B.STAT
SYLLABUS: 2011

CHOICE BASED CREDIT SYSTEM (CBCS)

St. JOSEPH'S COLLEGE (Autonomous)
Re-accredited with A+ Grade by NAAC
College with Potential for Excellence by UGC
TIRUCHIRAPPALLI - 620 002, TN
## B. STAT: COURSE DETAIL – 2011

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பதவியம் - 1

B.Stat

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GENERAL ENGLISH – I

Objectives:
1. To enable the students to develop their effective communicative skills in English.
2. To empower the students with fluency and accuracy in the use of English Language.
3. To transform them into globally employable persons with placement skills.

UNIT-I 12 Hrs
Prose
- Education.
- Employment.
- Unemployment.
Poem
- William Shakespeare—“All the World’s a Stage.”
Letter Writing
- Formal and Informal.
Short Story
- O Henry – Robe of Peace. (Extensive Reading).
Essential English Grammar – 1-6 units

UNIT-II 12 Hrs
Prose
- Application.
- Planning.
- Curriculum Vitae.
Poem
- Ben Jonson—“On Shakespeare”
Letter Writing
- Reading Comprehension
Short Story
- Rudyard Kipling—The Miracle of Puran Bhagat (Extensive Reading).
Essential English Grammar – 7-12 units

UNIT-III 11 Hrs
Prose
- Interview.
- Reporting.
- General Knowledge.
Poem
- Robert Herrick—“Gather Ye Rosebuds.”
- Note Making
Short Story
- H.G.Wells—The Truth About Pyecraft (Extensive Reading).
Essential English Grammar – 13-18 units

UNIT-IV 20 Hrs
Prose
- Review. (Super Toys)
- Stress.
- No Time.
Poem
- Oliver Goldsmith—“ The Village Schoolmaster”
- Developing story from hints
Short Story
- John Galsworthy—“Quality” (Extensive Reading).
Essential English Grammar – 19-24 units

UNIT-V 15 Hrs
Prose
- Killers.
- Galloping Growth.
- A Short Story.
Poem
- William Blake—“ From Auguries of Innocence”
- Précis Writing
Short Story
- William Somerset Maugham— Mabel (Extensive Reading).
Essential English Grammar – 25-30 units

Text Books
DESCRIPTIVE STATISTICS

Objective:
To explain how to analyse the given data. At the end of the course a student should be able to solve simple real life problems.

UNIT – I Collection and Scrutiny of Data
Origin and meaning of statistics – general uses-relation with other disciplines-Limitations and misuses of statistics.
Methods of collection: Complete enumeration – sample survey-Primary data; methods of collection; secondary data sources.

UNIT – II Presentation of Data
Presentation of data by tables and diagrams- construction of tables (univariate and bivariate)- classification – graphical representation of a frequency distribution by histogram, frequency polygon and Ogives.
Diagrammatic presentation: Line diagram, Bar diagrams: Simple, multiple, subdivided and percentage-Pie chart, comparative pie chart.

UNIT – III Analysis of Data (Univariate)
Measures of central tendency: Arithmetic mean-weighted mean-median-partition values-mode-geometric mean-Harmonic mean-choice of an average-characteristics of a good average.
Measures of dispersion: range-quartile deviation-mean deviation -standard deviation - relative measures of dispersion - Coefficient of variation-Lorenz curve.
Measures of skewness and kurtosis.

UNIT – IV Analysis of Data (Bivariate)
Correlation: Scatter plot-coefficient of correlation-probable error-coefficient of determination-Spearman’s rank correlation coefficient-correlation coefficient for bivariate frequency table-correlation ratio-partial
and multiple correlations (with respect to three variables only).
Association of attributes: Dichotomy-order of classes association and disassociation-methods: (I) comparison of observed and expected frequencies (II) proportion method, (III) Yule’s coefficient of association, (iv) coefficient of colligation.

UNIT – V Analysis of Data (Fitting of Mathematical Models)
Simple regression analysis: Distinction between regression analysis and correlation- Linear regression: Finding regression equations by Graphical method, method of least squares and using statistical constants( $\bar{x}, \bar{y}, s_x, s_y$ and $r$). Properties of linear regression coefficients. Curvilinear regression: Fitting of second degree Parabola, exponential and power curves.
Note: Probability and Expectation concepts are to be avoided.

TEXT BOOK:

REFERENCE BOOKS:

Note: The question paper may consist of Theory and Problems in the ratio 50:50.
COMPUTATIONAL STATISTICS – I (Internal)

Objective:
To impart the computational skills to the students.

UNIT – I

UNIT – II
Measures of Central Tendency: Mean, Median, Mode, Geometric mean, Harmonic mean, Weighted mean, Partition values. Measures of Dispersion: Range, Mean Deviation, Quartile Deviation, Standard Deviation, Combined Standard Deviation, Coefficient of Variation.

UNIT – III
Skewness and Kurtosis: Raw moments, Central moments Karl Pearsons coefficient of skewness, Bowley’s coefficient of skewness $\beta_1$, $\beta_2$, $\gamma_1$, $\gamma_2$.

UNIT – IV
Correlation: Karl Pearson’s correlation coefficient, Spearman’s rank correlation coefficient, coefficient of determination. Theory of attributes: Independence of attributes, consistency of data, Yule’s coefficient of association and Yule’s coefficient of colligation.

UNIT – V
Regression analysis: Lines of regression, exponential curves, Power curves, Parabola. Partial and multiple correlation coefficients with respect to three variables.

COMPUTER LAB – I
(OFFICE AUTOMATION)

Objective:
To train the students to solve practical problems with the help of the constituents of MS Office.

1. Entering a letter, aligning, editing, spell check and printing.
2. Creating Tables, inserting rows and columns and formatting.
3. Creating main document, data source and using mail merge facility.
4. Entering Text in Cells of Excel worksheet and entering formulas.
5. Formatting Cells, Centering across selection and changing font and size.
6. Preparing Pie chart and Bar charts.
7. Creating a new presentation in Power Point, numbering and copying slides.
9. Inserting Bullets and Pictures, Creating Tables and Inserting Autoshapes.
SEMESTER – I  
11UST130401  
CREDITS : 5  

ALLIED: COMPUTERS IN STATISTICS – I  
(OFFICE AUTOMATION)

Objectives:
- To train the students to get acquainted with the essential features of constituents of MS-Office.

UNIT – I  
Windows 2007

UNIT – II  
MS Word Basics

UNIT – III  
MS Word – Working with Tables and Graph
Adding a Table to your document – deleting, merging and splitting cells – Adding and deleting columns and rows.

UNIT – IV  
MS Excel Work Sheet Basics
Data Entry on the Worksheet – Built-in functions for good use – operations on Table – printing the data and results.

UNIT – V  
MS Excel – Statistical Applications
Construction of Line charts, Bar charts, Pie charts and scatter diagrams – Exporting data to Word and Power point.

TEXT BOOKS:
1. Office 2007 in simple steps, kogent solutions Team, Dream Tech., 2010 (chapters 1 to 7)
பதிவு : 2011

B.Stat

பதிவு : 5
(12 பாடல் ப்பிருபே)

ஜூன்றுவ கருவகம் – அமையும் பலை

ஜூன்றுவ எண்ணூறு – 5 புது விளக்கச் சுருக்கங்கள் பற்றிய


மணக் கிளை – கூட்டுவகாலத் தொகுப்பை, 2011-2014

மணக் கிளை – கூட்டுவகாலத் தொகுப்பை, எக்ளோய் தொகுப்பை, 2010

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GENERAL ENGLISH –II

Objectives:
1. To enable the students to develop their effective communicative skills in English.
2. To empower the students with fluency and accuracy in the use of English Language.
3. To transform them into globally employable persons with placement skills.

UNIT-I  12 Hrs
Prose  Environment.
A Dead Planet.
Riddles.
Poem  William Wordsworth—Nutting.
Shelley- Ozymandias.
Filling Money Order Chalan and Bank Chalan
Short Story  G.K.Chesterton – The Hammer of God (Extensive Reading)
Essential English Grammar: -31-36 Units

UNIT-II  12 Hrs
Prose  Qahwah
A Dilemma
Computeracy
Poetry  John Keats—La Belle Dame Sans Merci
Robert Browning- The Last Ride Together
Short Story  Katherine Mansfield—A Cup of Tea (Extensive Reading)
Dialogue Writing
Essential English Grammar:37-42Units

UNIT-III  11 Hrs
Prose  Review (Use Your English)
Entertainment
You and Your English
Poetry  Walt Whitman- I Čelebrate Myself.
Mathew Arnold—Dover Beach.

UNIT-IV  20 Hrs
Prose  War Minus Shooting .
Usage and Abusage.
Poetry  Sarojini Naidu—The Gift of India..
Robert Frost—Design .
Short Story  R.K. Narayana—Half a Rupee Worth (Extensive Reading)
Manohar Malgonkar—Bacha Lieutenant

UNIT-V  15 Hrs
Prose  Who’s Who.
Poetry  Nissim Ezekiel. The Night of The Scorpion
Short Story  Anita Desai—A Devoted Son (Extensive Reading)
Ruskin Bond—The Boy Who Broke the Bank(Extensive Reading)
Report Writing
Letter to the Editor
Essential English Grammar: 55-60Units

Text Books
Objective:
Inferential Statistics helps one to make inferences about a whole group by studying a part of it. This is the vital reason for the present importance and popularity of Statistics in diversified fields. The techniques in Inferential Statistics by and large depend on Probability concepts. Hence the study of Probability theory in this Semester serves as a pre-requisite for all the subsequent Semesters.

UNIT – I
Random experiment sample point, sample space, algebra of events, operation on events, classical and relative frequency approach to probability-discrete probability space, axiomatic approach to probability.

UNIT – II
Addition theorem of probability - Conditional probability-independence of events-multiplication theorem-Baye’s theorem and its application.

UNIT – III
Definition of discrete and continuous random variables - probability mass function, probability density functions, distribution function and their properties. Expectation of random variables and its properties. Joint distribution of two random variables, marginal and conditional distributions. Independence of random variables. Covariance, Correlation.

UNIT – IV
Moment generating functions - Characteristic functions – Inversion and Uniqueness theorems. (Statement only) cumulant generating functions and its properties. Moments, measures of central tendency, dispersion, skewness and kurtosis.

UNIT – V
Chebyshev’s Inequality and applications-Markov inequality-Concept of convergence in probability - Weak law of large numbers - Central limit theorems (De-Moivre and Levy - Lindeberg Levy theorem).

TEXT BOOK:

REFERENCE BOOKS:
COMPUTATIONAL STATISTICS – II (Internal)

Objective:
To impart the computational skills to the students

UNIT – I
Problems under the following: Random experiment sample point, sample space, algebra of events, Operation on events, classical and relative frequency approach to probability-discrete probability space, axiomatic approach to probability.

UNIT – II
Problems under the following: Addition theorem of probability - Conditional probability-independence of events-multiplication theorem-Baye's theorem.

UNIT – III
Problems under the following: Discrete and continuous random variables - probability mass function, probability density functions, distribution function. Expectation of random variables. Measures of central tendency, dispersion, skewness and kurtosis.

UNIT – IV
Problems under the following: Joint distribution of two random variables, marginal and conditional distributions. Independence of random variables. Covariance, Correlation.

UNIT – V
Problems under the following: Moment generating functions - Characteristic functions – Chebyshev's Inequality and applications – Weak law of large numbers.

COMPUTER LAB – II
(C Programming)

Objective:
To train the students to design and execute a variety of C programs on Computers.

List of Exercises
1. Use of GETC,PUTC, GETS and PUTS statements.
2. Use of SCANF and PRINTF statements.
3. Calculation of mean and variance.
4. Squeezing a given character string (Elimination of all white charaters).
5. Writing a character string in reverse order.
6. Computation of correlation and Regression Coefficients.
7. A problem involving Recursion or Palindrome.
9. Creation and updating of a sequential file
10. Creation and updating of a random file
Objective:
To explain the main features of C language, which plays a pivotal role in the programming field.

UNIT – I Intoductory concepts
Introduction to C - Fundamentals of C - Constants, Variables, Declarations - Expressions - Special Arithmetic operators - Conversions- Library routines - Execution of C programs in UNIX Environment.

UNIT – II Simple and Control Statements
Simple statements- GETC, PUTC, GETS, PUTS, SCANF, PRINTF and assignment statements – Illustrations.
Control statements- IF statements, SWITCH statements, GOTO statement- FOR, WHILE, DO WHILE statements – Problems.

UNIT – III Functions and Arrays
Functions- Importance of Functions in C – Declaration – Usage- Argument passing methods-Storage classes.
Arrays-Declarations-Dimensions-Usage-Arrays with Functions-Applications.

UNIT – IV Pointers
Pointers-Importance-Declaration-Pointer Arithmetic-Pointer Expression-Passing of Pointers- Pointers with Arrays-Pointers to Pointers.

UNIT – V File Processing
File Processing(Sequential and Random)- File organizations- Accessing methods-File processing statements-Simple Applications- Creation, Processing and Updating of files.

TEXT BOOKS:

REFERENCE BOOKS:
**பட்டியல்** - III

**பட்டியல்காரர்கள்**

1. கூட்டமைப்பு குரிய பொருளே பல்வேறு பல்வேறு பல்வேறு பல்வேறு பொருளே
   - பல்வேறு பொருளே பல்வேறு பல்வேறு பல்வேறு
2. பொருள் தவற் பல்வேறு கருதி அவள் கருதி கருதி
   - பொருள் தவற் பல்வேறு பல்வேறு
3. பொருள் தவற் பல்வேறு
4. பொருள் தவற் பல்வேறு
5. பொருள் தவற் பல்வேறு

**பட்டியல்கள்**

1. கூட்டமைப்பு குரிய பொருளே பல்வேறு பல்வேறு
2. பொருள் தவற் பல்வேறு
3. பொருள் தவற்

**கால் : 1**

(16 மறை விளக்க)

- உலகியல் - ஜியோவியல் (புதுக்கோட்டு)

**கால் : 2**

(10 மறை விளக்க)

- உலகியல், ஜியோவியல், பானேசியல் (வளிமார், அதிகியல்)

**கால் : 3**

(10 மறை விளக்க)

- தொழில்நுட்ப பட்டியல் - 'தொழில்நுட்ப பட்டியல் பட்டியல் தொழில்நுட்ப பட்டியல்'
- தொழில்நுட்ப 'தொழில்நுட்ப பட்டியல்' (தொழில்நுட்ப)
- புதுக்கோட்டு - புதுக்கோட்டு

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OBJECTIVES:
1. To enable the students to complete the pre-reading task to comprehend the local and global issues in the lessons.
2. To enable the students to complete the post-reading task centering on Grammar and Skill Development.
3. To empower the students with globally employable skills.

UNIT-I 12 Hrs
Larry Collins & Dominque Lapierre
Freedom at Midnight (Extract)
Alfred Uhry
Driving Miss Daisy
Extensive Reading—Robinson Crusoe (Chapters 1-3)

UNIT-II 12 Hrs
Alfred Lord Tennyson
Ulysses
Nathanial Branden
Our Urgent Need for Self-esteem
Extensive Reading—Robinson Crusoe (Chapters 4-6)
Essential English Grammar—67-72.
Reader’s Mail :The Hindu

UNIT-III 11 Hrs
Daniel Goleman
Emotional Intelligence
Marcel Junod
The First Atom Bomb.
Extensive Reading—Robinson Crusoe (Chapters 7-9)
Essential English Grammar—73-78.
Job Application.

UNIT-IV 20 Hrs
E.K.Federov
Climate Change and Human Strategy.
Paolo Mauro
Corruption: Cases, Consequences and Agenda for further Research.
Extensive Reading—Robinson Crusoe (Chapters 10-12)
Essential English Grammar—79-84.
Minutes Writing.

UNIT-V 15 Hrs
Anne Frank
The Diary of Young Girl
A.P.J.Abdul Kalam
Wings of Fire
Extensive Reading—Robinson Crusoe (Chapters 13-15)
Resume Writing.

TEXT BOOKS
DISCRETE PROBABILITY DISTRIBUTIONS

Objective:
To expose the various important discrete probability models and real life situations where these distributions provide appropriate models.

UNIT – I Bernoulli and Binomial Distributions

UNIT – II Poisson Distribution
Introduction to Poisson Distribution – moments - mode - Recurrence relation for the moments-MGF-Characteristic function – Cumulants - Additive property- Fitting of Poisson Distribution.

UNIT – III Negative Binomial Distribution
Introduction to Negative Binomial Distribution - MGF of Negative Binomial Distribution - Cumulants - Poisson as limiting case.

UNIT – IV Geometric and Hypergeometric Distributions

UNIT – V Multinomial and Power Series Distributions
Multinomial Distribution - moments of Multinomial Distribution - Introduction to Power Series distribution(Concept only).

TEXT BOOK:

REFERENCE BOOKS:
CONTINUOUS PROBABILITY DISTRIBUTIONS

Objective:
To expose the various important continuous probability models and real life situations where these distributions provide appropriate models.

UNIT – I Normal Distribution
Introduction to Normal Distribution-Limiting form of Binomial Distribution-Chief characteristics and its curve-Mean, median, Mode - M.G.F, moments and Cumulants -Points of Inflexion- Area property-Importance of Normal Distributions -fitting of normal distribution.

UNIT – II Rectangular, beta and Gamma Distributions
Introduction to Rectangular Distribution- M.G.F-moments, mean deviation about mean-Beta and Gamma Distributions : M.G.F, mean, harmonic mean, moments, and relationship between Beta and Gamma Distributions.

UNIT – III Exponential and Cauchy Distributions
Exponential Distribution- MGF of Exponential Distribution - Cauchy’s distribution: characteristic function, additive property and Moments – Lognormal distribution.

UNIT – IV Bivariate Normal Distribution

UNIT – V Sampling distributions: t, $\chi^2$ and F distributions:-Derivations of the distributions, Constants and M.G.F -Inter relationship between these distribution.

TEXT BOOK:

REFERENCE BOOKS:
SEMESTER – III
11UST330403A

ALLIED MATHEMATICS I

[For II B.Sc Statistics]

UNIT – I
Partial Fractions, Solving cubic equations with rational coefficients by trial and error method.

UNIT – II
Binomial theorem for positive integral index and rational index – Exponential Series and Logarithmic Series – only approximations in all the three series.

UNIT – III

UNIT – IV
Differentiation – Successive differentiation upto 2nd order only -Partial differentiation upto 2nd order – Application (and not verification) of Euler’s theorem.

UNIT – V
Integration of the following types only:
Type I → direct application of formulae
Type II → Integration using Substitution

\[
\text{Type III} \rightarrow \int \frac{(lx + m)}{(ax^2 + bx + c)} \, dx \\
\text{Type IV} \rightarrow \int \frac{(lx + m)}{\sqrt{(ax^2 + bx + c)}} \, dx \\
\text{Type V} \rightarrow \int \frac{(p \sin x + q \cos x)}{(a \sin x + b \cos x)} \, dx \\
\text{Type VI} \rightarrow \int \frac{dx}{(a \sin x + b \cos x + c)}
\]

Note: i) The syllabus does not include the proof of any theorem.
ii) The students are to be trained in simple illustrative examples only

Text Book:
Ancillary Mathematics by Narayanan and Manickavagam pillai—Relevant volumes.

REFERENCE:
Allied Mathematics by P. Kandasamy & K. Thilagavathy - Relevant Volumes.
ALLIED: ACCOUNTS - I

OBJECTIVES
- To enable the students to have a thorough knowledge of the fundamental concepts basic principles of accountancy.
- To provide knowledge on the importance of maintaining various book of accounts.

UNIT – I
(18 Hours)
Accounting principle concepts- subsidiary books – ledger

UNIT – II
(18 Hours)
Trail balance – bank reconciliation statement- rectification of errors

UNIT – III
(18 Hours)
Trading, Profit and Loss Accounts – Balance Sheet of a sole trader (Simple Adjustments)

UNIT – IV
(18 Hours)
Non-trading organization – Preparation of income and expenditure account form receipts and payment accounts (simple adjustments)

UNIT – V
(18 Hours)
Single entry or Accounts from incomplete records.

TEXT BOOK

REFERENCES
Syllabus : 2011

B.Stat

**Paper 1**

1. STATIC
   - Probability
   - Random Variables
   - Limit Theorems
   - Mathematical Statistics
   - Sample Surveys
   - Testing of Hypotheses
   - Estimation
   - Regression and Correlation
   - Time Series
   - Quality Control
   - Reliability

2. DYNAMIC
   - Stochastic Processes
   - Brownian Motions
   - Markov Chains
   - Renewal Theory
   - Queuing Theory
   - Inventory Models
   - Stochastic Control
   - Financial Mathematics
   - Stochastic Calculus

3. STATISTICS
   - Bayesian Statistics
   - Nonparametric Methods
   - Survival Analysis
   - Categorical Data Analysis
   - Multivariate Analysis
   - Factor Analysis
   - Cluster Analysis
   - Discriminant Analysis
   - Canonical Correlation
   - Structural Equation Modeling
   - Time Series Analysis
   - Longitudinal Data Analysis

4. DISTRIBUTIONS
   - Discrete Distributions
   - Continuous Distributions
   - Survival Distributions
   - Multivariate Distributions
   - Order Statistics

5. INFERENCE
   - Point Estimation
   - Interval Estimation
   - Hypothesis Testing
   - Nonparametric Tests
   - Bayesian Inference
   - Decision Theory
   - Bayesian Networks
   - Belief Networks

6. SIMULATION
   - Random Number Generation
   - Simulation of Stochastic Processes
   - Monte Carlo Methods
   - Importance Sampling
   - Variance Reduction Techniques
   - Markov Chain Monte Carlo
   - Sequential Monte Carlo
   - Bootstrap Methods

7. OPTIMIZATION
   - Unconstrained Optimization
   - Constrained Optimization
   - Global Optimization
   - Stochastic Optimization
   - Dynamic Programming
   - Integer Programming
   - Network Flows
   - Computational Graphs
   - Machine Learning

8. DESIGN OF EXPERIMENTS
   - Factorial Designs
   - Fractional Factorial Designs
   - Response Surface Methods
   - Taguchi Methods
   - Robust Design
   - DOE Software

9. EXPERIMENTAL DESIGN
   - Latin Squares
   - Balanced Incomplete Block Designs
   - Crossover Designs
   - Split Plot Designs
   - Hierarchical Designs
   - Nested Designs
   - Split Rank Designs
   - Stratiﬁed Sampling
   - Sampling from Finite Populations

| Chapter | Marks
|---------|-------|
| 1       | 20 (20 marks)
| 2       | 20 (5 marks)
| 3       | 60 (4 marks)
| 4       | 15 (1 mark)

**References**

1. K. J. Arrow, S. Karlin, Probability of measuring the states of nature (Bewley),
   Dhanbad Academic Publishers, Dhanbad.

**Exam Pattern**

- Paper 1: 3 hours, 180 marks
- Paper 2: 3 hours, 180 marks
- Paper 3: 3 hours, 180 marks
- Total: 540 marks
GENERAL ENGLISH - IV

Objectives:
1. To enable the students to complete the pre-reading task to comprehend the local and global issues in the lessons.
2. To enable the students to complete the post-reading task centering on Skill Development and Grammar.
3. To empower the students with globally employable soft skills.

UNIT-I 12 Hrs
Life Stories
F.G. Herod
Mother Teresa
R.K. Narayan
Swami and Friends
Extensive Reading
Treasure Island (1-4)
Essential English Grammar
91—95.
Film Review (The Hindu).

UNIT-II 12 Hrs
Imogen Grosberg
See Off the Shine
George Orwell
The Porting Spirit
Extensive Reading
Treasure Island (5-8)
Essential English Grammar
96-100.
Article Writing on Current Issues.

UNIT-III 11 Hrs
Philip Agre
Building an Internet Culture
Satyajit Ray
Odds Against Us
Extensive Reading
Treasure Island (9-12)
Essential English Grammar
Mock Interviews
101-105.

UNIT-IV 20 Hrs
Jerzy Kosinski
TV as Babysitter.
E.F. Scumacher
Technology With Human Face.
Extensive Reading
Treasure Island (13-17)
Essential English Grammar
Mock Group Dynamics
106-110.

UNIT-V 15 Hrs
Aluizio Borem, Fabrico
R. Santos & David E. Bower
Advent of Biology
Mark Ratner & Daniel Ratner
Nanotechnology
Extensive Reading
Treasure Island (18-22)
Essential English Grammar
Presentation Skills
111-114.

Text Books
**ELEMENTS OF STATISTICAL INFERENCE**

**Objective:**
To enable the students to clearly understand the concepts of statistical estimation and statistical hypothesis testing.

Good knowledge in Probability is the pre-requisite for this paper. Inferential Statistics helps us to infer about a whole group (population) by just studying a part of it (sample). When a population is to be studied, two distinct situations usually arise: (i) To know the unknown population characteristics (parameters), (ii) There may be some assumptions (hypotheses) about the population which should be tested for their validity. The Estimation theory is needed to tackle the first type of situations and Testing of Hypothesis is instrumental in dealing with the second type of situations. It is not an exaggeration to state that these are the two eyes of Statistical Inference. At the end of the course, the student will definitely be in a position to solve many social, economical, biological and other practical real-life problems.

**UNIT – I  Point Estimation Theory**

**UNIT – II  Testing of Hypothesis**
Simple and composite hypothesis - two kinds of errors, level of significance, size and power a test-desirable properties of a good test, most powerful test, Neyman-pearson lemma and its use – Simple example, Uniformly most powerful tests and unbiased tests based on normal Likelihood ratio test (without proof) and its properties. Applicatlon of LR test for single mean.

**UNIT – III  Tests of Significance**
Tests of significance-Asymptotic and exact tests based on normal, t, chi-square and F distributions with regard to mean, variance, standard deviation, coefficient of correlation, regression coefficients, partial and multiple correlation coefficients. contingency tables-tests for goodness of fit and test for independence of attributes. Tests for homogenity of variances, proportions and correlation coefficients.

**UNIT – IV  Interval Estimation**
Confidence Interval:
Interval estimation for proportions, mean(s), Variance(s) based on Chi-square, student’s t, F and Normal distributions.

**UNIT – V  Non-parametric tests**

**TEXT BOOK:**

**REFERENCE BOOKS:**
SEMMESTER – IV
11UST430404A

ALLIED MATHEMATICS II
[For II B.Sc Statistics]

UNIT - I
Integration of the following types only:
Type I  Definite Integrals - direct application of formulae for
\[ \int_{a}^{b} f(x)dx; \int_{-a}^{a} f(x)dx \text{ when } f(x) \text{ is even or odd} & \int_{0}^{2a} f(x)dx \]
Type II  →  Integration by parts
Type III  →  Bernoulli’s formula
Type IV  →  Double Integral with constant limits only
Type V  →  Triple Integral with constant limits only

UNIT – II

UNIT – III
Differential Equations of the II order with constant co-efficients with particular Integral for \( e^{ \alpha x}, \sin kx, \cos kx \) and \( x^{n} \)– Homogeneous Differential Equations of II order with variable co-efficients.

UNIT – IV
Complex numbers – finding the modulus and the amplitude of a complex number-Simple applications of De Moivre’s theorem. Fourier series in the interval \([-\pi, \pi]\) and \([0, 2\pi]\) only.

UNIT – V

Note: i) The syllabus does not include the proof of any theorem.
ii) The students are to be trained in simple illustrative examples only

Text Book:
Ancillary Mathematics by Narayanan and Manickavachagam pillai—Relevant volumes.

REFERENCE:
Allied Mathematics by P. Kandasamy and K. Thilagavathy.
OBJECTIVE

* To impart basic knowledge of partnership and company accounts
* To help students to know the treatment of account in different situations.

UNIT – 1 (20 Hours)

UNIT – 2 (20 Hours)

UNIT – 3 (20 Hours)

UNIT – 4 (15 Hours)

UNIT – 5 (15 Hours)
Company Final Account (Simple Adjustments)

REFERENCES

TEXT BOOK
ELECTIVE – I: NUMERICAL MATHEMATICS

Objectives
1. To tackle the practical situations demands the use of interpolation and extrapolation.
2. To solve Mathematical calculus problems, whenever the classical approach fails.
3. To solve mathematical calculus problems through computers.

UNIT – I Interpolation
Interpolation – Symbolic relations – Newton’s Forward and Backward difference formulae, Newton’s divided difference (general) formula – Lagrange’s formula.

UNIT – II Central Difference Formulae
Gauss forward and backward formulae-Stirling’s formula-Bessel’s formula-Everett’s formula-Appropriateness of formulae.

UNIT – III Inverse Interpolation
Inverse Interpolation: Method of successive approximation-Elimination of third order difference-Lagrange’s formula applied inversely.

UNIT – IV Solutions of Algebraic Equations
Bisection method, Regula falsi method and Newton-Rapson method.

UNIT – V Numerical differentiation and Integration
Numerical differentiation: Numerical differentiation up to second order-maxima and minima of a tabulated function.
Numerical integration: Trapezoidal rule - Simpson’s one third and three eighth rules - Weddle’s rule.

TEXT BOOKS:

REFERENCE BOOK:

Note: The question paper may consists of Theory and Problem in the ratio 40:60.
ELECTIVE – I: REAL ANALYSIS

Objectives:
To introduce the basic concepts in Real Analysis, which will help the students to easily understand probability concepts & inference concepts at a later stage in the course.

UNIT – I Fundamental concepts
Definition of a sequence-limit of a sequence-convergence and divergence of sequence - Bounded sequence-monotone sequence - Operations on convergent and divergent sequences. Limit superior and Limit inferior-Cauchy’s general principle of convergence (statement only).

UNIT – II Series

UNIT – III Differential Calculus
Concepts of Derivatives – Algebra of derivatives – Rolle’s theorem – Mean value theorem - Cauchy’s formula – Taylor’s series and Maclaurin’s series of functions of one variable. Simple problems (ex, log(1+x), cosx, sinx).

UNIT – IV Integral Calculus
Definition of Riemann Integral – Necessary and Sufficient condition for Riemann integral. Darboux theorem – Fundamental theorems of Integral calculus – First mean value theorem.

UNIT – V Improper Integrals
Improper Integrals: First kind, Second kind – Beta and Gamma integrals and their properties – Simple problems.

TEXT BOOKS:

REFERENCE BOOKS:
SAMPLING THEORY

Objective:
To impart the basic knowledge of statistical sampling concepts. At the end of the Course, the student should be able to select the suitable sampling techniques. Also, he should be in a position to conduct sample survey independently.

UNIT – I Sample Survey
Complete enumeration Vs Sampling – need and limitations of sampling design -Organization and Execution of Sample Surveys-Essential aspects of Sample Survey-Pilot Survey-Sources of Error in a survey. Sampling and Non-sampling errors.

UNIT – II Simple Random Sampling
Simple random sampling (WR and WOR) - Use of Random number Table-Unbiased estimates of Mean and Variance-Estim ation of Sample Size-Sampling for attributes.

UNIT – III Stratified Random Sampling
Stratified Random Sampling : Properties of the estimates - Unbiased estimates of Mean and Variance-Optimum and Proportional allocations-Comparison of different allocation.

UNIT – IV Systematic Sampling
Need for Systematic Sampling-Estimation of Mean and Variance of the Estimated mean-Comparison of Simple and Stratified random sampling with Systematic sampling-systematic sampling when the population with linear Trend.

UNIT – V Ratio & Regression Estimators
Ratio estimators: Ratio estimates, Variance of the Ratio Estimates-Ratio Estimator as BLUE- Bias of the ratio estimate. Regression estimators:
APPLIED STATISTICS
(Economic Statistics, Demography and Psychometry)

Objective:
To provide fundamental ideas about application of statistical concepts in the real world.

Statistics finds innumerable applications in almost all walks of life. One cannot exhaust all such applications in a course. Due to this reason, this paper is devoted to discuss the application of Statistics in three vital areas, namely Economics, Poluation studies, Psychology and Education.

Economic Statistics
UNIT – I  Time Series

UNIT – II  Index Numbers
Index numbers and their definitions, construction and uses – Commonly used index numbers – Laspeyre’s Paasche’s and Fisher’s ideal numbers – Criteria of a good index numbers. Test for index numbers like time-reversal test, factor – reversal test, Circular test. Fixed and Chain base index numbers – Cost of living index number – Base shifting, splicing and Deflating of index numbers.

UNIT – III  Demography

UNIT – IV  Life Table

UNIT – V  Psychometry
Methods of Standardisation of scales and tests. Z-scores, Standard scores, T scores, Percentile scores, Intelligent quotient and its measurement and uses – Validity of test scores and its determinations.

TEXT BOOK:

BOOK FOR REFERENCE:
LINEAR MODELS AND ECONOMETRICS

Objective:
The knowledge of Probability Theory, Quadratic forms and vector spaces in Mathematics is the pre-requisite for this paper. The purpose of this paper is to explain how to deal with multivariate (linearly related) situations. As an applications, Econometrics is introduced as a component.

UNIT – I Multivariate Normal Distribution

UNIT – II Linear Model

UNIT – III General Linear Model
General linear hypothesis model of full rank – Point estimation under normal and non-normal cases – Gauss Markow theorem – Interval estimation – Testing of hypothesis of $y = x\beta$ (main hypothesis only)

UNIT – IV Econometrics

UNIT – V Problems of Single Equation Model

BOOKS FOR STUDY:

BOOKS FOR REFERENCES:
Objective:
To import basic knowledge of various optimization techniques.
Resources are scarce in many a situation. Any decision making process may have to take into account, a set of constraints. The optimization in such situation is of vital importance. This paper involves few important optimization techniques that are free from Statistical concepts.

UNIT – I Nature of OR and LPP

UNIT – II Advanced Topics in LPP
Duality theory and its applications-Framing dual program-relationship between dul and primal problem-Dual simplex method (simple problems only).

UNIT – III Transportation Problem
Transportation problem—Linear programming formulation-Finding an Initial basic feasible solution by Northwest corner rule and Vogel’s rule-Optimality-Degeneracy.

UNIT – IV Assignment Problem
Assignment problem-Solving an assignment problem by Koney method (Hungarian)-Travelling Salesman Problem.

UNIT – V Sequencing and Replacement Problems
Sequencing Problem-Processing n jobs through two machines-Processing n jobs through three machines-Processing n jobs through m- machines.

Replacement Problems: Replacement of items whose maintenance costs increases with time and the value of the money remains the same during the period.

TEXT BOOK

REFERENCE BOOKS:
ELECTIVE – II : ACTUARIAL STATISTICS

Objective:
To study the vital application of statistics in the field of actuarial science

UNIT – I
Accumulated value and present value of a sum under fixed and varying values of interest. Nominal and effective values of interest – Annuity – Classifications of annuities – Present accumulated values of annuities – Immediate annuity due and deferred annuity.

UNIT – II
Redemption of loans – Redemption of loans by installments payable times in a year interest being p.a. effective. Role of probability distribution in general insurance (Weibull, Exponential).

UNIT – III

UNIT – IV

UNIT – V

TEXT BOOKS:
1. Mathematical basis of Life Assurance (IC-81): Published by Insurance Institute of India, bombay.
ELECTIVE – II: ELEMENTS OF STOCHASTIC PROCESSES

Objective:
Any characteristic that changes with respect to some parameter, say time, constitutes a process. When those changes are unpredictable (i.e., random or stochastic), the tools and techniques available in Stochastic process comes to our help to deal with such circumstances. This field is gaining momentum by being applied in many advanced scientific fields.

Wide spectrum of its applications are dealt with in the higher level courses. However the basic ideas will motivate the students to learn more about this fascinating area. This paper serves this purpose.

UNIT – I Types of Stochastic Processes
Elements of Stochastic Processes: Review of basic terminology: Classification of stochastic processes according to state space and index set – Elementary ideas on Poisson processes, Wiener processes, Martingales, Markov Processes and Stationary processes.

UNIT – II Markov Chain

UNIT – III
Classification of states of Markov chain. Recurrent Markov chain with examples – Periodicity Ergodic state – concepts, results and problems concerning limiting probabilities (i.e), $p_i^n(n)$ as $n$ (proof are excluded) Simple problems.

UNIT – IV Continuous time Markov Chain
Classical examples of continuous time Markov chains – Poisson proc-
ELECTIVE II : R-LANGUAGE – THEORY & PRACTICAL

Objectives:

Students of Statistics must learn to analyse the statistical data for survey and experimental data. This practical paper gives them on hand experience of analysis and interpretation of statistical data.

1. Matrix Operations: Addition, Subtraction, Multiplication, Determinant and Inverse
2. Formation of discrete and continuous frequency distributions-descriptive statistics.
3. Fitting of distributions and curves.
4. Graphs and diagrams: Pie, bar, line and scatter diagrams
5. Correlation coefficient rank correlation, partial and multiple correlations.
8. Cross tabulation and $\chi^2$ – test.
9. One way and two way ANOVA, CRD, RBD and LSD.
10. Non-parametric test: Binomial tests, run test, sign test, Median test, Mann-Whitney test, Kruskal-Wallis, Kendall’s and Friedman tests.

TEXT BOOK:


REFERENCE BOOKS:


SKILL BASED ELECTIVE – I: DATA ANALYSIS FOR COMPETITIVE EXAMINATIONS

Objective:
To impart quantitative aptitude to take part in the competitive examination.

UNIT – I
Algebraic simplification – Bodmas rule – Ratio and Proportions, Percentages

UNIT – II
Averages – combined averages – Simple interest & Compound interest

UNIT – III
Profit and loss – time and work

UNIT – IV
Graph Reading – Number Series.

UNIT – V
Tabulating the data and data sufficiency.

TEXT BOOK:
Syllabus : 2011

SEMESTER – VI
11UST630215

Hours/week : 6
Credits : 4

ENGINEERING STATISTICS

Objective:
To provide essential inputs about applicability of statistical concept, in the sphere of quality control and quality management. Industrialization is another vital sector that is needed for the balanced growth of any nation. When a stiff competitive environment prevails in the production sector, quality assurance and reliability of the products become the moot points. The ways and means to achieve these are taught through this paper.

UNIT – I General Theory of Control Charts
Concepts of Statistical Quality Control: Meaning-causes of variation-process control-process capability-General theory for control charts-Analysis and evaluation of Control charts, Statistical toleranceing.

UNIT – II Attribute and Variable Control Charts
Control Charts for variables-X, R, s charts, run charts, revision of controls.Control charts for attributes-p,np,C charts-CUSUM control charts.

UNIT – III Acceptance Sampling
Types of Inspection, Sampling vs 100% Inspection, Concepts of operating characteristics (OC) curves, AOQ,AQL, LTPD. Single Sampling Plan for attributes and variables, Published Sampling Plans MIL 105E & IS 2500 part1&2. Double Sampling plan.

UNIT – IV Reliability
Concepts and measures, components and systems, coherent systems, reliability of systems, cuts and paths, modular decomposition, bounds on system reliability. Accelerated life testing, reliability estimate based on failure times number of failures and stress-strength analysis, reliability demonstration plan.

UNIT – V Quality systems and Quality Assurance

TEXT BOOKS::

REFERENCE BOOKS:
4. ISO 9000 standards: Issued by Bureau of India.
OPERATIONS RESEARCH – II

Objective:
To impart knowledge of various optimization techniques that make use of statistical concepts abundantly. The Optimization techniques which do not involve statistical concepts are included in OR-I. On the other hand, in this paper those optimization techniques involving the statistical concepts, especially the probability principles are taught.

UNIT – I Theory of Games
Game theory Optimal solution of Two-person Zero-sum Games-Mixed strategies-Graphical solutions of (2 x n) and (m x 2) Games-Solution of m x n games by LPP.

UNIT – II PERT – CPM
Arrow (Network) Diagram representations-determination of critical path-Determination of the floats - Probability considerations in project scheduling.

UNIT – III Inventory models
Advantages of keeping inventories – Deterministic models with and without shortages – finite and infinite rate of replenishment – equal and unequal production runs probabilistic models without setup costs.

UNIT – IV Queueing Theory
Basic elements of the queueing model. Role of the Poisson and Exponential distribution: Arrival process-Departure processes - Detailed study of (M/M/1) / (/?/FIFO) models.

UNIT – V Simulation
Scope of simulation applications-Types of simulation-Role and generation of random numbers-The uniform distribution and its importance to simulation –Generation of random numbers by the multiplicative congruential method. Techniques for generating random deviates: Inverse transformation method (exponential weibull, Geometric distributions)-Rejection techniques (Beta and Gamma distributions). The convolution method (Poisson, Erlange and Binomial) concepts – no problem.

TEXT BOOKS:

REFERENCE BOOKS:
ELECTIVE – III : STATISTICAL PACKAGES THEORY AND PRACTICAL – SPSS

Objective:
To train the students in using good statistical packages for solving a variety of statistical problems.

1. Formation of discrete and continuous frequency distributions-descriptive statistics.
2. Graphs and diagrams: Pie, bar, line and scatter diagrams-Histogram and Normal probability plot.
3. Correlation coefficient rank correlation, partial and multiple correlations.
4. Regression : Simple and multiple linear regression.
5. Curve estimation.
7. Cross tabulation and $\chi^2$ – test.
8. One way and two way ANOVA – Factorial designs.

ELECTIVE – III : STATISTICAL PACKAGES THEORY AND PRACTICAL – SAS

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8. One way and two way ANOVA – Factorial designs.
SKILL BASED ELECTIVE – II : STATISTICS FOR MANAGEMENT

Objective:
Statistical skills are imparted for better managerial decisions

UNIT – I
Statistics meaning and its uses, Measures of central tendency mean, median, mode.

UNIT – II
Dispersion – study about, range, Standard Deviation and coefficient of variation, Skewness, and Kurtosis.

UNIT – III
Relationship between two variables: the scatter diagram; correlation, rank correlation and the regression lines– The coefficient of determination– Theory of attributes.

UNIT – IV
Probability – concepts of probability – Definition and properties of Binomial – Poisson and Normal probability distributions (No derivations, Simple problems only).

UNIT – V
Time series analysis: The components of time series analysis – The additive and multiplicative models – Measurement of trend by the method of Least squares & moving averages; measurement of seasonal variation by simple average method & Link relative method. (Problems only).

TEXT BOOKS:
Boot and Cox: Statistical Analysis for Managerial Decisions (Relevant chapters).
**SKILL BASED ELECTIVES**

**BOTANY**
- 11UBO540601 Mushroom Culture
- 11UBO640602 Herbal Technology

**BUSINESS ADMINISTRATION**
- 11UBU540601 Personality Development
- 11UBU640602 Managerial Skills

**CHEMISTRY**
- 11UCH540601 Food and Nutrition
- 11UCH640602 Everyday Chemistry

**COMMERCE**
- 11UCO540601A Accounting for Executives
- 11UCO540601B Soft Skills for Managers
- 11UCO640602A Total Quality Management
- 11UCO640602B Fundamentals of Accounting Packages

**COMMERCE (CA)**
- 11UCC540601 Soft Skills
- 11UCC640602 Basics of Accounting

**COMPUTER APPLICATIONS (Dept of IT)**
- 11UBC540601A Fundamentals of IT
- 11UBC540601B Internet Concepts
- 11UBC640602A Visual Programming
- 11UBC640602B Flash

**COMPUTER SCIENCE**
- 11UCS540601A Office Automation
- 11UCS540601B Internet Concepts
- 11UCS640602A Fundamentals of Computer Networks
- 11UCS640602B E-Commerce

**ECONOMICS**
- 11UEC540601 Security Analysis
- 11UEC640602 Economics of Insurance

**ELECTRONICS**
- 11UEL540601 DVD Troubleshooting and Assembling
- 11UEL640602 PC Assembling

**ENGLISH LITERATURE**
- 11UEN540601 Business English Writing
- 11UEN640602 Media Skills

**HISTORY**
- 11UHS540601 Indian History for Competitive Exams
- 11UHS640602 Tourism and Travel Management

**MATHEMATICS**
- 11UMA540601 Mathematics for Competitive Exams
- 11UMA640602 MATLAB

**PHYSICS**
- 11UPH540601 Cell Phone Servicing
- 11UPH640602A Electrical Wiring
- 11UPH640602B Videography

**STATISTICS**
- 11UST540601 Data Analysis for Competitive Exams
- 11UST640602 Statistics for Management

**TAMIL**
- 11UTA540601
- 11UTA640602