J. (1974), Introduction to Operations Research, Holden Day Publishing, San Francisco.
2. KantiSwarup, Gupta, P.K., Manmohan (1993), Operations Research, Sultan Chand Publishers.
3. Mittal, K.V. (1976), Optimization Methods in Operations Research, Wiley Eastern.

DESIGN AND ANALYSIS OF EXPERIMENTS

UG STATISTICS

Category: MC **Credits :**

Semester VI **Hours/Week : 6**

Objective: 1) To provide basic principles of experimentation
2) To discuss the analysis of data relating to agriculture, biological sciences and industry.

Unit 1 Contrasts - linear constraints - orthogonal contrasts - linear models - fixed effect model - random effect model - mixed effect model.

Unit 2 Principles of experimentation - analysis of variance - one-way classification - two-way classification - two-way classification with more than one observation per cell efficiency of two way over one way.

Unit 3 Completely Randomised Design (CRD) - Randomised Block Design (RBD) - Latin Square Design (LSD) - missing plot techniques.

Unit 4 Factorial designs: 2^2, 2^3 and 3^2 factorial designs; confounding and partial confounding.

Unit 5 BIBD: Intra block analysisof BIBD. Construction of BIBD (Simple construction).

Books for study:

1. Gupta S.C and Kapoor V.K.(2008), Fundamentals of Applied Statistics
2. Montgomery, D.C. (2010), Design and Analysis of Experiments, John Wiley & sons.

Books for reference:

1. Das M.N. and Giri N. (1986), Design and Analysis of Experiments, Wiley Eastern.
2. Kempthorne, O. (1987), Design and Analysis of Experiments, Wiley Eastern.

STATISTICAL QUALITY CONTROL

UG **STATISTICS**
Category: MC **Credits : 6**
Semester : VI **Hours/Week : 5**

Objective: 1) To provide an insight into quality assessment techniques.

2) To provide an insight into the real-life and varied application of the subject.

Unit 1 Quality improvement in the modern business environment: Philosophy and basic concepts of quality improvement - Statistical methods for quality improvement - Total Quality Management (TQM).

Unit 2 Modeling process quality: Describing variation - Histogram, Stem and Leaf plot, Box plot, Frequency distributions, Quantile plot (qq-plot) applications.

Unit 3 Statistical Process Control (SPC): Methods and philosophy of SPC - Control charts for attributes data - p chart, np chart, c and u charts and D chart - Control charts for variables - X and R charts, X and S charts - Applications.

Unit 4 Basic principles of CUSUM and slant control charts - process capability analysis - Applications.

Unit 5 Acceptance sampling: The acceptance sampling problem - Single sampling plan for attributes with applications - Basic concepts of double, multiple and sequential sampling plans - Concept of CSP.

Books for study:

1. Montgomery, D.C. (2007), Introduction to Statistical Quality Control (Third Edition), John Wiley and sons Inc.
2. Duncan, A.J. (2010), Quality Control and Industrial Statistics (Fourth Edition), Irwin, Homewood, Ill.
3. Forrest W. Breyfogle III(1999)- implementing six sigma: smarter solutions using statistical methods, john Wiley and Sons, Inc.

Books for reference:

1. Schilling, E.G. (1982), Acceptance Sampling in Quality Control, Marcel Dekker Inc., N.Y.
2. Grant, E.L. and Leavenworth, R.S. (1980), Statistical Quality Control (Fifth Edition), McGraw Hill, New York.

R LANGUAGE

UG STATISTICS

Category: MC(Practical) **Credits :**

Semester VI **Hours/Week : 6**

Objective: 1) To impart efficient Data Handling Techniques
2) To equip students to Statistical Programming Skills based on real life examples and datasets

Unit 1: Overview of R Environment – R editor – Workspace – Data type – Importing and Exporting Data – Basic Computational Ideas – Merges in R

Unit 2: Matrix Determinant – Inverse – Transpose – Trace – Eigen Values and Eigen Vectors – Construction of Bar, Pie, Histogram, Line Chart, Box Plot, Scatter Plot

Unit 3: Parametric and Non Parametric testing of Statistical Hypothesis – One Sample t test – two group t test – paired t test – one way ANOVA- two way ANOVA – Latin Square Design – Sign Test – Wilcoxon – MannWitney – Kruskal Wallis

Unit 4: Simple Correlation - Linear Regression – Multiple Linear Regression – Testing for overall significance of Model Coefficients – Testing for Individual Regression Coefficients – Outliers Detection – Dealing with Multicollinearity

Unit 5: Control Charts – Variable Control Chart - $\bar{x}$, R, S. Attribute Control Chart- p, np, c, u. CUSUM Control Chart, EWMA Control Chart, Process Capability Analysis.

Books for reference:

1. Learning Statistics using R By Rndall E.Schumacker, Sage Publication
2. R for Everyone By Jared P.Lander, Pearson Education

SURVEY PRACTICE AND REPORTING

UG STATISTICS
Category: MS **Credits :**
Semester VI **Hours/Week : 6**

Objective: 1) To motivate the students to understand the fundamentals to Sampling Survey

2) To enable and motivate the students to perform Statistical Analysis in Sampling Survey

Groups of students are expected to collect Primary Data through Design of Sample Surveys and Secondary Data from various sources, carry out statistical analysis and present a report on their findings. The surveys shall address some of the contemporary issues.

The data analysis needs to be carried out using any statistical package of the students' choice.