# GOVERNMENT ARTS COLLEGE (AUTONOMOUS)

## KUMBAKONAM 612 002

**Re - accredited With 'A' Grade by NAAC & Affiliated to Bharathidasan University**

## DEPARTMENT OF STATISTICS

**(Effective for those admitted from 2017-2018 onwards)**



## SYLLABI

## B.Sc., STATISTICS

**GOVERNMENT ARTS COLLEGE (AUTONOMOUS), KUMBAKONAM.**
Re-accredited with 'A' Grade by NAAC & Affiliated to Bharathidasan University
**B.Sc., STATISTICS**
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**SEMESTER - I**
**CC 1 - DESCRIPTIVE STATISTICS**

| Subject Code: 17U1S1 | Credits: 5 | External Marks: 75 | Hours: 6 |
|---|---|---|---|

**Objective:** *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:** Definition of Statistics – Functions and scope of Statistics – Primary data and Secondary data: Methods and Sources of collection of data– Merits and demerits.Classification: Definition and types. Tabulation– Parts of table and construction-Types of tables.

**Unit II:** Diagrammatic representations – Bar diagrams and Pie diagram. Graphical representations – Histogram, Frequency curve, frequency polygon and Ogive curves (definitions, construction and uses).

**Unit III:** Measures of Central Tendencies – Arithmetic Mean, Median,Mode, Geometric mean and Harmonic mean – Measures of Dispersion – Range, Quartile deviation, Mean deviation, Standard Deviation, Coefficient of Variation and Lorenz curve (Definitions, problems and uses).Measures of moments, skewness and kurtosis (Concepts only).

**Unit IV:** Correlation analysis – Definition and Types of Correlation - Properties (with proof), Methods – Scatter diagram, Karl Pearson's coefficient of Correlation and Spearman's Rank Correlation Coefficient. Regression lines and Regression coefficients- Properties (simple problems only)

**Unit V:** Association of Attributes – Class frequencies – Order of frequencies –(2X2) Contingency table – Finding missing frequencies – Yule's coefficient of Association and Coefficient of Colligation.

**List of books for study / Reference**

1. S.C.Gupta and V.K.Kapoor – Fundamentals of Mathematical Statistics, Sultan Chand & sons, New Delhi.(11th Edition June 2002. Reprint 2017).

2. S.P.Gupta – Statistical Methods. Sultan Chand & sons, New Delhi. (44th Revised Edition, 2014. Reprint 2017).

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## B.Sc., STATISTICS
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## SEMESTER - I
## AC 1 - MATHEMATICS I

| Subject Code: 17U1PM1,17U1CM1,17U1SM1 | Credits: 4 | External Marks: 75 | Hours: 4 |
|---|---|---|---|

**UNIT I:** **THEORY OF EQUATIONS :** Nature of roots - Equations with real co-efficients, Imaginary roots occur in pairs – rational co-efficients, irrational roots occur in pairs – Relation between roots and coefficients – Transformations of equations – Reciprocal equations.

**UNIT II:** **SERIES:** Applications of the Binomial theorem to Binomial series - Summations and limits of Binomial, Exponential & Logarithmic series.

**UNIT IV:** **MATRICES:** Definitions and Algebraic operations – Rank of a Matrix – Simultaneous linear equations - Eigen values and Eigen Vectors – Cayley Hamilton Theorem.

**UNIT III:** **TRIGNOMETRY:** Expansion of cos $n\theta$, sin $n\theta$, tan $n\theta$ - Powers of sines and cosines of $\theta$ interms of functions of multiples of $\theta$ - Expansion of sin $\theta$ and cos$\theta$ in a series of ascending powers of $\theta$.

**UNIT V:** **DIFFERENTIAL CALCULUS:** Curvature in Cartesian, polar and parametric form- p-r equation of curve.

## Books for Reference:

1. Algebra…….. T.K.M. Pillai
2. Algebra volume II …….. T.K.M. Pillai, T.Natarajan & K.S.Ganapathy
3. Trigonometry……….S. Narayanan & T.K.M.Pillai
4. Calculus Volume I ………………………….T.K.M. Pillai & S.Narayanan.
5. Engineering Mathematics……A. Singaravelu.
6. Algebra & trigonometry – I……A.Singaravelu & R.Ramaa
7. Differential calculus & Trigonometry… A.Singaravelu & R.Ramaa
8. Trigonometry………P.Duraipandian

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**SEMESTER - II**
**CC 2 - PROBABILITY THEORY**

| Subject Code: 17U2S2 | Credits: 5 | External Marks: 75 | Hours: 6 |
|---|---|---|---|

**Objective:** *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 (Major for B.Sc., Degree Course)*

**Unit I:** Sample Space – Events – Probability - definitions - Axiomatic approach- Addition and Multiplication theorems for two and three events. (Simple Problems).Conditional Probability – Independent events (Simple Problems) – Baye's theorem and its applications. Boole's inequality (concept only).

**Unit II:** Concept of random variables – Univariate, Bivariate and Discrete random variables- Probability mass function, Continuous random Variables– Probability density function. Distribution function – Properties - Independence of random variables.

**Unit III:** Mathematical expectation of Random variables - Properties of Mathematical expectation - Moments – Raw moments, Central moments –Measures of location and dispersion of random variables – Tchebychev's1 inequality and its applications.

**Unit IV:** Moment generating function of a random variable - properties and uses – Cumulants – Characteristic functions – Properties – Inversion theorem (statement only) - Weak law of large numbers- Statement and Applications.

**Unit V:** Bivariate distribution – Distribution functions of bivariate random variable and its properties – Joint Probability mass and density functions, marginal and conditional distributions– Conditional expectation – Concept of regression lines, Covariance and Correlation.

**List of books for study**
1. S.C.Gupta and V.K. Kapoor (2007). Fundamentals of Mathematical Statistics,Sultan Chand and Sons Publications, New Delhi.
2. J.N.Kapur and H.C.Saxena (1999). Mathematical Statistics – S.Chand and Company Ltd., New Delhi.

**Reference Books**
1. Marek. Fisz, (1961). Probability Theory and Mathematical Statistics, John Wiley and Sons.
2. Hogg. R. V. and Allen T. Craig (1998). Introduction to Mathematical Statistics.

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**SEMESTER - II**
**AC 2 - MATHEMATICS II**

| Subject Code: 17U2PM2,17U2CM2,17U2SM2 | Credits: 3 | External Marks: 75 | Hours: 3+3 |
|---|---|---|---|

**UNIT I:** **INTEGRAL CALCULUS:** Properties of Definite integrals – Integration Reduction formulae for $\int x^m(\log x)^n dx$, $\int x^n e^{ax} dx$, $\int \sin^n x\, dx$, $\int \cos^n x\, dx$, $\int \tan^n x\, dx$, $\int \sec^n x\, dx$, $\int \csc^n x\, dx$, $\int \sin^m x \cos^n x\, dx$ and $\int \cot^n x\, dx$.

**UNIT II:** Multiple Integrals – Change the order of Integration - Definition and properties of beta and gamma functions.

**UNIT III:** **Fourier Series** :Full Range and Half Range Series with periods $2\pi$ and $\pi$

**UNIT IV:** **VECTOR ANALYSIS:** Vector differentiation – Gradient – Directional Derivative - Divergence and Curl of a vector – Problems.

**UNIT V:** Vector Integration – Line integrals – Surface integrals and volume integrals – Gauss Divergence theorem – Green's theorem – Stoke's theorem (proof not included) – Problems using the above theorems.

**Books for reference:**
1. CALCULUS VOLUME II …………….………..T.K.M. PILLAI.
2. ENGINEERING MATHEMATICS………….……..A. SINGARAVELU.
3. ALLIED MATHEMATICS VOLUME II….A.SINGARAVELU
4. VECTOR ANALYSIS……..T.K.M. PILLAY
5. VECTOR ANALYSIS…….LAKSHMINARASIMHAN.

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**SEMESTER - II**
**AC 3 - MATHEMATICS III**

| Subject Code:<br>17U2PM3,17U2CM3,17U2SM3 | Credits: 3 | External Marks: 75 | Hours: 4 |
|---|---|---|---|

**UNIT I:**   **FIRST ORDER DIFFERENTIAL EQUATIONS:** Exact Differential Equations, Necessary   and Sufficient condition for integrability – Integrating factors – First order  Higher degree  Equations – Solvable for p,x,y - Clairaut's form.

**UNIT II:**   **SECOND ORDER DIFFERENTIAL EQUATIONS :** Second Order Differential Equations   with constant coefficients: Particular Integral    of functions of types $x^m$, $e^{ax}$, Cos mx, Sin mx, $e^x f(x)$ and $x^m f(x)$ – Second order Differential Equations with variable coefficients.

**UNIT III:**   **Partial Differential Equations:-**Formations of partial Differential Equations by eliminating arbitrary constants and arbitrary functions – First order partial Differential Equations  - Lagrange's Equations.

**UNIT IV:**   Four Standard Forms - Charpit's Method.

**UNIT V :**   **LAPLACE TRANSFORMS:** Laplace Transform – Properties – First   shifting theorem  –  Inverse Laplace Transforms – Applications to solve second order Differential  equations  with constant coefficients.

**BOOKS FOR REFERENCE:**
1. DIFFERENTIAL EQUATIONS AND ITS APPLICATIONS.....S. NARAYANAN & T.K.M.PILLAI
2. PARTIAL DIFFERENTIAL EQUATIONS.....I.N. SNEDDON
3. ENGINEERING MATHEMATICS.........A. SINGARAVELU.
4. ALLIED MATHEMATICS VOLUME II....A.SINGARAVELU
5. CALCULUS VOLUME II …………T.K.M.PILLAI

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**SEMESTER - II**

**CP 1 - MAJOR PRACTICAL I**

| Subject Code: 17U2SP1 | Credits: 4 | External Marks: 60 | Hours: 4 |
|---|---|---|---|

**Unit I:** Construction of Univariate and Bivariate Frequency Distributions. Diagrammatic representations – Bar and Pie diagrams. Graphical representations– Histogram, Frequency curve, Frequency Polygon and Ogive curves.

**Unit II:** Measures of Central Tendency – Arithmetic Mean, Median, Mode, Geometric mean and Harmonic mean.

**Unit III:** Measures of Dispersion – Quartile Deviation, Mean Deviation, Standard deviation and Co-efficient of variation. Moments, Measures of Skewness– Bowley's and Karl Pearson's methods - Kurtosis.

**Unit IV:** Computation of Karl Pearson's Co-efficient of Correlation and Spearman's Rank Correlation, Regression equations (two variables only). Calculation of Yule's Co-efficient of Association and Yule's Co-efficient of Colligation.

**Unit V:** Marginal and Conditional distribution - Expectation – Mean, Variance and Correlation Co-efficient - Bivariate Distribution.

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**SEMESTER - III**
**CC 3 - DISTRIBUTION THEORY**

| Subject Code: 17U3S3 | Credits: 5 | External Marks: 75 | Hours: 6 |
|---|---|---|---|

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

**Unit I:** Discrete distributions – Uniform, Bernoulli, Binomial, Poisson, Geometric, Hyper geometric and Negative Binomial distributions –Properties- Poisson distribution is a limiting form of Binomial distribution(with proof).

**Unit II:** Continuous distributions – Rectangular, Normal, Exponential, Cauchy, Gamma, Beta distribution –Properties and Applications**.**

**Unit III:** Sampling Distributions - chi square Distribution - definition, M.G.F, Mode, Additive property - Student's 't' and 'F' distributions - definition and derivation of density functions.

**Unit VI:** Convergence in probability-definition. Chebyche'v inequality and weak law of large numbers (with proof) and Statement of strong law of large numbers – Central limit theorems – Demoiver's Laplace theorem. Lindberg – Levy theorem (Statement only).

**Unit V:** Order Statistics – Distribution function of maximum and minimum order statistics– Simple applications – Distribution of $r^{th}$ order statistics and sample median – Simple problems – uses of order statistics.

**Reference Books:**

1. S.C.Gupta and V.K.Kapoor, (2004), Fundamentals Mathematical Statistics, Sultan Chand & Sons, New Delhi.
2. V.K. Rohatgi, (1985), An introduction to probability theory and mathematical statistics, Wiley Eastern Ltd., New Delhi

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**SEMESTER - III**

**AC 1 - PRINCIPLES OF MANAGEMENT**

| Subject Code: 17U3SB1 | Credits: 4 | External Marks: 75 | Hours: 4 |
|---|---|---|---|

**Objective :** To enable the students understand the principles of management and how to acquire the skills to become a good manager.

**Unit  I:** Management – meaning, definition, importance - features – Difference between management and administration – Functions of management – Management Skills.

**Unit II:** Scientific management – Meaning – Contribution of F.W. Taylor – Fayol's principles – Contribution of Peter Drucker's towards modern management – Role of managers.

**Unit III:** Planning – Nature – Purpose - Types of Planning – Steps in Planning – Limitations of Planning- MBO process – Advantages and Disadvantages of MBO – Decision making process.

**Unit  IV:** Organising – Principles - Process - Types of organisation – Span of Management – Merits of Delegation of Authority and Responsibility.

**Unit V:** Controlling – meaning – Process - Requirements of effective control- Budgetary and Non-Budgetary controlling techniques.

**Books Recommended:**
1. Principles and Practice of Management – L.M. Prasad
2. Principles and Practice of Management - V.S.P. Rao & P.S. Narayanan
3. Essentials of Management – Koontz and O'Donnell
4. Business Management  - Dinkar Pagare
5. The Practice of Management  - Peter Drucker

**SEMESTER - III**

**NME 1 - INDIAN POLITY**

இந்திய அரசியல்

| Subject Code: 17U3SNE1 | Credits: 2 | External Marks: 75 | Hours: 2 |
| --- | --- | --- | --- |

**Objective :**

*To study in detail about the Preamble and features of Indian Constitution*

இந்திய அரசியலமைப்பின் சிறப்பியல்புகள் மற்றும் முகப்புரையைப் பற்றி விரிவாக படிப்பது.

*To know about the powers and functions of the Indian president.*

இந்திய ஜனாதிபதியின் அதிகாரம் மற்றும் பணிகளைத் தெரிந்துகொள்வது.

*To understand about the Supreme Court and Judicial Review.*

நீதி புனராய்வு மற்றும் உச்ச நீதிமன்றம் பற்றி புரிந்து கொள்வது.

*To know about the funtions of the Election Commission.*

தேர்தல் ஆணையத்தின் பணிகளைத் தெரிந்துக்கொள்வது.

**Unit I:** Making of Indian Constitution – Features of Indian Constitution – Preamble.

**அலகு I:** இந்திய அரசியலமைப்பின் உருவாக்கம் - இந்திய அரசியலமைப்பின் சிறப்பியல்புகள் - முகப்புரை .

**Unit II:** Fundamental Rights - Directive Principles of State Policy.-Fundamental duties.

**அலகு II:** அடிப்படை உரிமைகள் - வழிகாட்டி நெறிமுறை கோட்பாடுகள் - அடிப்படை கடமைகள்

**Unit III:** Indian Federalism: Union and State Relations – Parliamentary

**அலகு III:** இந்திய கூட்டாச்சி: மத்திய மற்றும் மாநில உறவுகள் - பாராளுமன்ற அரசாங்கம் - ஜனாதிபதி -   பிரதம மந்திரி

**Unit IV:** Supreme Court and Judicial Review – Article 370 – Indian Sovereignty

**அலகு IV:** உச்ச நீதிமன்றம் மற்றும் நீதி புனராய்வு - விதி  - இந்திய இறையாண்மை

**Unit V:** Election Commission – Union Public Service Commission – State Public Service Commission – Finance Commission.

**அலகு IV:** தேர்தல் ஆணையம் - மத்திய பொதுப்பணி ஆணையம் - மாநில பொதுப்பணி ஆணையம் - நிதி ஆணையம்

**Reference Books:**

1. G. Austin. The Indian Constitution: Corner Stone of a Nation. Oxford University Press, 1996.

2. G. Austin. Working a Democratic Constitution: The Indian experience. Delhi, Oxford University Press, 2000.

3. M. Laxmikanth. Indian Polity: MC Graw Hill Education 4th Edition.

4. D.D. Basu. An Introduction to the Constitution of India. New Delhi, Prentice Hall, 1994.

5. S. Kashyap. Our Parliament, New Delhi. National book Trust, 1992.

6. M.V. Pylee. Introduction to the Constitution of India, New Delhi, Vikas, 1998.

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**SEMESTER - IV**
**CC 4 - STATISTICAL INFERENCE**

| Subject Code: 17U4S4 | Credits: 4 | External Marks: 75 | Hours: 5 |
|---|---|---|---|

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

**Unit I:** Point estimation – Definition and their Properties – Methods of estimation – Maximum Likelihood Estimators, Method of moments,Simple Problems – Cramer – Rao Inequality with Proof.

**Unit II:** Interval Estimation – Confidence Intervals for Proportions, Mean and Variance based on Chi-Square, Students t, F and Normal distributions.

**Unit III:** Testing of hypothesis – Definition – Null and Alternative Hypothesis, Level of Significance, Critical Region, Type I and Type II errors, Standard error. Power of the test, most powerful tests based on "t", Neyman-Pearson lemma, Chi-square, F and Normal distributions (without proof).

**Unit IV:** Test of significance – large sample test, test for single mean with known and unknown variances – Test for difference between two means with known and unknown variances.

**Unit V:** Test of significance - Small sample test based on Chi- square, t and F distributions – Means, Variance and Correlation Co-efficient. Chi square test for independence of Attributes and Goodness of fit.

**List of books for study / Reference**

1. Gupta S.C and Kapoor V.K - Fundamentals of Mathematical Statistics.

2. Goon A.M. Gupta M.A and Das Gupta B (1980) – An Outline of Statistical Theory, Volume 2

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**SEMESTER - IV**

**AC 2 - ACTUARIAL SCIENCE IN MANAGEMENT**

| Subject Code: 17U4SB2 | Credits: 5 | External Marks: 75 | Hours: 4 |
|---|---|---|---|

**Unit I:**   Principles of Life Assurance: Nature of Insurance – Classification of Insurance – History of Life Insurance in India.

**Unit II:**   Definition of Whole Life Assurance – term assurance – pure endowment – endowment assurance – critical illness assurance – whole life level annuity – temporary level annuity – premium, benefit – assurance and annuity contracts.

**Unit III:**   Derivation of means - Variances of the present values of the payment under simple assurance and annuity contracts assuming constant deterministic interest – simple problems.

**Unit IV:**   Expression in the form of sums for the mean and variance of the present values of benefit payments under simple assurance and annuity contract in terms of the curtate random future life time, assuming that death benefits are payable at the end of the year of death and annuities are paid annually in advance.

**Unit V:**   Derivation of the relations between annuities payable in advance and in arrear, between temporary, deferred and whole life annuities.

**Reference:**

CT – 5 General Insurance, Life and Health contingencies by Institute of Actuaries of India.

**SEMESTER - IV**

**CP 2 - MAJOR PRACTICAL II**

| Subject Code: 17U4SP2 | Credits: 4 | External Marks: 60 | Hours: 3 |
|---|---|---|---|

**Unit I:**   Fitting of Binomial and Poisson distributions and testing of its goodness of fit.

**Unit II:**   Fitting of Normal distribution -Area and Ordinate methods.Obtain Marginal and conditional density function – Expectations and correlations

**Unit III:**   Estimation of parameters by the methods of Moments and MLE – Binomial, Poisson, Normal distributions only.

**Unit IV:**   Asymptotic and exact tests of significance for proportions, means and variances. Independence tests for contingency tables of order (2x2).

**Unit V:**   Non-parametric tests – Sign test, Median test, Run test, Mann-Whitney test (one Sample and two sample problems).

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**SEMESTER - IV**

**AP 1 - ACTUARIAL SCIENCE IN MANAGEMENT - PRACTICAL**

| Subject Code: 17U4SBP1 | Credits: 3 | External Marks: 60 | Hours: 3+3 |
|---|---|---|---|

**Unit I:** Principles of Life Assurance: Nature of Insurance – Classification of Insurance – Demo

**Unit II:** Demo - Whole life assurance – Term assurance – Pure Endowment – Endowment assurance – critical illness assurance – Different Life Insurance Products.

**Unit III:** Derivation of means and variances - Deterministic interest – Simple Problems.

**Unit IV:** Simple Problems - Benefits are payable at the end of the year of death and annuities are paid annually in advance.

**Unit V:** Payable in advance and in arrear, between temporary, deferred and whole life annuities – Simple Problems.

**Reference:**

Online Trading and Share Marketing - Simple Problems.

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**SEMESTER - IV**
**NME 2 - MODERN INDIA**

| Subject Code: 17U4SNE2 | Credits: 2 | External Marks: 75 | Hours: 2 |
|---|---|---|---|

**Objectives**: *To enable the students to clearly understand the Socio-religious r      eform movements and Emergence of Indian Nationalism*

**Unit I:** Queen's Proclamation- 1858 Act- 1861 Act- Lytton's viceroyalty- Ripon and Local-Self-government.

**Unit II:** Socio-religious reform movements- Brahmo Samaj- Prarthana Samaj- Arya Samaj- the Ramakrishna Movement- the Theosophical Movement- Muslim reform movements- depressed class movements: Narayana Guru and SNDP- Jyothirao Phule and Satya Shodhak Samaj.

**Unit III:** Emergence of Indian Nationalism: causes- leadership- moderate achievements- 1892 Act.

**Unit IV:** The Swadeshi Movement- Tilak, Bipin Chandra Pal, Lala Lajpat Rai- 1909 Act- Annie Besant and Home Rule.

**Unit V:** Gandhi an Era: Non-cooperation Movement- Civil Disobedience Movement- Quit India Movement- Indian Independence- 1919 and 1935 Acts.

**Reference Books:**

1. Chhabra, G.S.Advanced Study in the History of Modern India Vol. I, II, III 1707 – 1947.

2. Desai, A.R.Social Background of India Nationalism.

3. Grover, B.L.A New Look on Modern Indian History.

4. Bipan Chandra (1989). India's Struggle for Independence.

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**SEMESTER - IV**
**SBE 1 - GAME THEORY AND INVENTORIES**

| Subject Code: 17U4SSE1 | Credits: 2 | External Marks: 75 | Hours: 2 |
|---|---|---|---|

**Objectives:** *To enable the students to clearly understand Game Theory and Inventory Control*

**Unit I:** Game Theory- Definition- Two Person Zero-Sum Games- Some Basic terms of Game Theory –The Maximum-Minimax Principle (Simple Problems).

**Unit II:** Games without Saddle Points- Mixed Strategies- Definition (Simple Problems)- Grapic Solution of 2Xn and mx2 Games (Simple Problems) - Dominance Property (Concept only).

**Unit III:** Arithmetic method for nxn Games – General solution of mxn Rectangular Games – Games against Passivity – Limitations and Extension (Concepts Only).

**Unit IV:** Inventory Control – Definition types of Inventories-Resons for carrying Inventories- Inventory Decision - Objectives of Scientific Inventory Control.

**Unit V:** Costs associated with Inventories factors Affecting Inventory control- An inventory Control Problem-The Concept of EOQ – Deterministic Inventory problems with no Shortages.

## Reference Books:

1. Operation Research, Kanti Swarup P.K. Gupta and Man Mohan. Sultan Chand & Sons, First Edition 1977.

2. Introduction on Operation Research, R. K. Sharma and Hira.

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**SEMESTER - V**

**CC 5 - SAMPLING TECHNIQUES**

| Subject Code: 17U5S5 | Credits: 5 | External Marks: 75 | Hours: 6 |
|---|---|---|---|

**Objectives:** *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:** Design, Organization and execution of the sample surveys – principal steps in sample survey – pilot survey – sampling and non – sampling errors – Advantages of sampling over complete census – Limitations of sampling.

**Unit II:** Sampling from finite population – simple random sampling – unbiased estimate of the mean and variance –Determination of sample size.

**Unit III:** Stratified random sampling – properties of the unbiased estimate of the mean and Variances – optimum and proportional allocation –Relative precision of a stratified sampling and simple random sampling.

**Unit IV:** Systematic sampling – Estimation of mean and variance – Comparison of simple random sampling and Stratified random sampling with systematic sampling

**Unit V:** Ratio – estimators – Variance of the ratio estimate – comparison of the ratio estimate with the mean per unit – Bias of the ratio estimate – Regression estimators – linear regression estimate – Regression estimators with pre-assigned ratio estimator.

**List of books for study / Reference**

1. William G.Cohran (1984) – sampling Techniques.

2. Kapoor V.K. and Gupta S.C. Fundamentals of Applied statistics.

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**SEMESTER - V**
**CC 6 - DESIGN OF EXPERIMENTS**

| Subject Code: 17U5S6 | Credits: 5 | External Marks: 75 | Hours: 6 |
|---|---|---|---|

**Objectives:** *To expose the essential ideas about designing and executing and Interpreting statistical field experiments.*

**Unit I:** Analysis of variance – Definition and assumptions Cochran's theorem (statement only) ANOVA – One way and Two way classifications.

**Unit II:** Design of Experiments – Terminology and principles of experiments Completely Randomized Design (CRD), Randomized Block Design (RBD) and Latin Square Design (LSD) Estimation of one and two missing values in RBD and LSD.

**Unit III:** Factorial Experiments – main effects and interactions, Definition of contrast and orthogonal contrast, Analysis of $2^2$ and $2^3$ factorial Experiments.

**Unit IV:** Confounding in Factorial design – Confounding in $2^3$ Experiment, Partial confounding in $2^3$ Experiment, merits and demerits of confounding.

**Unit V:** Split – plot design – Analysis, advantages and disadvantages, Analysis of Covariance for a one – way layout with one concomitant variable and an RBD with one concomitant variable

**List of books for study / Reference**

1. S.C. Gupta and V.K.Kapoor - Fundamentals of Applied Statistics.

2. Goon A.M. Gupta M.A and Das Gupta, B - Fundamentals of Statistics.

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**SEMESTER - V**
**CC 7 - ELEMENTS OF OPERATIONS RESEARCH**

| Subject Code: 17U5S7 | Credits: 5 | External Marks: 75 | Hours: 5 |
|---|---|---|---|

**Objective:** *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:** Definition of OR – Scope of OR - Different types of models. Definition of Linear Programming problem, Formulation of LPP - Graphical method of solving LPP (2 variables only) Solving LPP by simplex method and Big M method (No degeneracy and cycling) – simple problems

**Unit II:** Definition of Transportation problem – Unbalanced TP – Initial solution to a TP by North West Corner Rule, Cost minimum method and Vogel's approximation method. Algorithm to find optimal solution to a TP – simple problems.

**Unit III:** Assignment problem –definitions – Mathematical formulation of the problem-Reduction theorem-Solution methods of assignment problem- Unbalanced AP, Solving an assignment problem. – Dual of the assignment problem - Applications of assignment problem.

**Unit IV:** Introduction to Queuing theory – Characteristics of a Queuing system. Customers behavior in a queue. Steady –State solution for P(n) in the models $(M/M/1) : (\infty/FIFO)$ and $(M/M/1) : (N /FIFO)$. Calculation of E(n), E(m),average length of non-empty queue length – simple problems.

**Unit V:** Introduction to Network – Concepts of activity, node, network, critical path, different floats, Critical path method – Calculation of earliest time and latest time - PERT Calculations.

**List of books for study / Reference**

1. Kanti Swarup, P.K. Gupta & Man Mohan: Operations research – Sultan Chand & Sons.

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**SEMESTER - V**

**CP 3 - MAJOR PRACTICAL III**

| Subject Code: 17U5SP3 | Credits: 4 | External Marks: 60 | Hours: 4 |
|---|---|---|---|

**Unit I:** Estimation of mean and variance of the population is an unbiased estimate. Using simple random sampling (SRSWOR and SRSWR) and stratified random sampling with optimum and proportional allocation estimation of sample size.

**Unit II:** Ratio and linear regression methods of estimation of population mean and total estimation of mean and variance of the population and variance of the estimator of mean using systematic random sampling.

**Unit III:** Analysis of CRD, RBD one and two observations per cell and LSD layouts, missing plot techniques in RBD and LSD (one or two missing observations) Latin Square Design.

**Unit IV:** Analysis of $2^2$ and $2^3$ factorial design with and without confounding – Analysis of covariance for an RBD with one concomitant variable.

**Unit V:** Solving LPP by Graphical and simplex methods. Solving transportation and Assignment problems.

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**SEMESTER - V**
**MBE 1 - VITAL STATISTICS**

| Subject Code: 17U5SEC1 | Credits: 4 | External Marks: 75 | Hours: 3 |
|---|---|---|---|

**Objective:**   *To enable the students to clearly understand Vital statistics*

**Unit I:**    Introduction – Definition of Vital statistics, Uses of Vital statistics, methods of obtaining Vital statistics.Registration method,Census enumeration – Analytical method.

**Unit II:**    Measurement of Fertility – CBR (crude birth rate) – SFR (specific fertility rate) -   ASFR (age specific fertility rate) – GFR (general fertility rate) – TFR (total fertility rate)

**Unit III:**    Reproduction Rate – Gross Reproduction Rate – Net Reproduction Rate- Concepts and simple problems.

**Unit IV:**    Measurement of Mortality – Specific death rate – Standardized death rate – Infant Mortality- Concepts and simple problems.

**Unit V:**    Life Table –definition– Construction of a life table, Uses of Life table (simple problems)

**List of books for study / Reference**

1. S.C. Gupta and V.K.Kapoor – Fundamentals of Applied Statistics. Sultan Chand  and Sons  New Delhi.
2. S.P.Gupta –Statistical Methods

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**SEMESTER - V**
**SBE 2 - M.S OFFICE AND EXCEL WORKSHEET**

| Subject Code: 17U5SSE2 | Credits: 2 | External Marks: 75 | Hours: 2 |
|---|---|---|---|

**Objective:** *To enable the students to clearly understand M.S Office And Excel Worksheet.*

**Unit I:** Enhance a basic word document –Applying character formats – Changing fonts –size and style-Adjusting page setup – Inserting page numbers – Controlling Document Layout-working with indents- Using default tabs – Setting custom tabs.

**Unit II:** Automating a form with fields – Inserting fields – Adjusting section page numbers – Adding headers and Footers – Template – Editing a template – Creating a template category.

**Unit III:** Excel Workbook: Entering the worksheet data –Navigating an Excel worksheet – Understanding worksheet defaults- Selecting cell ranges – Selecting cell with the keyboard – Naming Ranges: Applying names to individual cells and ranges –Removing a name.

**Unit IV:** Naming Worksheets – Inserting and removing sheets – Creating identical worksheets – Grouping and Ungrouping worksheets – Excel Database: Concepts – Building a list database in Excel –Setting up fields – Entering and Editing data sets.

**Unit V:** Creating and Using Charts: Charting basics – Choosing the Right Type of Chart – Selecting worksheet content for the chart –Creating Bar diagrams, Pie diagram, Frequency and frequency polygons.

**Books for study**
Microsoft office 2000 –Laurie Ulrich-G.C.Jain for TechMedia, New Delhi. First edition, 1999.

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### SEMESTER - V
### SBE 3 - INDIAN OFFICIAL STATISTICS

| Subject Code: 17U5SSE3 | Credits: 2 | External Marks: 75 | Hours: 2 |
|---|---|---|---|

**Objective:** *To enable the students to clearly understand Statistical organization Industrial statistics and Wage statistics.*

**Unit I:** Statistical organization – Population Statistics – Agricultural Statistics – Indices of Agricultural production – Miscellaneous Agricultural Statistics.

**Unit II:** Industrial statistics – ASI – Indices of Industrial Production and profits.

**Unit III:** Price statistics – Price index numbers – Labour Bureau; Index number of Retail prices – Indices of security prices.

**Unit IV:** Wage statistics – trade statistics – Financial statistics – National income statistics.

**Unit V :** National sample surveys – Activities and publications of CSO and the Department of Statistics, Government of Tamil Nadu. National Income compilation.

### Reference

1. Gupta SP : Statistical Methods (Sultan Chand & Sons)

2. Saluja MR : Indian Official Statistical System (Publication of Indian Econometric Society)

3. Central Statistical Organisation, Guide to Official Statistics 1979 Ed Department of Statistics, Ministry of Planning, India

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**SEMESTER - VI**
**CC 8 - STATISTICAL QUALITY CONTROL**

| Subject Code: 17U6S8 | Credits: 6 | External Marks: 75 | Hours: 6 |
|---|---|---|---|

**Objective:** *To impart the basic knowledge of statistical quality control. At the end of the Course, the student should be able to select the suitable statistical quality control.*

**Unit I:** The concept of SQC Chance and Assignable causes of variation, Uses of SQC Process and product control chart for variables –$\bar{X}$ and R- charts - Revised control charts

**Unit II:** Control charts for attributes – Control chart for fraction defectives (p-chart), Control chart for number of defectives (d-chart) (for fixed and variable sample sizes), control chart for number of defects per unit (C-chart) – natural tolerance limits and Specification limits.

**Unit III:** Acceptance sampling by attributes – Acceptance Quality level (A.Q.L), Lot tolerance percent defectives (L.T.P.D), process average fraction defectives (P), producer's and consumer's risks. Rectifying inspection plans. Average outgoing quality limits (A.O.Q.L).

**Unit IV:** Operating Characteristic (O.C) curve – Average sample number (A.S.N) single sample plans: Determination of n and c A.O.Q.L – O.C and A.O.Q curves – Double sampling plans: O.C. curve, A.S.N and A.T.I curves.

**Unit V:** Sequential sampling – Sequential Probability Ratio Test (S.P.R.T) O.C. of sequential sampling plans, A.S.N function of sequential sampling plans.

**Reference**
1. Gupta. S.C. & Kapoor, V.K; Fundamentals Applied statistics Sultan Chand & co.
2. Duncan A.J. Statistical Quality control, Mc Graw Hill, New York.

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**SEMESTER - VI**
**CC 9 - TIME SERIES AND INDEX NUMBERS**

| Subject Code: 17U6S9 | Credits: 6 | External Marks: 75 | Hours: 6 |
|---|---|---|---|

**Objective:** *To provide fundamental ideas about application of statistical concepts in the real world.Statistics finds innumerable applications in almost all walks of life.*

**Unit I:** Time series –Concept and Sources of time series data – Components of time series – Additive and Multiplicative models – Resolving the components of time series – Trend –Methods of measuring trend – Semi average method – Method of moving average –Method of least squares – First order & second order polynomials and logistic curves

**Unit II:** Seasonal variation – Seasonal index – Methods of measuring seasonal index – Simple average method – Ratio to moving average - Ratio to trend method – Link relatives method – Cyclical variation –Problems and Uses.

**Unit III:** Index Numbers – Definition – uses - Problems in the construction –Different types of Index Numbers – Simple and Weighted Index Numbers –Laspeyre's Index Numbers – Paaschey's Index Numbers – Fisher's Index Numbers – Marshall - Edgeworth Index Numbers – Dorbish & Bowley's Index Numbers.

**Unit IV:** Index Numbers – Time reversal test – Factor Reversal Test –Circular Test – Chain base Index Number – Conversion of FBI into CBI and Vice versa –Uses of Index Numbers - Wholesale price Index Numbers (Concept only**).**

**Unit V:** Cost of living Index Numbers – Methods of construction – Aggregate method – Family budget method – Uses of cost of living Index Numbers- Splicing and Deflating – Base shifting (Concepts only).

**Reference**
1. A.M.Goon M.K.Gupta and B.Das Gupta (1994), Fundamentals of Statistics V-II, The worlds press Ltd., Calcutta.
2. Croxton: Applied General Statistics.
3. S.C.Gupta, V.K.Kapoor, (2007): Fundamentals of Applied Statistics, Sultan Chand & Sons, New Delhi

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**SEMESTER - VI**

**CP 4 - MAJOR PRACTICAL IV**

| Subject Code: 17U6SP4 | Credits: 5 | External Marks: 60 | Hours: 6 |
|---|---|---|---|

**Unit I:** Construction of $\bar{X}$ ,R, P, c and np charts, OC curves for single sampling plan.

**Unit II:** Time series: Fitting of linear, Quadratic and Exponential trend by the method of least squares. Fitting trend values by method of moving averages.

**Unit III:** Determination of seasonal variation by simple average method, moving average method (Additive and Multiplicative model), Link relative method.

**Unit IV:** Index Numbers: Construction of fixed and chain base numbers, Laspeyre's, Paaschey's, Bowley's, Fisher's and Marshall-Edgeworth index numbers.

**Unit V:** Construction of Cost of living Index Numbers – Aggregate method –Family budget method.

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## SEMESTER - VI
## MBE 2 -  NUMERICAL METHODS

| Subject Code: 17U6SEC2 | Credits: 4 | External Marks: 75 | Hours: 5 |
|---|---|---|---|

**Objective:** *To tackle the practical situations demands the use of interpolation and Extrapolation.*
*To solve Mathematical calculus problems, whenever the classical approach fails.*
*To solve mathematical calculus problems through computers*

**Unit I:** Finite differences – Forward and Backward difference operators 'E' and 'And' their basic properties – Interpolation with equal intervals – Newton's forward and backward difference formulae – simple problems.

**Unit II:** Interpolation with unequal intervals – Divided differences and their properties – Newton's divided difference formula – Lagrange's formula - simple problems

**Unit III:** Central difference interpolation formula – Gauss forward and backward differences formulae – Stirring's, Bessel's and Everett's central difference formulae.

**Unit IV:** Inverse interpolations – Lagrange's method – Interaction of successive approximation – method – simple problems. Numerical differentiation - Numerical differentiation up to second order only - simple problems.

**Unit V:** Numerical integration – Trapezoidal rule – Simpson's $1/3^{rd}$ and $3/8^{th}$ rules – Weddle's rule – Euler's summation formula – Numerical method of solution of ordinary differential equations – Taylor's series method – Euler method and Runge Kutta up to second order - - simple problems only.

### List of books for study / Reference

Gupta P.P. & Malik G.S. Calculus of finite differences and Numerical analysis.

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**SEMESTER - VI**
**MBE 3 - COMPUTER PROGRAMMING IN 'C'**

| Subject Code: 17U6SEC3 | Credits: 4 | External Marks: 75 | Hours: 5 |
|---|---|---|---|

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

**Unit I:** Introduction to C, Characters set, Variables, Data types – Declaration, Type conversions, Increment and Decrement operators, Bitwise, logical and Assignment operators.

**Unit II:** Expression and conditional expressions, Control structures If – Else, Switch, While, For, Do-While loop structures. Break, Continue, Go and label statement Functions, Function Returning, Non-integers, function argument State and register variables.

**Unit III:** Arrays and strings – Array Declaration – Multi Dimensional arrays, Strings / Character Arrays, Array initialization.

**Unit IV:** Pointers and addresses. Pointers and Arrays – Pointer to Functions.

**Unit V:** Structures and Functions, Arrays of Structures. Fields Unions – type definition – standard input and output – formatted output – Access to the standard library.

**List of books for study / Reference**

1. Balagursamy – Programming in C.

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**SEMESTER - I**

**AC 1 - STATISTICS FOR MATHEMATICS I**

| Subject Code: 17U1MST1 | Credits: 4 | External Marks: 75 | Hours: 4 |
|---|---|---|---|

**Objective:** *To study in detail about various types of classification and tabulation. To understand the structure of forming frequency tabulation.To know the problem in the Descriptive Measures, the basic concepts of probability and random variable.*

**Unit I:** Classification – Meaning, Objectives and Types. Formation –Discrete and Continuous distribution. Tabulation – Parts, General Rules and Types, Forming frequency tabulation (simple problem). Difference between Classification and Tabulation.

**Unit II:** Measures of central tendency – Mean, Median, Mode, Harmonic mean and Geometric mean and its Merits and demerits (Simple problems).Measures of Dispersion -Range, Quartile Deviation, Mean Deviation, Standard Deviation and Co – efficient of Variation and its Merits and demerits (Simple problems).

**Unit III:** Skewness, Kurtosis and Moments – Definitions, Co - efficient of Skewness, Bowley's and Karl Pearson's Skewness – simple problems.

**Unit IV:** Probability – Statistical and Mathematical Probability, Axiomatic Probability.Addition, Multiplication and Baye's theorem. (Simple problems) Boole's Inequality.

**Unit V:** Random Variables - Discrete and Continuous random variables (simple problems).Distribution function and its properties (no proof). Mathematical Expectation - Definition- properties.Joint distribution - Marginal and Conditional distributions, Moments, Moment generating functions (MGF) –Definition and its properties, Characteristics function definition and its properties.(Without derivation).

**Reference Text Books**:

1. Fundamentals of Mathematical Statistics - Gupta S.C. and Kapoor V.K, Sultan & Sons, New Delhi.
2. Statistics -R.S.N. Pillai and V. Bagavathi, Chand& company LTD, New Delhi.
3. Probability, Statistics and random Process - T. Veerarajan. Tata McGraw-Hill Publishing Company limited. New Delhi.
4. Statistical methods- S.P.Gupta, Sultan &Sons, New Delhi.

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## SEMESTER - II

### AC 2 -   STATISTICS FOR MATHEMATICS II

| Subject Code: 17U2MST2 | Credits: 3 | External Marks: 75 | Hours: 4 |
|---|---|---|---|

**Objective:**  *To know the basic special discrete and continuous probability distribution.To understand the problem in correlation, regression and Test of significance for large and small samples.*

**Unit I:**  Discrete distributions –Binomial, Poisson, Geometric and Negative Binomial distributions-Definitions, mean, variance, mgf and characteristic function.(Derivation only)

**Unit II:**  Continuous distributions –Normal, Uniform and Exponential distribution.Beta and Gamma distribution - Definitions, mean, variance, mgf and characteristic function (Derivation only).

**Unit III:**  Correlation –Definition, Types, methods-scatter diagram, Karl – Pearson's co – efficient of correlation, Rank correlation –Properties and uses. (Simple problems)

**Unit IV:**  Regression –Definition, properties of Regression co-efficient, Regression equations (two variables- Simple problems). Difference between Correlation and Regression.

**Unit V:**  Test of Significance for large Samples – Single mean, difference between means, single proportion and difference between double proportions. Test of Significance for Small Samples –'t' test for Single mean, Difference between two means, Chi – Squaretest Goodness of fit- simple problems.

**Reference Text Books**:

1. Fundamentals of Mathematical Statistics, Gupta S.C. and V.K. Kapoor Sultan & Sons, New Delhi.
2. Mathematical Statistics, Kapoor and Saxena – Chand& Co, New Delhi.
3. Statistics (Theory and Practice) R.S.N. Pillai and V. Bagavathi - Chand& company LTD, New Delhi.

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**SEMESTER - II**

**AP 1 -   STATISTICS FOR MATHEMATICS - PRACTICALS**

| Subject Code: 17U2MSTP1 | Credits: 3 | External Marks: 60 | Hours: 4 |
|---|---|---|---|

***Objective:*** *To know the problem in the Descriptive Measures, Skewness, kurtosis, moments.To understand the problem in correlation, regression and Test of significance for large and small samples.*

**Unit I:** Measures of central tendency - Arithmetic Mean, Median, Mode, Geometric Mean, Harmonic Mean. (Numerical problems only).

**Unit II:** Measures of Dispersion -Quartile Deviation, Mean Deviation, Standard Deviation and Co-efficient of variation. (Numerical problems only)

**Unit III:** Karl Pearson's and Bowley's Co-efficient of Skewness, kurtosis and moments (Numerical problems only)

**Unit IV:** Fitting of Binomial and Poisson distributions. Fitting of Normal distribution (Area method only)

**Unit V:** Karl Pearson's co-efficient of correlation, Spearman's rank correlation co-efficient, Regression lines (Numerical problems only)  Test of significance based on Normal Distribution for mean and proportions.    Student's t – test for mean - Chi-square test Goodness of fit.

**NOTE:**  First THREE Units to be covered in Semester –I and remaining THREE Units in Semester – II

**Reference Text Books**

Practical statistics -R.S.N. Pillai and V. Bagavathi - -Chand& Co

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**SEMESTER - I**

**AC 1 - STATISTICS FOR GEOGRAPHY I**

| Subject Code: 17U1GST1 | Credits: 4 | External Marks: 75 | Hours: 4 |
|---|---|---|---|

***Objective:***

- *To know the basic concepts of statistics.*
- *To study in detail about various types of classification and tabulation. The structure of forming frequency tabulation.*
- *To know the problem in the Descriptive Measures.*

**Unit I:** Statistics – Definition, Functions and Limitations –usesof statistics – Collection of data – Primary and Secondary data Classification –Definition, Types of Classification. Tabulation – Definition, Rules for tabulation, parts of table, type of tables. Difference between classification and tabulation. Forming frequency distributions – Simple Problems.

**Unit II:** Diagrammatic and Graphic representation – Definition and Difference – Bar diagram – Simple, Component, multiple and pie diagram – Histogram, Frequency polygon, frequency curve and ogives.

**Unit III:** Measures of Central Tendency – Mean Median, Mode and Quartiles-Definition, merits and demerits (simple problem).

**Unit IV:** Measures of dispersion – Range, co efficient of Rang, Quartile deviation, co efficient of Q.D, Standard deviation and Co - efficient of variation – Definition, merits and demerits. (Simple problems)

**Unit V:** Skewness– Definition – Bowley's and Karl Pearson's Coefficient of Skewness (Simple problems).kurtosis-Definition and types. (Concept only)

<u>**Reference Text books:**</u>

1. Fundamentals of Mathematical Statistics - Gupta S.C and Kapoor V.K Sultan & Sons, New Delhi.
2. Statistical methods- S.P.Gupta, Sultan & Sons, New Delhi.

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**SEMESTER - II**

**AC 2 -   STATISTICS FOR GEOGRAPHY II**

| Subject Code: 17U2GST2 | Credits: 3 | External Marks: 75 | Hours: 4 |
|---|---|---|---|

**Objective:**

> To understand the problem in correlation and regression.
> To study in detail about various types of sampling.
> To understand Indian statistics.

**Unit I:**  Correlation – Definition, Types – Scatter diagram, Karl Pearson's Coefficient of Correlation – Spearman's Rank Correlation coefficient. (Simple problems)Regression –Definition. Regression lines (Two variables only, Simple Problems) .Difference between Correlation and Regression.

**Unit II:**  Time series –definitions-component-Measurement of long term trend: Graphical method, Semi average method, Moving averages method for **3 years** only –merits and demerits. (Simple problems).

**Unit III:**  Index Numbers – definitions and uses -Problems of construction – Price relatives – simple Aggregate and simple Average of price relatives method, Weighted index number – Laspeyre's Paaschey's and Fisher's Ideal Index number. (Simple problems)

**Unit IV:**  Spatial statistics – Mean center, Weighted mean center, Median center – Standard distance – Nearest neighbor analysis. (Simple problems)

**Unit V:**  Sampling – Census and sampling methods – Merits and Demerits – simple Random sampling, Stratified random sampling and systematic sampling methods –quota sampling (No derivation).

<u>**Reference Text books**</u>

1. Fundamentals of Mathematical Statistics    - Gupta S.C and Kapoor V.K Sultan & Sons, New Delhi.
2. Statistical methods- S.P.Gupta, Sultan & Sons, New Delhi.
3. Statistics - R.S.N. Pillai & V.Bhavathi (unit V: chapter22).

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**SEMESTER - II**

**AP 1 - SATISTICS FOR GEOGRAPHY  - PRACTICALS**

| Subject Code: 17U2GSTP1 | Credits: 3 | External Marks: 60 | Hours: 4 |
|---|---|---|---|

**Objective :**
- To know the basic concepts of Association of attributes.
- To know the scope of time series, index number and spatial statistics.

**Unit I:**  Frequency distributions, Diagrammatic representation –Bar and pie diagrams, –Histograms. Graphical representations, frequency curve Frequency polygon, gives.

**Unit II:**  Mean Median, Mode, Harmonic mean and Quartile deviation.

**Unit III:**  Standard deviation and Co - efficient of variation .Measures of skewness-Bowley's & Karl Pearson method.

**Unit IV:**  Computation of Karl Pearson's Co-efficient of correlation and spearman's Rank correlation, Regression equation (two variables only.

**Unit V:**  Time series –-Measurement of long term trend: Graphical method, Semi average method, Moving averages method for **3 years** only ,Index Numbers - simple Aggregate and simple Average of price relatives method, Weighted index number – Laspeyre's Paaschey's and Fisher's Ideal Index number.

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**SEMESTER - III**

**AC 1 - PRINCIPLES OF MANAGEMENT**

| Subject Code: 17U3SB1 | Credits: 4 | External Marks: 75 | Hours: 4 |
|---|---|---|---|

**Objective :** To enable the students understand the principles of management and how to acquire the skills to become a good manager.

**Unit I:** Management – meaning, definition, importance - features – Difference between management and administration – Functions of management – Management Skills.

**Unit II:** Scientific management – Meaning – Contribution of F.W. Taylor – Fayol's principles – Contribution of Peter Drucker's towards modern management – Role of managers.

**Unit III:** Planning – Nature – Purpose - Types of Planning – Steps in Planning – Limitations of Planning- MBO process – Advantages and Disadvantages of MBO – Decision making process.

**Unit IV:** Organising – Principles - Process - Types of organisation – Span of Management – Merits of Delegation of Authority and Responsibility.

**Unit V:** Controlling – meaning – Process - Requirements of effective control- Budgetary and Non-Budgetary controlling techniques.

**Books Recommended:**
6. Principles and Practice of Management – L.M. Prasad
7. Principles and Practice of Management - V.S.P. Rao & P.S. Narayanan
8. Essentials of Management – Koontz and O'Donnell
9. Business Management  - Dinkar Pagare
10. The Practice of Management  - Peter Drucker

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**SEMESTER - IV**

**AC 2 - ACTUARIAL SCIENCE IN MANAGEMENT**

| Subject Code: 17U4SB2 | Credits: 5 | External Marks: 75 | Hours: 4 |
|---|---|---|---|

**Unit I:** Principles of Life Assurance: Nature of Insurance – Classification of Insurance – History of Life Insurance in India.

**Unit II:** Definition of Whole Life Assurance – term assurance – pure endowment – endowment assurance – critical illness assurance – whole life level annuity – temporary level annuity – premium, benefit – assurance and annuity contracts.

**Unit III:** Derivation of means - Variances of the present values of the payment under simple assurance and annuity contracts assuming constant deterministic interest – simple problems.

**Unit IV:** Expression in the form of sums for the mean and variance of the present values of benefit payments under simple assurance and annuity contract in terms of the curtate random future life time, assuming that death benefits are payable at the end of the year of death and annuities are paid annually in advance.

**Unit V:** Derivation of the relations between annuities payable in advance and in arrear, between temporary, deferred and whole life annuities.

**Reference:**

CT – 5 General Insurance, Life and Health contingencies by Institute of Actuaries of India.

**GOVERNMENT ARTS COLLEGE (AUTONOMOUS), KUMBAKONAM.**

Re-accredited with 'A' Grade by NAAC & Affiliated to Bharathidasan University

**B.Sc., STATISTICS**

**(Effective for those admitted from 2017-2018 onwards)**

**SEMESTER - IV**

**AP 1 - ACTUARIAL SCIENCE IN MANAGEMENT - PRACTICAL**

| Subject Code: 17U4SBP1 | Credits: 3 | External Marks: 60 | Hours: 3+3 |
|---|---|---|---|

**Unit I:** Principles of Life Assurance: Nature of Insurance – Classification of Insurance – Demo

**Unit II:** Demo - Whole life assurance – Term assurance – Pure Endowment – Endowment assurance – critical illness assurance – Different Life Insurance Products.

**Unit III:** Derivation of means and variances - Deterministic interest – Simple Problems.

**Unit IV:** Simple Problems - Benefits are payable at the end of the year of death and annuities are paid annually in advance.

**Unit V:** Payable in advance and in arrear, between temporary, deferred and whole life annuities – Simple Problems.

**Reference:**

Online Trading and Share Marketing - Simple Problems.