# B.Sc. STATISTICS

**SYLLABUS - 2014**

**SCHOOLS OF EXCELLENCE**
**with**
**CHOICE BASED CREDIT SYSTEM (CBCS)**

**SCHOOL OF COMPUTING SCIENCES**
**St. JOSEPH'S COLLEGE (Autonomous)**
Accredited at 'A' Grade (3rd Cycle) by NAAC
College with Potential for Excellence by UGC
**TIRUCHIRAPPALLI - 620 002, INDIA**

## SCHOOLS OF EXCELLENCE WITH CHOICE BASED CREDIT SYSTEM (CBCS)

### POST GRADUATE COURSES

St. Joseph's College (Autonomous), a pioneer in higher education in India, strives to work towards the academic excellence. In this regard, it has initiated the implementation of five "Schools of Excellence" from this academic year 2014 – 15, to standup to the challenges of the 21st century.

Each School integrates related disciplines under one roof. The school system allows the enhanced academic mobility and enriched employability of the students. At the same time this system preserves the identity, autonomy and uniqueness of every department and reinforces their efforts to be student centric in curriculum designing and skill imparting. These five schools will work concertedly to achieve and accomplish the following objectives.

- Optimal utilization of resources both human and material for the academic flexibility leading to excellence.
- Students experience or enjoy their choice of courses and credits for their horizontal mobility.
- The existing curricular structure as specified by TANSCHE and other higher educational institutions facilitate the Credit-Transfer Across the Disciplines (CTAD) - a uniqueness of the choice based credit system.
- Human excellence in specialized areas
- Thrust in internship and / or projects as a lead towards research and
- The **multi-discipline** nature of the newly evolved structure (School System) caters to the needs of stake-holders, especially the employers.

### What is Credit system?

Weightage to a course is given in relation to the hours assigned for the course. Generally one hour per week has one credit. For viability and conformity to the guidelines credits are awarded irrespective of the teaching hours. The following Table shows the correlation between credits and hours.

However, there could be some flexibility because of practical, field visits, tutorials and nature of project work.

For UG courses, a student must earn a minimum of 150 credits as mentioned in the table below. The total number of minimum courses offered by a department are given in the course pattern.



## SUMMARY OF HOURS AND CREDITS
## UG COURSES - STATISTICS

| Part | Semester | Specification | No. of Courses | Hours | Credits | Total Credits |
|---|---|---|---|---|---|---|
| I | I-IV | **Languages** (Tamil/Hindi/French/Sanskrit) | 4 | 16 | 12 | **12** |
| II | I-IV | **General English** | 4 | 20 | 12 | **12** |
| III | I-VI | **Core**<br>Theory<br>Practicals<br>Internship & Project Work<br>Comprehensive Exam | 17 | 90 | 69 | |
| | | **Core Electives** | 3 | 12 | 11 | |
| | | **Allied** | 4 | 24 | 18 | |
| | | **Additional Core Courses for Extra Credits** | - | - | - | **98** |
| 1V | V-VI | **Skilled Based Electives**<br>Between Schools (BS)<br>Within School (WS) | <br>1<br>1 | <br>2<br>2 | <br>2<br>2 | <br><br>**4** |
| | V | **Inter Departmental Courses (IDC)**<br>- Soft Skills | <br>1 | <br>2 | <br>2 | <br>**2** |
| | I-IV | **NMC**<br>Communicative English<br>Computer Literacy | <br>1<br>1 | <br>0<br>2 | <br>5<br>2 | <br><br>**7** |
| | I-IV | **Environmental Studies** | 1 | 2 | 2 | **2** |
| | | **Value Education** | 4 | 8 | 8 | **8** |
| V | I-V | **SHEPHERD & Gender Studies** | 1 | - | 5 | **5** |
| | I-V | **AICUF, Fine Arts, Nature Club, NCC & NSS** | | | | |
| | | **TOTAL** | | **180** | | **150** |

### Course Pattern

The Under Graduate degree course consists of Five vital components. They are as follows:

Part -I : Languages (Tamil / Hindi / French / Sanskrit)
Part-II : Genera English
Part-III : Core Course
(Theory, Practicals, Core Electives, Allied, Project, Internship and Comprehensive Examinations)
Part-IV : SBE, NMC, Value Education, Soft Skills & EVS
Part-V : SHEPHERD, AICUF, Finearts, Nature Club, NCC, NSS, etc.

**Non-Major Courses (NMC)**

There are three NMC's – Communicative English, Computer Literacy and Environmental Studies offered in the I, II & III Semesters respectively.

**Value Education Courses:**

There are four courses offered in the first four semesters for the First & Second UG students.

**Non Major Elective / Skill Based Elective:**

These courses are offered in two perspectives as electives "With-in School" (WS) and "Between School" (BS).

**Subject Code Fixation**

The following code system (11 characters) is adopted for Under Graduate courses:

| 14 | UXX | X | X | XX | XX |
|---|---|---|---|---|---|
| ↓ | ↓ | ↓ | ↓ | ↓ | ↓ |
| Year of Revision | UG Code of the Dept | Semester of the Part | Specification | Subject Category | Running in that part |
| **14** | **UST** | **1** | **3** | **2** | **1** |

***For Example*** :

I B.Sc. Statistics, first semester Descriptive Statistics-I

The code of the paper is 14UST130201.

Thus, the subject code is fixed for other subjects.

**Subject Category**

00 - Languages (Tamil / Hindi / French / Sanskrit)
01 - General English
02 - Core (Theory, Practicals, Comprehensive Exams, Internship & Project viva-voce)
03 - Core Electives
04 - Allied
05 - Additional core Courses for Extra Credits (If any)
06 - Skill Based Electives (BS) & (WS)
07 - Soft Skill
08 - NMC (Communicate English, Computer Literacy/SAP)
09 - EVS
10 - Value Education
11 - SHEPHERD & Gender Studies
12 - AICUF / Nature Club / Fine Arts / NCC / NSS /etc.



**EXAMINATION**

**Continuous Internal Assessment (CIA):**

| **UG - Distribution of CIA Marks** | |
|---|---|
| **Passing Minimum: 40 Marks** | |
| Library Referencing | 5 |
| 3 Components | 35 |
| Mid-Semester Test | 30 |
| End-Semester Test | 30 |
| **CIA** | **100** |

**MID-SEM & END – SEM TEST**

Centralised – Conducted by the office of COE

1. Mid-Sem Test & End-Sem Test: (2 Hours each); will have Objective + Descriptive elements; with the existing question pattern PART-A; PART-B; and PART-C
2. CIA Component III for UG & PG will be of 15 marks and compulsorily objective multiple choice question type.
3. The CIA Component III must be conducted by the department / faculty concerned at a suitable computer centres.
4. The 10 marks of PART-A of Mid-Sem and End-Sem Tests will comprise only: OBJECTIVE MULTIPLE CHOICE QUESTIONS; TRUE / FALSE; and FILL-IN BLANKS.
5. The number of hours for the 5 marks allotted for Library Referencing/ work would be 30 hours per semester. The marks scored out of 5 will be given to all the courses (Courses) of the Semester.
6. English Composition once a fortnight will form one of the components for UG general English

**SEMESTER EXAMINATION**

Testing with Objective and Descriptive questions

**Part-A: 30 Marks**
**Objective MCQs only**

Answers are to be marked on OMR score-sheet. The OMR score-sheets will be supplied along with the Main Answer Book. 40 minutes after the start of the examination the OMR score-sheets will be collected

**Part-B + C = 70 Marks**

**Descriptive**

**Part-B:** 5 x 5 = 25 marks; inbuilt choice;

**Part-C:** 3 x 15 = 45 marks; 3 out of 5 questions, open choice.

***The Accounts Paper of Commerce will have***

**Part-A**: Objective = 25

**Part-B**: 25 x 3 = 75 marks.

***Duration of Examination must be rational***; proportional to teaching hours 90 minute-examination / 50 Marks for courses of 2/3 hours/week (all Part IV UG Courses) 3-hours examination for courses of 4-6 hours/week.

**EVALUATION**

**Percentage Marks, Grades & Grade Points**

**UG (Passing minimum 40 Marks)**

| Qualitative Assessment | Grade Points | Grade | Mark Range %) |
|---|---|---|---|
| Exemplary | 10 | S | 90 & above |
| Outstanding | 9 | A+ | 85-89.99 |
| Excellent | 8 | A | 80-84.99 |
| Very Good | 7 | B | 70-79.99 |
| Good | 6 | C | 60-69.99 |
| Satisfactory | 5 | D | 50-59.99 |
| RA | 4 | E | 40-49.99 |
| | 0 | RA | < 40 |

**CGPA - Calculation**

Grade Point Average for a semester is calculated as indicated here under:

$$\frac{\text{Sum total of weighted Grade Points}}{\text{Sum of Gredits}}$$

Weighted Grade Points is ***Grade point x Course Credits.*** The final CGPA will only include: Core, Core Electives & IDCs.

A Pass in SHEPHERD will continue to be mandatory although the marks will not count for the calculation of the CGPA.



**Continuous Internal Assessment (CIA):**

| Class | Mark Range (%) |
|---|---|
| Distinction | 75 & above, first attempt |
| First | 60 & above |
| Second | 50 to 59.99 |
| Third | 40 to 49.99 |

**Declaration of Result:**

Mr./Ms. _____ has successfully completed the Under Grduate in _____ programme. The candidate's Cumulative Grade Point Average (CGPA) in Part – III is _____ and the class secured is _____ by completing the minimum of 150 credits.

The candidate has acquired _____ (if any) more credits from SHEPHERD / AICUF/ FINE ARTS / SPORTS & GAMES / NCC / NSS / NATURE CLUB, ETC. The candidate has also acquired _____ (if any) extra credits offered by the parent department courses.

_____

# B.Sc. STATISTICS

## Course Pattern - 2014 Set

| Sem | Part | | Code | Course | Hrs | Crs |
|---|---|---|---|---|---|---|
| I | I | Language | 14UGT110001 | Language-I:(Tamil /Hindi /French/Sanskrit) | 4 | 3 |
| | II | English | 14UGE120101 | General English - I | 5 | 3 |
| | III | Core | 14UST130201 | Descriptive Statistics | 7 | 6 |
| | | | 14UST130202 | Computational Statistics-I | 4 | 2 |
| | | | 14UST130203 | Computer Lab-I | 2 | 2 |
| | | Allied | 14UST130401 | Allied I: Computers in Statistics-I (Office Automation) | 6 | 5 |
| | IV | NMC | 14UCE140801 | Communicative English | - | 5 |
| | | V. Edn | 14UFC141001 | Value Education - I: Essentials of Ethics, Yoga and Stress Management | 2 | 2 |
| | | | | ***Total for Semester I*** | ***30*** | ***28*** |
| II | I | Language | 14UGT210002 | Language-II:(Tamil /Hindi /French/Sanskrit) | 4 | 3 |
| | II | English | 14UGE220102 | General English - II | 5 | 3 |
| | III | Core | 14UST230204 | Probability theory | 7 | 6 |
| | | | 14UST230205 | Computational Statistics-II | 2 | 1 |
| | | | 14UST230206 | Computer Lab-II | 2 | 1 |
| | | Allied | 14UST230402 | Allied I : Computers in Statistics-II (C-Programming) | 6 | 5 |
| | IV | NMC | 14UCE240802 | Computer Literacy | 2 | 2 |
| | | V. Edn | 14UFC241002 | Techniques of Social Analysis | 2 | 1 |
| | | | | ***Total for Semester II*** | ***30*** | ***22*** |
| III | I | Language | 14UGT310003 | Language-III (Tamil / Hindi / French / Sanskrit) | 4 | 3 |
| | II | English | 14UGE320103 | General English – III | 5 | 3 |
| | III | Core | 14UST330207 | Discrete Probability Distributions | 6 | 4 |
| | | | 14UST330208 | Continuous Probability Distributions | 5 | 4 |
| | | Allied | 14UST330403 A | Allied II :Mathematics-I OR | 6 | 5 |
| | | | 14UST330403 B | Allied II :Accounts-I | | |
| | IV | NMC | 14UCE340901 | Environmental Studies | 2 | 2 |
| | | V. Edn | 14UFC341002 | Professional Ethics I: Social Ethics (OR) | 2 | 2 |
| | | | 14UFC341003 | Professional Ethics I: Religious Doctrine | | |
| | | | | ***Total for Semester III*** | ***30*** | ***23*** |



| | | | | | | |
|---|---|---|---|---|---|---|
| IV | I | Language | 14UGT410004 | Language-IV (Tamil / Hindi / French / Sanskrit) | 4 | 3 |
| | II | English | 14UGE420104 | General English - IV | 5 | 3 |
| | III | Core | 14UST430209 | Estimation Theory | 4 | 3 |
| | | | 14UST430210 | Testing of Hypothesis | 5 | 4 |
| | | | 14UST430211 | Numerical Mathematics | 4 | 3 |
| | | Allied | 14UST430404 A | Allied II :Mathematics-II (OR) | 6 | 5 |
| | | | 14UST430404 B | Allied II :Accounts-II | | |
| | IV | V. Edn | 14UFC441004 | Professional Ethics-II: Social Ethics OR | 2 | 2 |
| | | | 14UFC441005 | Professional Ethics-II: Religious Doctrine | | |
| | | | | ***Total for Semester IV*** | ***30*** | ***23*** |
| V | III | Core | 14UST530212 | Sampling Theory | 4 | 3 |
| | | | 14UST530213 | Applied Statistics | 4 | 3 |
| | | | 14UST530214 | Linear Models and Econometrics | 5 | 3 |
| | | | 14UST530215 | Operations Research-I | 5 | 3 |
| | | Core Elec. | 14UST540301 A | Actuarial Statistics OR | 4 | 4 |
| | | | 14UST540301 B | Elements of Stochastic Processes | | |
| | | | 14UST530302 | Statistical Packages Practical - SPSS | 4 | 4 |
| | IV | SBE | 14UST540601 | (BS): Data Analysis for Competitive Examinations | 2 | 2 |
| | IV | IDC | 14USS540701 | **Soft Skills** | 2 | 2 |
| | | | | ***Total for Semester V*** | ***30*** | ***24*** |
| VI | III | Core | 14UST630216 | Internship | - | 2 |
| | | | 14UST630217 | Design of Experiments | 7 | 4 |
| | | | 14UST630218 | Engineering Statistics | 7 | 4 |
| | | | 14UST630219 | Operations Research-II | 7 | 4 |
| | | | 14UST630220 | Comprehensive Examination | - | 2 |
| | | Core Ele | 14UST630303 A | R-Language –Practical OR | 4 | 4 |
| | | | 14UST630303 B | Statistical packages(SAS) -Practical | | |
| | | | 14UST630304 | Group Project | 3 | 3 |
| | IV | SBE | 14UFC640602 | (WS): Statistics for Management | 2 | 2 |
| | III | Extra Credit Course | 14UST630501 | Big Data Analytics | | (4) |
| | | | | ***Total for Semester VI*** | ***30*** | ***25*** |
| I-V | V | | 14UCW651101 | SHEPHERD and Gender Studies | - | 5 |
| | | | | **Total for all Semesters** | 180 | **150** |

* Code numbers according to the subject chosen

@ Practical examination in the following even semester.

*gUtk: 1* *kz; Neuk: 4*
**14UGT110001** *Gsspfs: 3*

## nghJ jjk;o-I

**Nehffqfs**:

1. r%f khwwr r;ejidfis csslff;a jwfhy ,yff;aqfis mw;Kfk nrajy.
2. GJfft;ij> r;Wfij> ciueil Mf;a ,yff;aqfs;d eak ghuhlLjy.
3. rej;gg;ioa;dw; vOj khz thfisg ga;wWt;jjy.

**gadfs**:

1. khz thfs r%f khwwrr;ejidfis mw;eJnfhsth.
2. rej;gg;iofis eff; vOJk j;wd ngWth.
3. Gjj;yff;aqfisggilfFk j;widAk> j;wdhaT nraAk j;widAk ngWth.

**myF-1**: kfhft; ghuj;ahh ft;ijfs
ghuj;jhrd ft;ijfs
ciueil-Kjy %dW flLiufs (10 kz; Neuk)

**myF-2**: glLfNfhlilahh ghlyfs
ghtyNuW ngUQr;jj;udhh ghlyfs
,yffzk-ty;k;Fk ,lqfs (12 kz; Neuk)

**myF-3**: GJfft;ij tbtqfs
,yff;atuyhW-%dwhk ghfk
r;Wfij-Kjy MW r;Wfijfs (10 kz; Neuk)

**myF-4**: GJfft;ijfs
ngzz;af ft;ijfs
,yff;atuyhW-ehdfhk ghfk
,yffzk-ty;k;fh ,lqfs (14 kz; Neuk)

**myF-5**: nkho;ngahgGfft;ijfs
r;Wfij-7 Kjy 12 Kba css r;Wfijfs
ciueil-4Kjy 6 Kba css flLiufs (14 kz;Neuk)

**ghlE}y**


1. nghJjjk;o-nraAs j;ulL-jk;ohaTjJiwntsp;aL-2014-2017
2. r%ft;ay Nehff;y jk;o ,yff;a tuyhW> jk;ohaTjJiwntsp;aL> J}a tsdhh fyY}h> j;Urr;uhggss;-2> 2014
3. ciueilf Nfhit-jk;ohaTjJiwntsp;aL> 2014
4. r;Wfijjnjh FgG




**Sem. I** **Hours/Week: 5**
**14UGE120101** **Credits: 3**

## GENERAL ENGLISH-I

**Objectives**

To help students

* Use words and phrases related to self, home, friends and relatives in meaningful contexts.
* Use language to perform basic functions like describing, clarifying, suggesting, and giving directions.

**Unit-1**

01. Personal Details
02. Positive Qualities
03. Listening to Positive Qualities
04. Relating and Grading Qualities
05. My Ambition
06. Abilities and Skills
07. Self-Improvement Word Grid
08. What am I doing?
09. What was I doing?
10. Unscramble the Past Actions
11. What did I do yesterday?

**Unit-2**

12. Body Parts
13. Actions and Body Parts
14. Value of Life
15. Describing Self
16. Home Word Grid
17. Unscramble Building Types
18. Plural Form of Naming Words
19. Irregular Plural Forms
20. Plural Naming Words Practice
21. Whose Words?

**Unit -3**

22. Plural Forms of Action Words
23. Present Positive Actions
24. Present Negative Actions
25. Un/Countable Naming Words
26. Recognition of Vowel Sounds
27. Indefinite Articles

28. Un/Countable Practice
29. Listen and Match the Visual
30. Letter Spell - Check
31. Drafting Letter

**Unit 4**

32. Friendship Word Grid
33. Friends' Details
34. Guess the Favourites
35. Guess Your Friend
36. Friends as Guests
37. Introducing Friends
38. What are We Doing?
39. What is (s)he / are they Doing?
40. Yes / No Question
41. What was s/he doing?
42. Names and Actions
43. True Friendship
44. Know your Friends
45. Giving Advice/Suggestions
46. Discussion on Friendship
47. My Best Friend

**Unit 5**

48. Kinship Words
49. The Odd One Out
50. My Family Tree
51. Little Boy's Request
52. Occasions for Message
53. Words denoting Place
54. Words denoting Movement
55. Phrases for Giving Directions
56. Find the Destination
57. Giving Directions Practice
58. SMS Language
59. Converting SMS
60. Writing Short Messages
61. Sending SMS
62. The family debate
63. Family Today

**Textbook**

1. Joy, J.L. & Peter, F.M. (2014). *Let's Communicate*, New Delhi, Trinity Press.



**Sem. I** **Hours/Week: 7**

**14UST130201** **Credits: 6**

## DESCRIPTIVE STATISTICS

**Objectives**

- To explain how to analyze 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 - Types of variables.

**UNIT – II: PRESENTATION OF DATA**

Presentation of data by tables and diagrams- construction of tables (univariate and bivariate) - classification – types of classification – graphical representation of a frequency distribution: 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-Spearmen'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(x, y, sx, sy

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**

1. Gupta, S.C. and Kapoor, V.K.: "Fundamentals of Mathematical Statistics", Sultan Chand & Sons, New Delhi, 11th Ed, 2002.

**REFERENCE BOOK**

1. Saxena H.C.: "Elementary Statistics". S. Chand & Co., 1983.

***Note***:

The question paper may consist of Theory and Problems in the ratio 50:50.

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**Sem. I** **Hours/Week: 4**
**14UST130202** **Credits: 2**

## COMPUTATIONAL STATISTICS-I

**OBJECTIVE**

- To impart the computational skills of solving Statistical problems to the students.

**UNIT – I:**

Frequency Distributions – Univariate, Bivariate and cross-tabulation. Graphs: Histogram, Frequency polygon, Frequency curves, Ogives, Lorenz curve. Diagrams: Cluster bar diagrams, Stacked bar diagrams, Pie chart, Pictograms, Scatter diagram.

**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 Pearson's coefficient of skewness, Bowley's coefficient of skewness b1, b2, g1, g2.

**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.

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**Sem. I** **Hours/Week: 2**
**14UST130203** **Credits: 2**

**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.
8. Changing fonts and colours, inserting Clip Art and Formatting options.
9. Inserting Bullets and Pictures, Creating Tables and Inserting Autoshapes.
10. Calculation of Statistical constants using Excel functions.

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**Sem. I** **Hours/Week: 6**
**14UST130401** **Credits: 5**

## Allied Computers in Statistics: OFFICE AUTOMATION

**OBJECTIVES**

- To train the students to get acquainted with the essential features of Constituents of MS-Office.

**UNIT – I: WINDOWS 2007**

Windows Explorer – My Computer - My Documents - Folder Creation – Creating, Copying, Editing and Deleting a File – Find and Replace Facility – Desktop Configuration – File Compression and extraction.

**UNIT – II: MS – WORD BASICS**

Creating, saving, Previewing and Printing a Word document - Editing: cut, copy, paste, find, replace, undo, redo, and book working - Applying Basic formatting: changing font and font size – bold, italic and under line features - color selection – alignment – Bullet and Numbered Lists.

**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. Inserting a Picture – clip Art, Shape and Smart Art – Designing and Reviewing a word document – Headers and Footers – Page margins, page orientation, page breaks – Performing Spelling and grammar checks.

**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. Descriptive Statistics – Data Analysis PAK in Excel – Frequency Distribution, Histogram, Cross Tabulation and Pivot Tables – Summary Statistics (Measures of central Tendency, Variation, Skewness and kurtosis) – Correlation and Regression Analysis.

**TEXT BOOKS**


1. Office 2010 in simple steps, Kogent solutions Team, Dream Tech., 2010 (chapters 1 to7)
2. Statistics made simple, K.V.S. Sharma, PHI, 2006 (chapters 4 to 7 and 9).




**gUtk: 2** **kz; Neuk: 4**
**14UGT210002** ***Gss/fs; 3***

## nghJ jjk;o-II

**Nehffqfs :**

1. rka eyy;z ff czhit tshjjy.
2. jk;of fhgg;aqfs;y moFk› mw;T zhTk ClLk gFj;fisg gbjJg Gh;eJ nfhs Sjy.
3. ciueilf flLiu vOJk j;wd ngWjy.

**gadfs :**

1. jk;ioj j;Ujjkhfg gbffTk› NgrTk› g;ioa;dw; vOjTk Njhrr; ngWjy.
2. ,yff;aqfs;y gbjjtwiw Kiwahf thofifa;y filgg;bjjy.

**myF: 1** **(12 kz; Neuk)**

r;yggj;fhuk - kJiuf fhzlk (fhL fhz fhij)
,yff;a tuyhW - irtk tsujj jk;o Kjy Guhzqfs Kba.

**myF : 2** **(12 kz; Neuk)**

kz;Nkfiy - ghjj;uk ngww fhij
ngh;aGuhzk - nkagnghUsehadhh Guhzk

**myF : 3** **(12 kz; Neuk)**

fkguhkhazk - fhlr;gglyk
ciueil - 7 Kjy 9 Kba css flLiufs
,yffzk - vOjj;yffzk

**myF : 4** **(12 kz; Neuk)**

FzqFbk]jhd rhf;G ghlyfs
r;ww;yff;aqfs - fy;qfjJgguz;
ciueil - 10 Kjy 11 tiua;yhd flLiufs

**myF : 5** **(12 kz; Neuk)**

,ulrz;a ahjj;hfk- kuzgglyk
,yff;a tuyhW - jk;o ,yffz E}yfs Kjy r;ww;yff;aqfs Kba.
,yffzk - nrhyy;yffzk

**ghlE}y:**


1. nraAs j;ulL - jk;ohaTjJiwntsp;aL› 2014-2017.
2. r%ft;ay Nehff;y jk;o ,yff;a tuyhW› jk;ohaTjJiwntsp;aL› J}atsdhh fyY}h› j;Urr;uhggsp› 2014.
3. ciueilfNfhit› jk;ohaTjJiwntsp;aL› 2010.

SEM-II Hours/week: 5
14UGE220102 Credits: 3

## GENERAL ENGLISH-II

**Objectives**

To help students

* Use words and phrases related to education, entertainment, career, and society in meaningful contexts.
* Use language to perform basic functions like comparing, debating, and storytelling.

**Unit 1**

01. Education Word Grid.
02. Reading Problems and Solutions.
03. Syllabification.
04. Forms for Expressing Quality.
05. Expressing Comparison.
06. Monosyllabic Comparison.
07. Di/polysyllabic Comparison.
08. The best monosyllablic Comparision
09. The best di/polysyllabic Comparision.
10. Practising Quality Words.

**Unit 2**

11. *Wh* Words
12. Yes/No Recollection
13. Unscramble *Wh* Questions
14. *Wh* Practice
15. Education and the Poor
16. Controlled Role play
17. Debate on Education
18. Education in the Future
19. Entertainment Word Grid
20. Classify Entertainment Wordlist
21. Guess the Missing Letter
22 Proverb-Visual Description
23. Supply *Wh* Words
24. Rearrange Questions
25. Information Gap Questions

**Unit 3**

26. Asking Quetions
27. More about Actions
28. More about Actions and Uses



29. Crime Puzzle
30. Possessive Quiz
31. Humourous News Report
32. Debate on Media and Politics
33. Best Entertainment Source

**Unit 4**

34. Career Word Grid
35. Job-Related Wordlist
36. Who's Who?
37. People at Work
38. Humour at Workplace
39. Profession in Context
40. Functions and Expressions
41. Transition Fill-in
42. Transition Sord Selection
43. Professional Qualities
44. Job Procedures
45. Preparing a Resume
46. Interview Questions
47. Job Cover Letter Format
49. E-mailing an Application
50. Mock Interview

**Unit 5**

51. Society Word Grid
52. Classify Society Wordlist
53. Rearrange the Story
54. Storytelling
55. Story Cluster
56. Words Denoting Time
57. Expressing Time
58. What Can You Buy?
59. Noise Pollution
60. Positive News Headlines
61. Negative News Headlines
62. Matching Conditions
63. What Whould You Do?
64 If I were the Prime Minister
65. My Dream Country

**Textbook**

1. Joy, J.L. & Peter, F.M. (2014). *Let's Communicate*, New Delhi: Trinity Prss.

**Sem. II** **Hours/Week: 7**
**14UST230204** **Credits: 6**

## PROBABILITY THEORY

**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**

1. Gupta, S.C. and Kapoor, V.K.: "Fundamentals of Mathematical Statistics", Sultan Chand & Sons, New Delhi, 11th Ed., 2002.



**REFERENCE BOOKS**

1. Dudewicz, E.J. and Mishra, S.N. "Introduction to Mathematical Statistics", John Wiley, 1988.
2. Hogg, R.V. and Craig, A.T.: "Introduction to Mathematical Statistics, Prentice Hall, England", 5th Ed, 1999.

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**Sem. II** **Hours/Week: 2**
**14UST230205** **Credits: 1**

## COMPUTATIONAL STATISTICS-II (INTERNAL)

**OJECTIVE**

•To impart the computational skills based on statistical problems 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.

**TEXT BOOK**

1. Gupta, S.C. and Kapoor, V.K.: "Fundamentals of Mathematical Statistics", Sultan & Chand Sons, New Delhi, 11th Ed., 2002.

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**Sem. II** **Hours/Week: 2**
**14UST230206** **Credits: 1**

## 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 al white charaters).
5. Writing a character string in reverse order.
6. Computation of correlation and Regression Coefficients.
7. A problem involving Recursion or Palindrome.
8. A problem involving Pointers and Functions.
9. Creation and updating of a sequential file.
10. Creation and updating of a random file.

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**Sem. II** **Hours/Week: 6**
**14UST230402** **Credits: 5**

**Allied: Computers in Statistics-II**

## 'C' PROGRAMMING

**OBJECTIVE**

* To explain the main features of C language, which plays a pivotal role in the programming field.

**UNIT – I: INTRODUCTORY 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**

1. Balagurusamy, E.: "Programming in ANSI C", Tata McGraw – Hill publishing Company Ltd.1992.
2. Byron S. Gottfried, Theory and problems of programming with C, SCHAUM Out line Seires, International Editions.

**REFERENCE BOOKS**

1. Herbert Schildt, Osborn : "C made Simple", McGraw Hill Publications.
2. Kernighan and Ritchie: "C Programming Language", Prentice Hall of India Pvt. Ltd., 2000.

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**gUtk: 3** **kz; Neuk: 4**
**14UGT310003** ***Gss/fs: 3***

## ngh J jjk;o-III

**Nehffqfs :**

1. nrknkho;j jk;or nraAs fshd gj;ndz Nky fz fF› gj;ndz fo fz fFg ghlyfisg gbjJg nghUs Gh;eJ nfhs Sk j;wd ngWjy
2. gzil ,yff;aqfs;y mikeJss r%ff fUjJffis czhjJjy.
3. kuGf ft;ij tbtqfis mw;ar nrajy.
4. ft;ijfs;y mz;fs mikeJss ghqifg Gh;jy.
5. Gj;dk to;jwfhyr rKjhar r;ffyfisAk› mjwfhd jhTfisAk Muhaejw;jy.

**gadfs :**

1. nrknkho;ahk jk;o nkho;a;d r;wgig mw;jy.
2. gzil ,yff;aqfs czhjJk mwffUjJffis mw;eJ khzth xOff new;a;y thoeJ r%fjij NkkgLjJth.
3. khzth Gj;djijf fwgjd %yk rKjhar r;ffyfis czheJ mtww;wFj jhT fhzgh.

**myF : 1** (16 kz; Neuk)

nghUeuhwWggil (KOikAk)

**myF : 2** (10 kz; Neuk)

FWenjhif› ahgg;yffzk (ntzgh› Mr;haggh)

**myF : 3** (10 kz; Neuk)

fy;jnjhif ,yff;a tuyhW - |jk;o nkho;a;d njhdikAk r;wgGk| Kjy |rqfj njhif E}yfs| Kba. Gj;dk - KOikAk.

**myF : 4** (12 kz; Neuk)

gj;wWggjJ› GwehD}W› mz;a;yffzk.

**myF : 5** (12 kz; Neuk)

j;UfFws - mwk
ehybahh - nghUlghy
,yff;a tuyhW - rqf ,yff;aqfs;d jd;jjdikfs Kjy ,ulilf fhgg;aqfs Kba.

**ghlE}yfs :**


1. nraAs j;ulL› jk;ohaTjJiw nts;aL (2014-2017)
2. r%ft;ay Nehff;y jk;o;yff;a tuyhW› jk;ohaTjJiw nts;aL›2014
3. Gj;dk (xtnthU fyt;ahzLk xtnthU Gj;dk). nehejNrhW (2014-2015)




**SEM-III** **Hours/week: 5**
**14UGE320103** **Credits: 3**

## GENERAL ENGLISH-III

**Objectives:**

* To enable the students to comprehend the local and global issues through the lessons.
* To enable the students to do the tasks centering on Skill Development and Grammar.
* To empower the students with interactive skills.

| Tasks Designed for Each Unit | Skills Focused to be Developed for Each Unit | Hours Allotted |
|---|---|---|
| 1. Pre-reading Task | Listening and Reading Skills through teacher-led reading practice | 2 Hours |
| 2. Objectives | Listening and Reading Skills | |
| 3. Text | Listening and Reading Skills through teacher-led reading practice | |
| 4. Glossary (Using Words and Phrases in Sentences) | Referring and Language Using Skills | 2 Hours |
| 5. Reading Comprehension | Reading, Speaking, and Writing Skills | 1 Hour |
| 6. Critical Analysis | Critical Thinking and Speaking Skills | 2 Hours |
| 7. Creative Task | Creative Thinking and Speaking Skills | 2 Hours |
| 8. General Writing Skills | Writing Skill | 1 Hour |
| 9. Activities on Grammar | Grammar Using and Writing Skills | 2 Hours |

**UNIT I**

* Suggestions to Develop Your Reading Habit — 12 Hrs
  Grammar: Simple Present Tense

**UNIT II**

* The Secret of Success: An Anecdote — 12 Hrs
  Grammar: Present Continuous Tense

**UNIT III**

* Hygiene — 12 Hrs
  Grammar: Simple Past Tense

**UNIT IV**

* Dr. A.P.J. Abdul Kalam: A Short Biography — 12 Hrs
  Grammar: Past Continuous Tense

**UNIT V:**

* "Golden Rule":A Poem — 12 Hrs
  Grammar: Simple Future Tense & Future Continuous Tense

**Textbook:**


1. Jayraj, S. Joseph Arul *et al*. (2014). *Trend-Setter:* An Interactive General English Textbook for Under Graduate Students, New Delhi, Trinity.

**Sem. III** **Hours/Week: 6**
**14UST330207** **Credits: 4**

## 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**

Bernoulli Distribution-Introduction to Binomial Distribution - Moments-recurrence relation for the moments-mean deviation about mean, mode-MGF-Additive property-cumulants-recurrence relation for cumulants-Fitting of Binomial Distribution.

**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**

Geometric Distribution - Lack of memory concept - moments of Geometric Distribution - Hypergeometric Distribution - Mean and Variance of Hypergeometric Distribution. Approximation to Binomial Distribution.

**UNIT – V: MULTINOMIAL AND POWER SERIES DISTRIBUTIONS**

Multinomial Distribution - moments of Multinomial Distribution - Introduction to Power Series distribution(Concept only).

**TEXT BOOK**

1. Gupta, S.C. and Kapoor, V.K.: "Fundamentals of Mathematical Statistics", Sultan Chand & Sons, New Delhi, 11th Ed., 2002.

**REFERENCE BOOKS**

1. Johnson, N.L. and Kotz, S: "Discrete Distributions", John Wiley and Sons, 1969.
2. Johnson, N.L. and Kotz, S.: "Continuous univariate Distributions", Vol. I & Vol. II, John Wiley and Sons, 1970.



**Sem. III** **Hours/Week: 5**
**14UST330208** **Credits: 4**

## 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**

Bivariate Normal distribution: MGF-Marginal and conditional distribution of bivariate normal distribution and distribution of Order Statistics.

**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**

1. Gupta, S.C. and Kapoor, V.K.: "Fundamentals of Mathematical Statistics", Sultan & Chand & Sons, New Delhi, 11th Ed,2002.

**REFERNECE BOOKS**

1. Johnson, N.L. and Kotz, S: "Discrete Distributions", John Wiley and Sons, 1969.
2. Johnson, N.L. and Kotz,S.: "Continuous univariate Distributions", Vol. I & Vol. II, John Wiley and Sons, 1970.

**Sem. III** **Hours/Week: 6**
**14UST330403A** **Credits: 5**

## Allied-II:
## MATHEMATICS-I

**Objective:**

Mathematics background is the strong foundation to learn 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**

Matrices – different types of matrices – Minors, Cofactors of elements of a square matrix – computation of adjoint and Inverse of a square matrix – solution of linear equations using matrix inversion.

**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

$$\text{Type III} \rightarrow \int \frac{(lx+m)}{(ax^2+bx+c)}dx \qquad \text{Type IV} \rightarrow \int \frac{(lx+m)}{\sqrt{(ax^2+bx+c)}}dx$$

$$\text{Type V} \rightarrow \int \frac{(p\sin x+q\cos x)}{(a\sin x+b\cos x)}dx \qquad \text{Type VI} \rightarrow \int \frac{dx}{(a\sin x+b\cos x+c)}$$

Type II ® Integration using Substitution

**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 Books:**

1. Ancillary Mathematics by Narayanan and Manickavachagam Pillai – Vol-I S.Viswanathan Printers, Publishers, PVT Ltd,2007 (for units I,II and III)
2. Calculus by Narayanan and Manickavachagam Pillai –Vol-I & Vol-II, S. Viswanathan Printers, Publishers, PVT Ltd,2013 (for units IV and V)

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**Sem. III** **Hours/Week: 6**
**14UST330403B** **Credits: 5**

## Allied-II:
## ACCOUNTS-I

**Objectives:**

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

**UNIT I (18 Hours)**

Accounting Principles- Concepts - Subsidiary Books (purchase book, sales book, purchase return book, sale return book) - Cash book – Ledger.

**UNIT II (18 Hours)**

Trial balance – Trading, Profit and Loss Accounts – Balance Sheet of a Sole Trader(closing stock, outstanding expenses, prepaid expenses, income receivable, received in advance, depreciation and provision for bad debts.

**UNIT III (18 Hours)**

Accounts for Non-trading concerns- Preparation of Income and ExpenditureAccount from Receipts and Payment Accounts (simple adjustments).

**UNIT IV (18 Hours)**

Single Entry system- net worth method- conversion method.

**UNIT V (18 Hours)**

Errors –classification- rectification- suspense account - effect on profit- preparation of bank reconciliation statement.

**TEXT BOOK**

1. Reddy TS and Murthy A, (2006), Financial Accounting, MarghamPublications, Chennai.

**BOOKS FOR REFERENCES**

1. Shukla MC, Grewal TS and Gupta SC, (2006), Advanced Accounts Volume I, S.Chand and Company Ltd, New Delhi.
2. Gupta RL and Gupta VK, (2006), Financial Accounting, Sultan Chand and Sons, New Delhi.
3. Gupta RL and Radhaswamy, (2006), Advanced Accountancy, Volume I, Sultan Chand and Sons, New Delhi.
4. Jain SP, Narang KL,(2004), Advanced Accountancy Volume I, Kalyani Publishers.
5. Maheshwari SN and Maheshwari SK, (2005), Introduction to Accountancy, Vikas Publishing House PVT.Ltd. New Delhi.

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**gUtk: 4** **kz; Neuk: 4**

**14UGT410004** ***Gss;fs: 3***

## ngh Jjjk;o-IV

**Nehffqfs :**

1. ehlfjj;d Nehffk> mjd NghfF> cjj;fs> ghjj;ug ghqF> ciuahly Kiw> fwgidjj;wk Nghdwtwiw nts;ggLjjy.
2. Gj;a ehlfqfisg gilfFk j;wid khztufs;ilNa cUthfFjy.

**gadfs :**

1. ehlfto;mof;ay czuTfis tsujjy.
2. ehlfqfisr r%fg gadghlbwF Vwg cUthfFjy.

**myF : 1** **(12 kz; Neuk)**

kNdhdkzak> gha;uk> mqfk - 1> fsk 1 - 5 tiu.

**myF : 2** **(12 kz; Neuk)**

kNdhdkzak> mqfk - 2> fsk 1 - 3 tiu.
ciueil ehlfk (Kjy ,uzL ehlfqfs)

**myF : 3** **(12 kz; Neuk)**

kNdhdkzak> mqfk - 3> fsk 1 - 4 tiu.

**myF : 4** **(12 kz; Neuk)**

kNdhdkzak> mqfk - 4> fsk 1 - 5 tiu.

**myF : 5** **(12 kz; Neuk)**

kNdhdkzak> mqfk - 5> fsk 1 - 3 tiu.
ciueil ehlfk (3> 4Mk ehlfqfs)

**ghlE}yfs :**

1. Rejudhu> kNdhdkzak> jk;ohaTjJiw (gj;gG)> J}a tsdhu fyY}u;j;Urr;uhggss;-2. (mqfk : 3 fsk : 4 eqfyhf)
2. mzzhkiy.r;. (njh.M.)> Nr.,uhkhD[k ehlfqfs> fhtah nts;aL> nrdid

**kj;gngz gf;uT :**

kNdhdkzak - 80
ciueil ehlfk - 20
ciueil ehlfk ghfk - 3,y flLiu t;dht;y klLk ,lk ngwy Ntz Lk.

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**SEM-IV** **Hours/week: 5**
**14UGE420104** **Credits: 3**

## GENERAL ENGLISH-IV

**Objectives:**

* To enable the students to comprehend the local and global issues through the lessons.
* To enable the students to do the tasks centering on Skill Development and Grammar.
* To empower the students with interactive skills.

| Tasks Designed for Each Unit | Skills Focused to be Developed for Each Unit | Hours Allotted |
|---|---|---|
| 1. Pre-reading Task | Listening and Reading Skills through teacher-led reading practice | 2 Hours |
| 2. Objectives | Listening and Reading Skills | |
| 3. Text | Listening and Reading Skills through teacher-led reading practice | |
| 4. Glossary (Using Words and Phrases in Sentences) | Referring and Language Using Skills | 2 Hours |
| 5. Reading Comprehension | Reading, Speaking, and Writing Skills | 1 Hour |
| 6. Critical Analysis | Critical Thinking and Speaking Skills | 2 Hours |
| 7. Creative Task | Creative Thinking and Speaking Skills | 2 Hours |
| 8. General Writing Skills | Writing Skill | 1 Hour |
| 9. Activities on Grammar | Grammar Using and Writing Skills | 2 Hours |

**UNIT-I: Women through the Eyes of Media** **12 Hrs**

Grammar: Present Perfect Tense

**UNIT-II: Effects of Tobacco Smoking** **12 Hrs**

Grammar: Present Perfect Continuous Tense

**UNIT-III: The Impact of Liquor Consumption on the Society** **12 Hrs**

Grammar: Past Perfect Tense

**UNIT-IV: An Engineer Kills Self as Crow Sat on his Head: A News Paper Report** **12 Hrs**

Grammar: Past Perfect Continuous Tense

**UNIT-V: Traffic Rules** **12 Hrs**

Grammar: Future Perfect Tense & Future Perfect Continuous Tense

**Text Book:**

Jayraj, S. Joseph Arul. et al. (2014). *Trend-Setter: An Interactive General English Textbook for Under Graduate Students*, New Delhi, Trinity.



**Sem. IV** **Hours/Week: 4**
**14UST430209** **Credits: 3**

## ESTIMATION THEORY

**OBJECTIVE**

* To enable the students to clearly understand the concepts of Statistical Estimation .This subject deals with various statistical estimation methods of parameters and its applications in solving real life problems.

**UNIT – I: POINT ESTIMATION THEORY**

Parametric Estimation: Estimator - Characterisitics of an Estimator - Consistency and Unbiasedness of an Estimator-Cramer-Rao Inequality. Efficiency-Asypmtotic efficiency of an Estimator- Estimators based on Sufficient Statistics- Neyman's Factorization Theorem (without proof)- Rao-Blackwell Theorem.

**UNIT – II: METHODS OF POINT ESTIMATION-1**

Methods of point estimation-Method of Maximum Likelihood Estimator (MLE) - Properties of MLEs(without proof) – Problems based on MLEs.

**UNIT – III: METHODS OF POINT ESTIMATION-2**

Method of Moments – Problems-Method of Least Squares - Method of Minimum Chi-square-Method of Minimum variance-Minimum Variance Unbiasred Estimation (MVUE)-Problems based on MVUE.

**UNIT – IV: INTERVAL ESTIMATION-1**

Concept of interval estimation - Interval estimation in case of large samples - Confidence interval for proportions, means and variances based on Normal distribution.

**UNIT – V: INTERVAL ESTIMATION-2**

Interval estimation for small samples – Confidence intervals for means, variances, correlation coefficient and regression coefficient based on Chi-square, Student's t, and F distributions.

**TEXT BOOK**

1. Gupta, S.C. and Kapoor, V.K.: "Fundamentals of Mathematical Statistics", Sultan Chand & Sons,New Delhi, 11th Ed, 2002.

**REFERENCE BOOKS**

1. Kendall, M. and Stuart, A.: "The advanced theory of Statistics" Vol. II, Charles Griffin, 1961.

2. Rohatgi, V.K. : "Statistical Inference", John Wiley and sons, 1984.
3. Hogg, R.V, Craig. A.T. and Tannis: "Introduction to mathematical statistics", Prentice Hall, England, 1995.
4. Dudewicz. E.J and Mishra.S.N. : "Modern Mathematical statistics", John Wiley and sons, 1988.

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**Sem. IV** **Hours/Week: 5**
**14UST430210** **Credits: 4**

## TESTING OF HYPOTHESIS

**OBJECTIVE**

To enable the students to test various Statistical hypotheses.

**UNIT – I: TESTING OF HYPOTHESIS-1**

Simple and composite hypothesis - two kinds of errors, level of significance, size and powerof a test-desirable properties of a good test, most powerful test, Neyman-Pearson lemma with proof.

**UNIT – II: TEST OF HYPOTHESIS-2**

Simple examples using Neyman-Pearson lemma .Uniformly most powerful tests and unbiased tests based on normal Likelihood ratio test (without proof) and its properties. Applicaton of LR test for single mean.

**UNIT – III: TEST OF SIGNIFICANCE FOR LARGE SAMPLES**

Test of significance for mean(s), variance(s), proportion(s), correlation coefficient(s) based on Normal distribution.

**UNIT – IV: TEST OF SIGNIFICANCE FOR SMALL SAMPLES**

Test of significance for mean(s), variance(s), correlation coefficient(s), regression coefficient, based on t, Chi-square and F-distributions. Applications of Chi-square in test of significance (independence of attributes, goodness of fit).

**UNIT – V:**

Non-parametric tests – Kolmogorov -Smirnov test, Sign test, Wald- Wolfowitz run test, run test for randomness, median test, Wilcoxon test and Wilcoxon – Mann-Whitney test.

**TEXT BOOK**

1. Gupta, S.C. and Kapoor, V.K.: "Fundamentals of Mathematical Statistics", Sultan & Chand & Sons, New Delhi, 11th Ed, 2002.



**REFERENCE BOOKS**

1. Kendall, M. and Stuart, A.: "The advanced theory of Statistics" Vol.II, Charles Griffin, 1961.
2. Rohatgi, V.K. : "Statistical Inference", John Wiley and sons, 1984.
3. Hogg, R.V, Craig. A.T. and Tannis: "Introduction to mathematical statistics", Prentice Hall, England, 1995.
4. Dudewicz. E.J and Mishra.S.N.: "Modern Mathematical statistics", John Wiley and sons, 1988.

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**Sem. IV** **Hours/Week: 4**
**14UST430211** **Credits: 3**

## 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**

1. Sastry.S.S. :Introductory Methods of Numerical Analysis, PHI 2000.
2. Atkinson. K, Elementary Numerical Analysis, John Wiley & Sons, 1993.

**REFERENCE BOOK**

1. Gerald, C.F. and Wheatley,P.O.: Applied Numerical Analysis (4th Ed.), Addison-Wesley.

***Note***:

The question paper may consists of Theory and Problem in the ratio 40:60.

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**Sem. IV** **Hours/Week: 4**
**14UST430404A** **Credits: 3**

**Allied-III:**

## MATHEMATICS-II

**Objective:**

* Mathematics background is the strong foundation to learn Statistics

**UNIT - I**

Integration of the following types only:

Type I Definite Integrals - direct application of formulae for

$\int_0^a f(x)dx$; $\int_{-a}^{a} f(x)dx$ when f(x) 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**

Differential Equations of the First Order – Variables Separable – Homogeneous equations – Linear Equations.

**UNIT – III**

Differential Equations of the II order with constant co-efficients with particular Integral for ekx,

sin kx, cos kx and xn– 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 [-p, p] and [0, 2p] only.

**UNIT – V**

Solving differential equations using Taylor series method – Picards method – Euler's method – Modified Euler's method – Runge-kutta method of second order

***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:**

1. Calculus by Narayanan and Manickavachagam pillai Vol-II and Vol-III. S.Viswanathan Printers Publishers, PVT Ltd,2013 (for units I,II, III and IV)
2. Numerical Methods by N.M.Valarmathy and Iyengar .Vikas Publishing House Pvt. Ltd, 2006 (for Unit V)

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**Sem. IV** **Hours/Week: 6**
**14UST430404B** **Credits: 5**

**Allied-III:**

## ACCOUNTS-II

**Objectives:-**

- To impart basic knowledge of cost and management accounting
- To help the student to know the application of them in different situations.

**Unit I**

Preparation of cost sheet- tender quotation. (18 hours)

**Unit II**

Cash flow management- meaning- preparation of cash flow statement. (18 hours)

**Unit III**

Working capital management- meaning- components- Calculation.(18 hours)

**Unit IV**

Marginal costing – Marginal cost- Contribution –PV Ratio – BEP – Margin of safety –CVP-decision making (simple).(18hours)

**Unit V**

Budgeting control- preparation of cash budget- sales budget- production budget- production cost budget- flexible budget.(18 hours)

**Text book:**

1. Reddy and murthy, Cost Accounting (latest Ed.,),Margham Publications, Chennai(Unit I).
2. Reddy and murthy, Management Accounting (latest Ed.,), Margham Publications, Chennai.(Unit II, III, IV & V)

**BOOKS FOR REFERENCES**

1. S.N. Maheswari, (2007), Cost Accounting, S.Chand& Co, New Delhi.
2. Jain & Narang, (2006), Cost Accounting Principles and Practice, Kalyani Publishers, New Delhi.



**Sem. V** **Hours/Week: 4**
**14UST530212** **Credits: 3**

## 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-Estimation of Sample Size-Sampling for attributes.

**UNIT – III: STRATIFIED RANDOM SAMPLING**

Stratified Random Sampling : Properties of the estimates – Unbiased estimates of Mean and Variance.

**UNIT – IV: STRATIFIED RANDOM SAMPLING**

Optimum and Proportional allocations - Comparison of different allocation.

**UNIT – V: 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.

**TEXT BOOKS**

1. Gupta, S.C. and Kapoor, V.K.: Fundamentals of Applied Statistics, Sultan Chand & Co., 11th ed., 2002 (Units I-IV).
2. William G. Cochran.: Sampling Techniques, John Wiley Sons, 1999.

**REFERENCE BOOK**

1. Daroga Singh and Choudary, F.S.: Theory and Analysis of Sample Survey Designs, New age international publishers, 1986.

2. Sukhatame, P.V. and Sukhatame, B.V.: Sampling Theory of Surveys with Applications, ISAS publishers, 3rd Ed, 1957.
3. Sampath, S: Sampling Theory and Methods, Narosa Publishing House, 2001.

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**Sem. V** **Hours/Week: 4**
**14UST530213** **Credits: 3**

## APPLIED STATISTICS

**OBJECTIVE**

1. To provide fundamental ideas about application of statistical concepts in the real world.
2. Statistics finds innumerable applications in almost all walks of life.
3. 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, and official Population studies, Psychology and Education.

**ECONOMIC STATISTICS**

**UNIT – I: TIMES SERIES - 1**

Concepts of time series – Components of time series – Additive and multiplicative models for the analysis of time series - Measurement of trend by (i) Graphic method, (ii) Semi Average method, (iii) Method of Curve Fitting by principle of least squares, (iv)Method of Moving Averages.

**UNIT – II: TIME SERIES - 2**

Measurement of Seasonal Variations by (i) Method of simple average, (ii) Ratio-to-trend method, (iii) Ratio-to-Moving Average Method, (iv) Link Relatives method. Measurement of Cyclic variations by residual approach. Random Component of a time series – Variate difference method.

**UNIT – III: INDEX NUMBERS - 1**

Index numbers and their definitions, Construction and uses – Commonly used index numbers – Laspeyre's, Paasche's and Fisher's index numbers – Criteria of a good index number.

**UNIT – IV: INDEX NUMBERS - 2.**

Test for index numbers 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 – V: OFFICIAL STATISTICS**

Statistical System in India - Official sources of Statistics – Functions of NSSO- CSO –Importance of Census- Census and data collection.

**TEXT BOOK**

1. Gupta, S.C. and Kapoor, V.K.: Fundamentals of Applied Statistics. Sultan Chand & sons - 2007. (Units 1- IV)
2. Pillai RSN and Bagavathi V, Statistics, S. Chand & Co., Ed. 2003 (Unit V)

**BOOK FOR REFERENCE**

1. Garret, H.E., Education and Psychological Statistics

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**Sem. V** **Hours/Week: 5**
**14UST530214** **Credits: 3**

## 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**

Introduction to multivariate normal distribution – Marginal distribution – Moments of the Multivariate distribution – Linear functions of Normal variables – Independence in Multivariate normal distribution. Condition for independence.

**UNIT – II: LINEAR MODEL**

Linear function – Measurement error – Equation error – Linear Model – 5 types of linear model, namely, functionally related Models, Mean related Models, Experimental design Models, Variance – Components Models and Regression Models - Models for Disaster Management.

**UNIT – III: GENERAL LINEAR MODEL**

General linear hypothesis model of full rank – Point estimation under normal and non-normal cases – Gauss Markow theorem.

**UNIT – IV: ECONOMETRICS**

Definition – Scope – Objective – Limitations – Divisions of Econometrics. National Income – Method of Estimation of National Income in India – Difficulties in estimation.

**UNIT – V: PROBLEMS OF SINGLE EQUATION MODEL**

Autocorrelation – Multi-collinearity – Heteroscdasticity – Specification problems and bias – Errors in variables.

**BOOKS FOR STUDY**


1. Graybill, F.A.: An Introduction to linear Statistical Models – Vol. I, (Chapters 3, 5 & 6, McGraw Hill, 1961.
2. Singh, S.P., Parashar, K. and Singh, H.P.: Econometrics, (UNITs IV & V) Sultan Chand & Co, 1980.


**BOOKS FOR REFERENCES**


1. Rao, C.R.: Linear Statistical Inference and its applications, John Wiley & Sons, 1972.
2. Johnson, J (1984): Econometrics Methods, McGraw Hill Book Co, 1984.


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**Sem. V** **Hours/Week: 5**
**14UST530215** **Credits: 3**

## OPERATIONS RESEARCH-I

**OBJECTIVES**

- To import basic knowledge of various optimization techniques.
- Resources are scarce in many situations. Any decision making process may have to take into account, a set of constraints. The optimization in such a situation is of vital importance. This paper involves few important optimization techniques that are used in managerial decision taking process.

**UNIT – I: NATURE OF OR AND LPP**

Different types of models in OR, their construction and general methods of solution. Linear Programming: Introduction-Formulation of LPP- Simplex method

**UNIT – II:**

Degeneracy and unbounded solution-Two phase method- The Big M method (Algorithms and Simple Problems only).



**UNIT – III: 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 – IV: TRANSPORTATION PROBLEM**

Transportation problem-Linear programming formulation-Finding an Initial basic feasible solution by Northwest corner rule and Vogel's rule-Optimality- MODI method- Degeneracy.

**UNIT – V: ASSIGNMENT PROBLEM**

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

**TEXT BOOK**


1. Kanti Swarup, Gupta, P.K. and Man Mohan: "Operations Research", Sultan Chand & sons,New Delhi, 13th ed, 2007.


**REFERENCE BOOKS**


1. Philips, D.T., Ravindran, A and Solberg, J.J.: "Operations Research-Principle and Practice"
2. Taha, H.A : "Operations Research – An Introduction", PHI, 1998.


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**Sem. V** **Hours/Week: 4**
**14UST540301A** **Credits: 4**

**Core Elective-I:**

## 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:**

Vital Statistics – meaning and uses of vital statistics – Measures of mortality – C.D.R., S.D.R., A.S.D.R. – Central mortality rate – Force of mortality – measures of fertility – C.B.R., G.F.R., A.S.F.R., T.F.R., G.R.R. and N.R.R.

**UNIT – IV:**

Mortality Table – Columns of mortality table – Completing an incomplete mortality table uses of mortality table – Expectation of life – Computing probabilities of survival and death using mortality tables – select mortality table – Ultimate mortality table – Aggregate mortality table.

**UNIT – V:**

Principle of insurance – Assurance benefits – Types of assurance – Endowment assurance, pure endowment assurance, whole life insurance and temporary assurance – Premiums – Natural premium – Level premium – Net premium – Office premium – Bonus loading with profit and without profit – Policy value – Retrospective policy value and prospective policy value.

**TEXT BOOKS**


1. Mathematical basis of Life Assurance (IC-81): Published by Insurance Institute of India, Bombay.
2. Gupta, S.C. and Kapoor, V.K.: Fundamentals of Applied Statistics (for UNIT - III only), Suntan Chand & Co. 3rd Ed.


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**Sem. V** **Hours/Week: 4**
**14UST540301B** **Credits: 4**

**Core Elective-I:**

## ELEMENTS OF STOCHASTIC PROCESSES

**OBJECTIVES**

- 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, Wineer processes, Martingales, Markov Processes and Stationary processes.

**UNIT – II: MARKOV CHAIN-I**

Markov Chain: Definition – transition probability matrix – Examples of Markov chains (A spatially Homogeneous Markov chains – one dimen- sional random walk – Etherfest model – A discrete Queuing Markov chain – Inventory model – success run – Branching processes).

**UNIT – III: MARKOV CHAIN-II**

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

**UNIT – IV: CONTINUOUS TIME MARKOV CHAIN**

Classical examples of continuous time Markov chains – Poisson processes, General pure birth processes and Yule's process. Birth and death processes and their differential equations with solutions. Examples: Linear growth with immigration process and M/M/1 queuing model.

**UNIT – V: RENEWAL THEORY**

Renewal process: Introduction – Definitions and examples – Renewal function and renewal density – renewal equation – The Poisson process as a renewal process – Elementary renewal theorem and applications, statement and uses of key renewal theorem.

**TEXT BOOK: Treatment strictly as in**


1. Samuel Karlin and Taylor: A First course in Stochastic Processes, Academic Press, New York, 1975. chapters 1,2&3– Its entirety chapter 4–(exclude sections 3,7 and in (I) counter models, Birth and Death processes with absorbing states and Finite state continuous time Markov chain). Chapter 5 – Sections 1,2,3 (excluding counter models),4,5&6.


**REFERENCE BOOKS**


1. Medhi,J: Stochastic Processes, Wiley Eastern, 2nd., 1994.
2. Adke, S.R. and Manjunath, S.M.: An Introduction to finite Markov processes, Wiley Eastern. 1984.

**Sem. V** **Hours/Week: 4**
**14UST530302** **Credits: 4**

**Core Elective-II:**

## STATISTICAL PACKAGES: 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.
6. Compare means: Independent sample test and paired t- test.
7. Cross tabulation and Chi-square – test.
8. One way and two way ANOVA – Factorial designs.
9. Non parametric test: Binomial tests, run test, sign test, Median test, Mann-whitney test, Kruskal-Wallis, Kendall's and Friedman tests.

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**Sem. V** **Hours/Week: 2**
**14UST540601** **Credits: 2**

**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:**

Tabulation of data.

**TEXT BOOK**

R.S. Aggarwal, "Quantitative Aptitude", S. Chand & Co., New Delhi, 2005.

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**Sem. V** **Hours/Week: 4**
**14USS540701** **Credits: 3**

**IDC:**

## SOFT SKILLS

**Objectives**

* This course is aimed at introducing the students to the nuances of developing the basic skills that required of an educated youth; and to train them to present the best of themselves as job seekers.

**Module 1: Effective Communication & Resume Writing**

Basics of communication - definition of communication, Barriers of Communication, Non-verbal Communication; Effective Communication - Johari Window, The Art of Listening, Conversation Techniques, Good manners and Etiquettes.

**Module II: Resume Writing & Interview skills**

Resume Writing: What is resume? Types of Resume - Chronological, Functional and Mixed Resume, Steps in preparation of Resume. Interview Skills: Common interview questions, Attitude, Body Language, The mock interviews, Phone interviews, Behavioral interviews.

**Module III: Group Discussion**

Group Discussion Basics, GD Topics for Practice, Points for GD Topics. Personal Effectiveness: Self Discovery; and Goal Setting

**Module IV: Numerical Ability**

Average, Percentage; Profit and Loss, Simple Interest, Compound Interest; Time and Work, Pipes and Cisterns; Time and Distance, Problems on Trains, Boats and Streams; and Calendar, Rations and Proportions.

**Module V: Test of Reasoning**

Verbal Reasoning: Series Completion, Analogy; Data Sufficiency, Assertion and Reasoning; and Logical Deduction. Non-Verbal Reasoning: Series; and Classification

**References**


1. Aggarwal, R.S. 2010. A Modern Approach to Verbal and Non Verbal Reasoning. S.Chand, New Delhi.
2. Covey, Stephen. 2004. 7 Habits of Highly effective people, Free Press. Egan, Gerard. (1994). The Skilled Helper (5th Ed). Pacific Grove, Brooks/ Cole.
3. Khera, Shiv 2003. You Can Win. Macmillan Books , Revised Edition.
4. Murphy, Raymond. 1998. Essential English Grammar. 2nd ed., Cambridge University Press. Sankaran, K., & Kumar, M. Group Discussion and Public Speaking. M.I. Pub, Agra, 5th ed., Adams, Media.
5. Trishna's 2006. How to do well in GDs & Interviews, Trishna Knowledge Systems.
6. Yate, Martin. 2005. Hiring the Best: A Manager's Guide to Effective Interviewing and Recruiting.




**Sem. VI** **Hours/Week: 7**
**14UST630217** **Credits: 5**

## DESIGN OF EXPERIMENTS

**OBJECTIVE**

- To expose the essential ideas about designing and executing and interpreting statistical field experiments.
- Statistical experiments shall be designed and studied to identify the best agricultural inputs, like the best fertilizers etc. In a country like ours, which is basically an agricultural one, one ought to know how to select the best agricultural inputs and reap the maximum yield. Through this paper, the student is enabled to acquire the knowledge about this vital area and help the society (agriculturists) with his knowledge.

**UNIT – I: FUNDAMENTAL PRINCIPLE OF EXPERIMENTS**

Fundamental principles of experimentation – Randomization, Replication and Local control techniques. Uniformity trials – Transformation of data and its uses.

**UNIT–II: THE ANALYSIS OF VARIANCE AND ANALYSIS OF COVARIANCE**

ANOVA – One way and two way classification – Ilustration - Analysis of Covariance for a one way layout with one concomitant variable – Analysis of Covariance for an RBD with one concomitant variable.

**UNIT – III: BASIC DESIGNS**

Completely randomized experiments(CRD)-Randomized block designs(RBD)-Latin square designs(LSD)-Missing plot techniques- efficiency of the above designs.

**UNIT – IV: FACTORIAL EXPERIMENTS**

Factorial experiments - 22, 23 and 32 factorial designs-Confounding in 22, 23 and 32 experiments. Partial confounding in 23 experiments. Concept on asymetrical factorial design only.

**UNIT – V: BIBD**

Balanced incomplete block design(BIBD) - Intra block analysis of BIBD – Parametric relationships of BIBD.

**TEXT BOOK**


1. Gupta, S.C. and Kapoor, V.K. : Fundamentals of Applied Statistics, Sultan Chand & Co, 3rd ed, 2007.

**REFERENCE BOOKS**


1. Das, M.N. and Giri, N.C.: Design and analysis of Experiments, New age International Publication 2nd ed, 1986.
2. Doughlas, C. Montgomery: Design and analysis of Experiemnts, John Wiley & sons, 1976.
3. Oscar Kempthrone: Design and analysis of experiments, John wiley and Sons, 1952.


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**Sem. VI** **Hours/Week: 7**
**14UST630218** **Credits: 5**

## ENGINEERING STATISTICS

**OBJECTIVES**

- 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-, 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 part 1 & 2. Double Sampling plan.

**UNIT – IV: RELIABILITY**

Concepts and measures, components and systems, coherent systems, reliability of systems-serial and parallel system 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**

Concepts of Quality Management-Inspection, Quality Control and Quality Assurance. Systems approach for Quality-ISO9000 Standards-Implications and requirements. Quality Audits, Assessments and Surveillance. Concepts of Total Quality Management.

**TEXT BOOKS**


1. Gupta.S.C and Kapoor.V.K: Fundamentals of Applied Statistics Sultan Chand & Co., 1984
2. Montgometry D.C., : Statistical Quality Control , John Wiley and sons, 2nd Ed, 1991.
3. Juran, J.M. : Quality Control Handbook, McGraw Hill, 1998.


**REFERENCE BOOKS**


1. Mahajan : Statistical Quality Control, Dhanpat rai & sons, 1997.
2. Mann, Schafer & Singpurwarla(1974): Methods for Statistical Analysis of Reliability & life data, John Wiley & sons, NewYork, 1974.
3. Feigunbaum, A.V.: Total Quality Control, 3rd Ed, McGraw Hill, 1991.
4. ISO 9000 standards: Issued by Bureau of India.


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**Sem. VI** **Hours/Week: 7**
**14UST630217** **Credits: 5**

## DESIGN

**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 $(2 \times n)$ and $(m \times 2)$ Games-Solution of $m \times n$ 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: QUEUING THEORY**

Basic elements of the queuing 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**


1. Kanti Swarup, Gupta, P.K. and Man Mohan: Operations Research, Sultan Chand & Co, 3rd ed., 1984.
2. Philips, D.T., Ravindran, A. and Solberg, J.J.: Operations Research Principles and Practice. UNIT 5: Chapter 9 Relevant article.


**REFERENCE BOOK**


Hamdy, A. and Taha: Operations Research, 6th ed., PHI, 1998.


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**Sem. VI** **Hours/Week: 7**
**14UST630303A** **Credits: 5**

**Core Elective-III: (Practical)**

## R-LANGUAGE

**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.
6. Compare means: Independent sample test and paired t- test.
7. Cross tabulation and Chi-squre – test.
8. One way and two way ANOVA – Factorial designs.
9. Non parametric test: Binomial tests, run test, sign test, Median test, Mann-whitney test, Kruskal-Wallis, Kendall's and Fried man tests.

**TEXT BOOK**


1. Brian Everitt and Torsten Hothorn. "A Handbook of Statistical Analyses Using R". Chapman & Hall/CRC, Boca Raton, FL, 2006. ISBN 1-584-88539-4.


**REFERENCE BOOKS**


1. William N. Venables and Brian D. Ripley. "Modern Applied Statisticswith S". Fourth Edition, Springer, New York, 2002. ISBN 0-387-95457-0.
2. John Maindonald and John Braun. "Data Analysis and Graphics Using R". Cambridge University Press, Cambridge, 2003.


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**Sem. VI** **Hours/Week: 4**
**14UST630303B** **Credits: 4**

**Core Elective-III: (Practical)**

## STATISTICAL PACKAGE (SAS)

**OBJECTIVE**

* Students of Statistics must learn to anlyse 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.
6. Regression : Simple and multiple linear regression.
7. Compare means: Independent sample test and paired t-test.
8. Cross tabulation and Chi-squre – 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 Fried man tests.

**Sem. VI** **Hours/Week: 3**
**14UST630304** **Credits: 3**

## GROUP PROJECT

**OBJECTIVE**

* To enable the students to apply the statistical techniques for solving real-life problems.
* A good project goes a long way in providing practical training to the students. They get an opportunity through the project to apply some of the vital theoretical concepts and techniques that had learnt in the previous Semesters.
* On most of the occasions, socio-economic survey and market research surveys are periodicaly conducted by government agencies, NGO's and private organizations. So, it is proposed to offer good project topics to the students in these practical areas. The students will be thoroughly trained through the project not only in scientific selection of sample for data collection, but also in identifying and applying approximate statistical techniques in their projects.
* The board evaluation strategy of the project will entitle the allocation of appropriate marks to the project report preparation and the remaining marks to the project viva-voce, as indicated below:

| | **Marks** |
|---|---|
| Project report evaluation | - 60 |
| Project Viva | - 40 |



**Sem. VI** **Hours/Week: 2**
**14UST640602** **Credits: 2**

## Skill Based Elective-II: STATISTICS FOR MANAGEMENT

**OBJECTIVE**

* Statistical skills are imparted for taking 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: TEST OF SIGNIFICANCE**

Large sample tests based on mean(s), proportion(s).

**UNIT – V:**

Small sample test based on means, variances, correlation coefficients - based on t and F-distributions. Applications of c2 tests.

**TEXT BOOK**

1. Boot and Cox: Statistical Analysis for Managerial Decisions (Relevant chapters).

**Sem. VI**
**14UST630221** **Credits: 4**

**Extra Credit Course:**

## BIG DATA ANALYTICS

**OBJECTIVES**

* Students are give introduction to about Big data analytics and this paper gives overall view of how big data Generated and Analyzed.

**UNIT-I:**

Introduction - what is big data?– sources of big data – real time application of big data – sensitivity analysis using big data – challenges in collecting and validating big data .

**UNIT-II:**

Hadoop – Hadoop ecosystem for processing big data –Hadoop cluster- Hadoop distributed file system – working with files in HDFS – map reduce technique for big processing – Joining data from different sources using map reduce.

**UNIT-III:**

Hive and pig – need for high-level tools in big data processing – unstructured and structured data – Not Only SQL (NOSQL) commands – use of Hive as an interface to Hadoop – Use of pig as a programming Tool for big data processing.

**UNIT-IV:**

Statistical techniques for data analysis – Hypothesis teaching – Regression analysis – Use of toolpak in excel for statistical techniques – Use of R language for high-level big data process tasks.

**UNIT-V:**

Data mining through statistics – data mining for marketing, sales and customer relationship management – predictive modeling – nearest neighbour approach – survival analysis – automatic cluster deduction – market basket analysis.

**BOOK FOR STUDY**

1. Big data analysis for Dummies, Dummies press, 2011.
2. Hadoop Fundamentals, packet Publications, 2012.

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