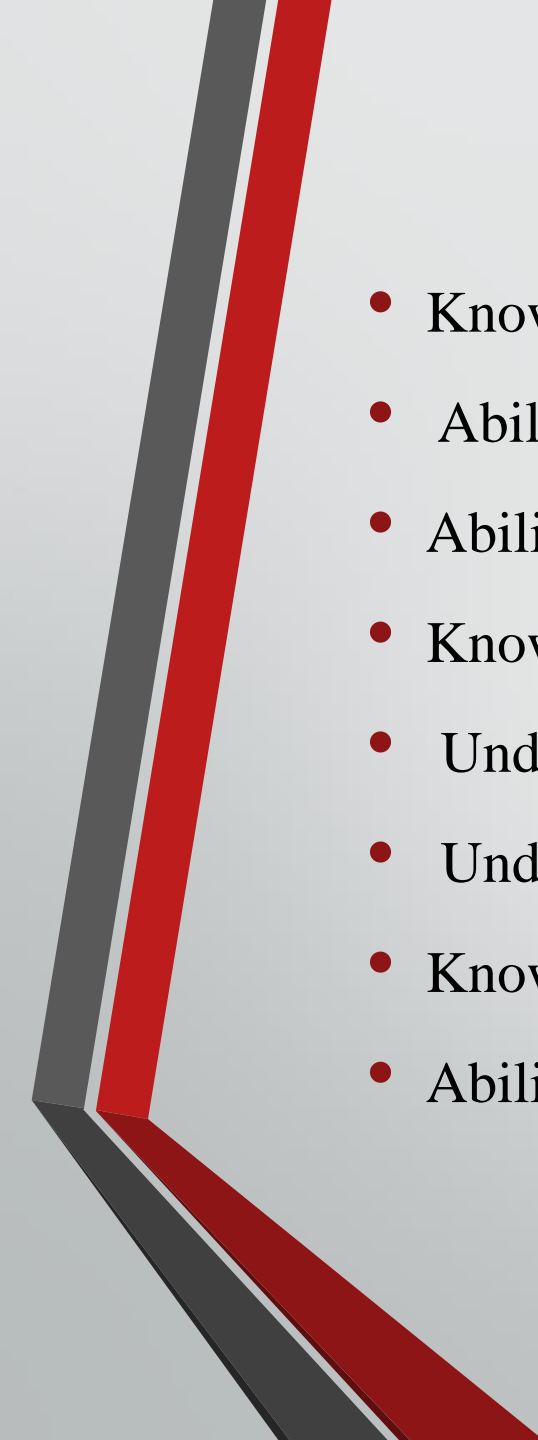


PROGRAMME SPECIFIC OUTCOME

- Knowledge of descriptive statistics.
- Ability to understand calculus (differential, integral, differential equations and partial differential equations).
- Understanding the probability theory, standard discrete distributions and continuous distributions.
- Ability to understand algebra (theory of equations and matrices).
- Ability to understand sampling distribution and its statistical inference.
- Knowledge of sample survey and Indian Official Statistics.
- Ability to understand Mathematical Analysis (Real Analysis, Infinite series, linear, continuity, differentiability and numerical analysis).
- Knowledge of estimation, methods of estimation and principles of test of significance.
- Ability to understand Statistical Quality Control (Statistical Process control, Control Charts for variables, Acceptance sampling plan and Six-Sigma).

- 
- Knowledge of Stochastic Process and Queueing theory.
 - Ability to do statistical computing using C/C++ Programming.
 - Ability to understand Operation Research.
 - Knowledge of Time Series Analysis.
 - Understanding the design of experiment.
 - Understanding of Multivariate Analysis and Non-Parametric methods.
 - Knowledge of Economic Models, Estimation, Regression and Collinearity.
 - Ability to undertake project work.

FYUGP SEMESTER-I(MAJOR & MINOR)

Course name: Descriptive Statistics & Probability-I

Course code: STAo100104

Course Outline:

1. Statistical methods

- Definition and scope of statistics
- Concepts of Statistical population and sample
- Data
- Presentation
- Collection and scrutiny of data

2. Measures of central tendency

- Mathematical measures of central tendency
- Measures of dispersion: range, quartile deviation, etc.

3. Probability

- Introduction
- Random experiments, sample space, events, etc.
- Definition of Probability

- Conditional probability
- Laws of addition and multiplication
- Independent events
- Theorem of total probability
- Bayes' theorem and its applications

4. Random variables and expectations

- Discrete and continuous random variables
- Pmf, pdf and cdf
- Illustrations and probabilities
- Expectation of univariate random variables

Course Outcome:

1. To have foundational idea about the various statistical methods, measures of central tendency and basics of probability and expectation.
2. To understand the methods of collecting data, their representational formats and basic statistical tools

FYUGP SEMESTER-I(SEC)

Course name: Data collection and presentation

Course code: SECo102603

Course Outline:

1. Use of data

- Use of data in social sciences
- Types and sources of data
- Data collection methods
- Population census vs sample surveys
- Random sampling

2. Questionnaire and schedule

- Meaning
- How to prepare
- Use of questionnaire and interview schedule

3. Presentation of data

- Data presentation in tabular formats
- Use of diagrams
- Creating charts and diagrams in MS Excel- bar, line, etc

Course Outcome:

1. To understand use of data, presentation of data using computer software MS Excel
2. To have the ability to prepare questionnaire/interview schedules.
3. To understand collection of primary and secondary data and its presentation

FIRST SEMESTER HONOURS(CBCS)

Course Name: Descriptive Statistics

Course Code: STA- HC-1016

Course Outline:

1. Statistical Methods

- Definition and scope of Statistics
- Concept of statistical population and sample
- Data: Quantitative and qualitative, attributes, variables, scale of measurement
- Presentation: Tabular and Graphical
- Consistency and Independence of Data

2. Measures of Central Tendency

- Mathematical and positional
- Measures of Dispersion
- Collection and Scrutiny of Data

3. Bivariate Data

- Definition

- Scatter Diagram
- Simple, partial and multiple correlation
- Rank correlation
- Simple Linear Regression
- Principle of least squares and fitting of polynomials and exponential curves.

4. Index Numbers

- Definition
- Construction of index numbers and problems thereof for weighted mean and unweighted index numbers
- Chain index numbers
- Consumer price index numbers

Course Outcome:

1. To explore the basic knowledge of Statistics such as collection, tabulation, comparison and presentation of data
2. To find out the variation and the relationship among the variables.
3. To learn about the standard of living of people of various regions by acquiring the knowledge of index numbers.

Course Name: Calculus
Course Code: STA- HC-1026

Course Outline:

1. Differential Calculus

- Limits of function
- Continuous function and its properties
- Partial differentiation and total differentiation
- Indeterminate forms: L-Hospital's rule, Leibnitz rule
- Euler's theorem on homogeneous functions
- Maxima and minima of functions of one or two variables
- Constrained optimization techniques
- Jacobian

2. Integral Calculus

- Review of integration and definite integral
- Differentiation under integral sign, double integral, change of order of integration, transformation of variables
- Beta and Gamma functions

3. Differential Equations

- Exact differential equations
- Integrating factors
- Change of variables
- Total differential equations
- Differential equations of first order and first degree and first order but no first degree
- Clairaut's equations
- Higher order differential equations

4. Partial Differential Equations

- Formation and solution of a partial differential equations
- Equations easily integrable
- Linear partial equations of first order

Course Outcome:

1. To learn about continuous function, differentiation and Jacobian
2. To solve different problems of integral calculus and beta, gamma functions
3. To know about differential equations and Partial differential equations

SECOND SEMESTER HONOURS

Course Name: Probability and Probability Distributions

Course Code: STA- HC-2016

Course Outline:

1. Probability

- Introduction
- Random Experiments
- Sample size, events and algebra of events
- Definitions of Probability
- Conditional Probability
- Theorem of Total probability
- Bayes' theorem

2. Random variables

- Discrete and Continuous random variables
- P.m.f., p.d.f. ,and c.d.f
- Illustrations and properties of random variables
- Univariate transformations with illustrations
- Two dimensional random variables

3. Mathematical Expectation and Generating functions

- Expectation of single and bivariate random variables and its properties
- Moments and cumulants
- M.g.f, c.g.f. and characteristic function
- Conditional expectations

4. Mathematical Expectation and Generating Functions

- Standard probability distributions e.g. Binomial, Poisson etc with their properties
- Log normal, Laplace, Weibull

Course Outcome:

1. To understand the principle of probability theory and probability distributions for discrete and continuous random variables.
2. To understand the marginal and conditional probabilities and covariance of two random variables.
3. To know about mathematical expectation and generating functions.

Course Name: Algebra
Course Code: STA- HC-2026

Course Outline:

1. Theory of Equations

- Statement of the fundamental theorem of algebra and its consequences
- Roots and coefficients
- Solutions of cubic and biquadratic equations
- Symmetric Polynomials
- Vector spaces
- Subspaces
- Linear dependence and independence
- Dimension Theorem

2. Algebra of matrices

- Review
- Triangular, symmetric and skew-symmetric matrices etc
- Singular and non-singular matrices and their properties
- Trace of a matrix
- Adjoint and inverse of a matrix

3. Determinant of matrices

- Definition
- Properties and applications of determinants for 3rd and higher orders
- Evaluation of determinants of order 3 and more using transformations
- Jacobi's theorem
- Row reduction and echelon forms
- The matrix equation $AX=B$
- Solution set of linear equations

4. Matrices

- Rank of a matrix
- Standard theorem on ranks
- Partitioning of matrices and simple properties
- Characteristic roots and characteristic vector
- Cayley Hamilton theorem
- Quadratic forms
- Linear orthogonal transformation and their diagonalization

Course Outcome:

1. To understand the technique of the solution of different types of equations.
2. To acquire knowledge about different types of matrices.

THIRD SEMESTER HONOURS

Course Name: Sampling Distributions

Course Code: STA- HC-3016


Course Outline

1. Order Statistics

- Introduction
- Distribution of r th order statistic
- Smallest and largest order statistic
- Joint distribution of r th and s th order statistics
- Distribution of sample median and sample range

2. Sampling Distribution

- Definitions of random sample, parameter and statistic
- Sampling distribution of a statistic
- Sample variance and sample proportion
- Null and alternative hypothesis

- 
- Level of significance
 - Type I and Type II errors
 - Large sample tests
 - Single proportions and difference of two proportions

3. Exact sampling distribution

- Definition and derivation of p.d.f of χ^2 with n df
- Nature of pdf curve for different df
- Mean, variance, mgf, cgf, mode, additive property and limiting form of χ^2 distribution
- Tests of significance and confidence intervals based on χ^2 distribution

4. Sampling distribution

- Student's and Fishers t-distribution
- Derivation of its pdf
- Nature of probability curve for different df
- Mean, variance, moments and limiting form of t- distribution

- Snedecore's F- distribution
- Relationship between t, F and χ^2 distribution
- Tests of significance and confidence intervals based on t and F distributions

Course Outcome:

1. To understand order statistics
2. To learn the concept of sample, population, parameter, statistic etc.
3. To acquire knowledge about χ^2 , t and F distribution and their properties and applications in different fields

Course Name: Survey Sampling and Indian Official Statistics

Course Code: STA- HC-3026

Course Outline:

1. Survey sampling

- Concept of population and sample
- Complete enumeration versus sampling
- Sampling and non sampling errors
- Types of sampling
- Basic principles of sample survey
- SRSWR or SRSWOR
- Definition and procedure of selecting a sample
- Estimates of population mean, total and proportion

2. Stratified random sampling

- Technique
- Estimates of population mean and total and variance of these estimates
- Proportional and optimum allocation and their comparison with SRS
- Practical difficulties in allocation
- Estimation of gain in proportion
- Systematic sampling
- Comparison of systematic sampling with SRs with SRS and stratified sampling
- Introduction to PPS sampling and two stage sampling

3. Ratio and Regression Method of Sampling

- Introduction to ratio and regression methods of estimation
- First approximation to the population mean and total
- Cluster sampling
- Concept of sub sampling

4. Official Statistics

- Present official statistical system in India
- Methods of collection of official statistics
- Role of MOSPI
- CSO, NSSO and national Statistical commission
- GOI's Principal publications containing data on the topics such as population, industry and finance

Course Outcome:

- 1.To achieve idea about different sampling techniques of drawing samples from a population
- 2.To use SRSOR,SRSWOR and Stratified Random sampling, etc
3. To acquire knowledge about the role of MOSPI,CSO, NSSO and National Statistical Commission.

Course Name: Mathematical Analysis

Course Code: STA- HC-3036

Course Outline:

1. Real analysis

- Representation of real numbers as points on the line
- Bounded and unbounded sets
- Neighbourhood and limit points
- Suprimum and infimum
- Derived sets, open and closed sets
- Sequences and their convergence
- Limits of some special sequences
- Cauchy's general principle of convergence
- Cauchy's first theorem on limits
- Monotonic sequences
- Limit superior and limit inferior of a bounded sequence.

2. Infinite Series

- Infinite series
- Positive termed series and their convergence
- Comparison test, D'Alembert's ratio test, Cauchy's nth root test, Raabe's test
- Absolute convergence of series
- Conditional convergence
- Indeterminate forms
- L' Hospital's rule

3. Limit, Continuity and differentiability

- Review
- Uniform continuity and boundedness of a function
- Rolle's and Lagrange's Mean value theorem
- Taylor's theorem with Lagrange's and Cauchy's form of remainder
- Taylor's and Maclaurin's series expansion of $\sin(x)$, $\cos(x)$, etc.

4. Numerical analysis

- Factorial
- Finite differences and interpolation.
- Operators, E and divided difference
- Newton's forward, backward and divided difference interpolation formula
- Lagrange's interpolation formula
- Central differences, Gauss and Stirling Interpolation formula
- Numerical integration
- Trapezoidal rule, Simpson's one-third rule, three- eights rule, Weddle's riule with error terms
- Stirling's approximation to factorial n
- Solution of difference equations of 1st order

Course Outcome:

- To understand real numbers, different type of sets, principle of convergence, monotonic sequence.
- To acquire knowledge about the infinite series, limit, continuity, and differentiability of a function, application of mean value theorem, Taylor's theorem.
- To have idea about the application of different formulae of interpolation, central differences, numerical integration, solution of difference equations.

FOURTH SEMESTER HONOURS

Course Name: Statistical inference

Course Code: STA- HC-4016

Course Outline:

1. Estimation

- Concepts of estimation
- Unbiasedness, sufficiency, consistency and efficiency
- Factorization theorem
- Complete statistic, Minimum Variance unbiased estimator
- Rao-Blackwell and Lehmann-Scheffe theorem
- Cramer-Rao inequality and MVB estimators

2. Methods of estimation

- Methods of ,moments
- Methods of maximum likelihood estimation
- Methods of minimum Chi-square

3. Principles of test of significance

- Null and alternative hypothesis
- Type- I and Type-II errors
- Critical region, level of significance, size and power, best critical region
- Most powerful test Uniform most powerful test
- Neyman Pearson Lemma
- Likelihood ratio test,
- Properties of likelihood ratio tests.

4. Principles of test of significance

- Sequential Analysis

Course Outcome

- To understand the concept of estimation, unbiasedness, sufficiency, consistency, efficiency, methods of estimation, principle of test of significance, sequential probability ratio test.

Course Name: Linear models

Course Code: STA- HC-4026

Course Outline:

1. Gauss- Markov Set-up:

- Theory of linear estimation
- Estimability of linear parametric functions
- Method of least squares
- Gauss-Markov theorem
- Estimation of error variance

2. Regression Analysis:

- Simple regression analysis
- Estimation and hypothesis testing in case of simple regression models

3. Analysis of variance

- Definitions of fixed, random and mixed effect models

Analysis of variance and covariance in one-way classified data for fixed effect models

- Analysis of variance and covariance in two-way classified data for fixed effect models

4. Model Checking

- Prediction from a fixed model
- Violations of assumptions of AOV and their remedies by transformation

Course Outcome:

- To achieve the knowledge of least square method, Gauss- Markov theorem, regression analysis, concept of fixed, random and mixed effect model, analysis of variance and covariance in one-way and two-way classified data for fixed effect model, prediction of fitted model

Course Name: Statistical Quality Control

Course Code: STA- HC-4036

Course Outline:

1. Statistical Process control

- Quality
- Quality system and standards
- Statistical Process control
- Statistical Control charts

2. Control charts for variables

- X-bar & R- chart, X-bar & s-chart
- Control charts for attributes
- Comparison between control charts for variables and control charts for attributes
- Analysis of patterns on control chart
- Estimation of process capability

3. Acceptance Sampling Plan

- Principles of acceptance sampling plans
- Single and double sampling plan their OC, AQL, LTPD etc function with a graphical interpretation
- Use and interpretation of Dodge and Remig's sampling inspection plan tables

4. Six-sigma

- Introduction to six- sigma

Course Outcome:

- To get the basic knowledge of statistical process control, different types of control charts like X-bar & R-chart, np-chart, p-chart and c-chart.
- To get knowledge of single and double acceptance sampling plan, concept of Six Sigma.

FIFTH SEMESTER CORE

Course Name: Stochastic Process and Queuing Theory

Course Code: STA- HC-5016

Course Outline

1. Probability Distribution

- Generating functions
- Bivariate probability generating function
- Stochastic Process

2. Markov Chains

- Definition
- Transition Probability matrix
- Order of Markov Chain
- Markov chain as graphs
- Higher transition probabilities
- Generalisation of independent Bernoulli trials
- Classification of states and chains

3. Poisson Process

- Postulates
- Properties
- Inter-arrival time

4. Queuing System

- General Concept
- Steady state distribution
- Queuing model
- M/M/1 with finite and infinite system capacity
- Waiting time distribution

Course Outcome:

- To understand the concept of probability generating function, stochastic process, stationary process, Markov chain and its order, transition probability, classification of state.
- To get the knowledge of Poisson process and its properties, Queuing system.

Course Name: Statistical computing Using C/C++ Programming

Course Code: STA- HC-5026

Course Outline:

1. C Programming

- History and Importance of C
- Components, basic structure programming, character set, C tokens, Keywords and identifiers and execution of a C program
- Data types
- Constants and variables
- Operators and Expressions
- Implicit and explicit type conversions in expressions
- Library Functions
- Managing input and output operations

2. Decision making and arrays

- Decision making and branching
- Looping in C
- Arrays
- Character Arrays and Strings

Course Outcome:

- To gain the basic knowledge of different operators and expressions used in C/C++ programming.
- To be familiar with some loops and arrays used in programming.

FIFTH SEMESTER (DSE) PAPER

Course Name: Operations Research

Course Code: STA- HE-5016

Course Outline

1. Operations research

- Introduction
- Phases of OR
- Model Building
- Various types of OR problems
- Linear Programming Problem
- Mathematical formulation of the L.P.P
- Graphical solutions of a L.P.P
- Simplex method for solving L.P.P

2. Transportation problem

- Transportation problem

3. Game Theory

- Rectangular game
- Minimax-maximax principle

4. Inventory Management

- ABC inventory system
- Characteristics of inventory system
- EOQ models and its variations
- Quantity discount model with price breaks

Course outcome:

- To understand L.P.P and various methods of solving it.
- To be able to solve Transportation problem and game theory.
- To be able to understand inventory management

Course Name: Time Series Analysis

Course Code: STA- HE-5026

Course Outline:

1. Introduction to time series

- Introduction
- Application
- Components of a time series
- Decomposition of time series
- Trend

2. Introduction to time series

- Method of moving averages
- Detrending
- Seasonal component

3. Moving averages

- Ratio to moving averages
- Link relative method

Deseasonalization

4. Forecasting and smoothing to time series

- Random experiment
- Forecasting

Course Outcome

- To understand various components of time series and methods of determining trend, seasonal variations, forecasting and smoothing to time series.

Course Name: Time Series Analysis

Course Code: STA- RE-5026

Course Outline:

1. Introduction to time series

- Introduction
- Application
- Components of a time series
- Decomposition of time series
- Trend

2. Introduction to time series

- Method of moving averages
- Detrending
- Seasonal component

3. Moving averages

- Ratio to moving averages
- Link relative method

Deseasonalization

4. Forecasting and smoothing to time series

- Random experiment
- Forecasting

Course Outcome

- To understand various components of time series and methods of determining trend, seasonal variations, forecasting and smoothing to time series.

SIXTH SEMESTER CORE PAPER

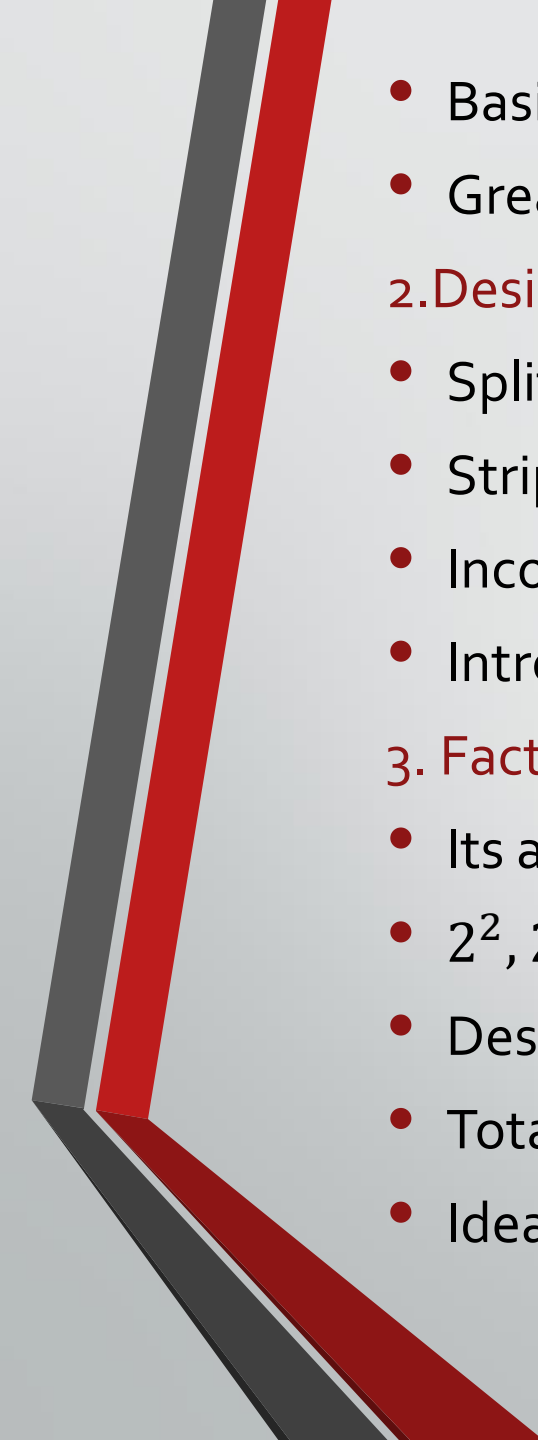
Course Name: Design of Experiments

Course Code: STA- HC-6016

Course Outline:

1. Design of Experiments

- Role
- Historical perspective
- Terminology
- Experimental error
- Basic Principles
- Uniformity trials
- Choice of size and shape of plots and blocks

- 
- Basic Designs- CRD,RBD, LSD.
 - Greaco Latin square design

2. Design of Experiments

- Split plot design
- Strip Plot Design
- Incomplete Block Designs
- Introduction to Balanced Incomplete Block design

3. Factorial experiments

- Its advantages, notations and concepts
- $2^2, 2^3 \dots 2^n$ and 3^2 factorial experiments
- Design and analysis
- Total and Partial confounding for 2^n
- Idea of 3^2 experiment.

Course Outcome:

1. To get knowledge of different design like CRD, RBD, LSD, split plot design, strip plot design, incomplete block design, BIBD and their application in analysis of data found in different fields.
2. To be familiar with the different factorial experiment and their utilities in different fields.

Course Name: Multivariate Analysis and Nonparametric Methods

Course Code: STA- HC-6026

Course Outline:

1. Bivariate and multivariate Distribution

- Bivariate Normal Distribution
- Multivariate Data

2. Multivariate Normal distributions

- Multivariate normal distribution and its properties
- Sampling distribution for mean vector and variance- covariance matrix
- Multiple and Partial correlation coefficient and their properties
- Basic idea of Principle Component analysis
- Hotelling T^2 – concept and applications

3. Non-parametric tests

- Non-parametric tests

Course outcome:

1. To get the knowledge of bivariate and multivariate normal distribution along with their properties and applications in various fields.
2. To get the concept of different non-parametric test such as Kolmogorov Smirnov test, Sign test, Wilcoxon Mann Whitney test, Kruskal-Wallis test and their practical applications

SIXTH SEMESTER (DSE) PAPER

Course Name: Econometrics

Course Code: STA- HE-6016

Course Outline:

1. Economic Models

- Introduction
- Linear models

2. Estimation

- Least square assumptions
- Estimation of regression parameters
- Tests of significance and confidence intervals

3. Regression

- Multiple regression analysis
- Estimation and inference

4. Collinearity

- Multicollinearity
- Autocorrelation
- Heteroscedasticity

Course Outcome:

1. To understand objectives and nature of econometrics, estimation by least square method, multiple regression analysis, multicollinearity autocorrelation and heteroscedasticity.

SIXTH SEMESTER

Course Name: Project Paper

Course Code: STA- HE-6046

Objective:

The aim of the course is to initiate students to write and present a statistical report, under the supervision of a faculty, on some area of human interest. The project work will provide hands on training to the students to deal with data emanating from some real life situation and propel them to dwell on some theory or relate it to some theoretical concepts

SIXTH SEMESTER CORE PAPER

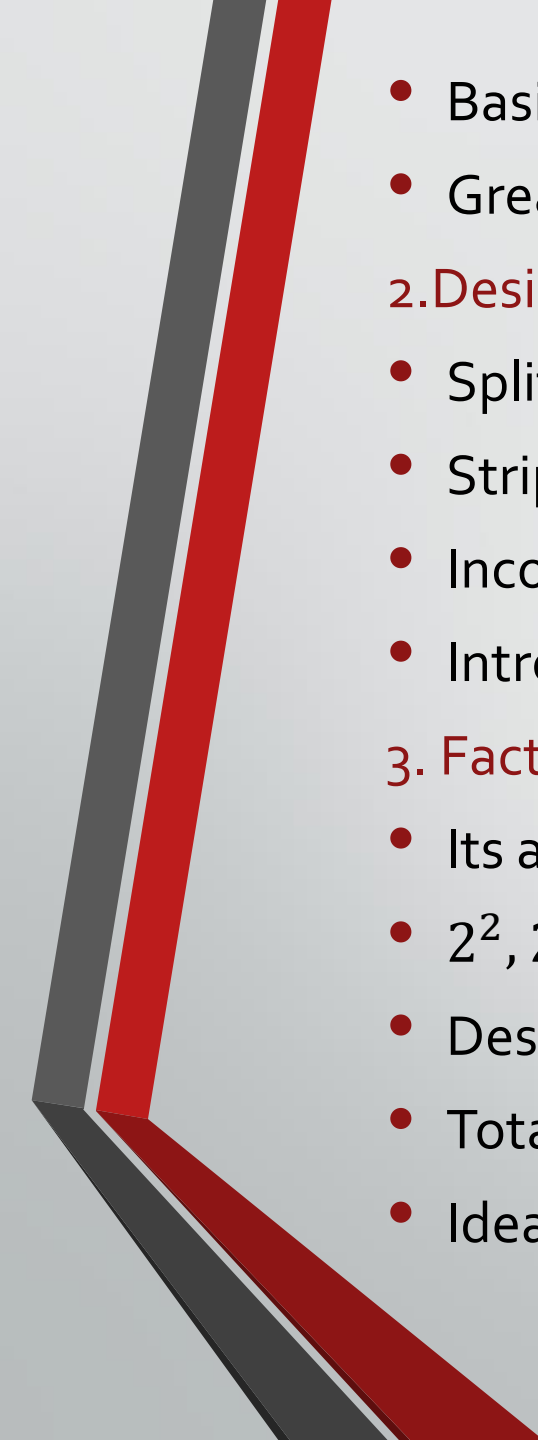
Course Name: Design of Experiments

Course Code: STA- RE-6036

Course Outline:

1. Design of Experiments

- Role
- Historical perspective
- Terminology
- Experimental error
- Basic Principles
- Uniformity trials
- Choice of size and shape of plots and blocks

- 
- Basic Designs- CRD,RBD, LSD.
 - Greaco Latin square design

2. Design of Experiments

- Split plot design
- Strip Plot Design
- Incomplete Block Designs
- Introduction to Balanced Incomplete Block design

3. Factorial experiments

- Its advantages, notations and concepts
- $2^2, 2^3 \dots 2^n$ and 3^2 factorial experiments
- Design and analysis
- Total and Partial confounding for 2^n
- Idea of 3^2 experiment.

Course Outcome:

1. To get knowledge of different design like CRD, RBD, LSD, split plot design, strip plot design, incomplete block design, BIBD and their application in analysis of data found in different fields.
2. To be familiar with the different factorial experiment and their utilities in different fields.

Course Name: Statistical methods

Course Code: STA- HG-1016

Course Outline:

1. Statistical data
 - Introduction
 - Data
 - Presentation
2. Measures of Central Tendency
 - Mathematical and positional
 - Measures of Dispersion
3. Calculus of Finite Difference
 - Finite difference
 - Interpolation
 - Divided difference
 - Numerical Integration

4. Bivariate data

- Bivariate data
- Simple linear regression
- Principles of least squares

5. Theory of attributes

- Consistency of data
- Independence and association of attributes
- Measures of association and contingency

Course Outcome:

1. To know the importance and scopes and basics of Statistics
2. To know different measures of central tendency and different measures of dispersion.
3. To understand the operators of finite difference, difference table, Newton's forward and backward interpolation formula, divided difference and numerical integration
4. To know simple, partial, multiple and ranked correlation, simple linear regression and principle of least squares .
5. To know about the basic theory of attributes.

SECOND SEMESTER GENERAL

Course Name: Introductory probability

Course Code: STA- HG-2016

Course Outline

1. Probability

- Definitions
- Central Probability
- Laws of addition, and multiplication
- Independent events
- Theorem of total probability
- Bayes' theorem and its applications

2. Random Variables

- Discrete and continuous random variables
- P.m.f, p.d.f, c.d.f
- Illustrationsof random variables and its properties

- Expectation, variance, moments and moments generating functions

3. Convergence in Probability

- Idea of convergence in probability
- Chebyshev's inequality
- Weak law of large numbers
- De-Moivre Laplace and Lindeberg-Levy central limit theorem

4. Standard Distributions

- Standard probability distributions

Course outcome

- To understand the principle of probability theory.
- To understand discrete and continuous random variables, pmf, pdf, cdf, expectation, moments etc.
- To have an idea of Chebyshev's inequality, WLLN, De-Moivre Laplace etc.
- To know about the discrete probability distributions viz Binomial, Poisson, etc, continuous probability distributions viz Uniform, Normal etc

THIRD SEMESTER GENERAL

Course Name: Basics of Statistical inference

Course Code: STA- HG-3016

Course Outline

1. Tests of Hypothesis

- Estimation of population mean
- Confidence intervals for the parameters of normal distribution
- The basic idea of significance test
- Null and alternative hypothesis
- Type I & Type II errors
- Level of significance
- Concept of p- value
- Tests of hypothesis for the parameters of a normal distribution

Non- Parametric Tests

2. Categorical Data Analysis

- Categorical Data

3. Analysis of variance

- Analysis of variance
- One way and two way classified data
- Three basic principles of design of experiments-Treatments, Blocks and plot
- Analysis of completely randomized design
- Randomised complete block design
- Bioassay

Course Outcome:

1. To have the basic knowledge of tests of hypothesis i.e. Null and alternative hypothesis, type I type II error, non- parametric tests.
2. To know the one-way and two-way classifications of analysis of variance, basic principles of design of experiments, CRD etc

FOURTH SEMESTER GENERAL

Course Name: Applied statistics

Course Code: STA- HG-4016

Course Outline:

1. Time Series

- Economic time series
- Measurement of trend by method of free- hand curve
- Method of semi averages
- Method of least squares
- Measurement of seasonal variations by method of ratio to trend method

2. Index Numbers

- Definition
- Construction of index numbers of prices and quantities
- Consumer price index number
- Uses and limitations of index numbers

3. Statistical Quality Control

- Importance of statistical methods
- Determination of tolerance limits
- Causes of variations in quality
- General theory of control charts
- Process and product control
- Control charts for variables
- Control charts for attributes

4. Demography

- Demographic methods
- Measurement of mortality
- Life tables
- Measurement of fertility and reproduction
- Measurement of population growth

5. Demand analysis

- Theory of consumption and demand
- Demand function
- Elasticity of demand
- Lorentz curve and Gini's coefficient
- Engel's law and Engel's curve
- Pareto's law of income distribution

Course Outcome:

- To understand various components of time series and methods of determining trend and ratio to trend method of determining seasonal variation.
- To understand different types of index numbers, uses and limitations of index numbers
- To get the basic knowledge of statistical quality control and control charts.
- To know the different levels of mortality and fertility.
- To understand demand analysis i.e, demand function, elasticity of demand, Lorentz curve etc.

THIRD SEMESTER SEC

Course Name: Statistical Data Analysis Using Software Package

Course Code: STA- SE-3014

Course Outline

1. Graphical Representation

- Load data
- Plot a graph namely histograms, boxplot, etc.

2. Report Generation

- Generate automated reports giving detailed descriptive statistics
- Correlation and lines of regression

3. Fitting Curves

- Random number generation and sampling procedures
- Fitting of polynomials and exponential curves
- Application Problems based on fitting of suitable distributions
- Normal Probability plot

4. Analysis

- Simple analysis
- Create and manage statistical analysis projects
- Import data
- Code editing
- Basics of statistical inference

Course Outcome:

1. To have the ability of graphical representation of data in MS Excel
2. To get the knowledge of curve fitting and statistical analysis in MS Excel.

FOURTH SEMESTER SEC

Course Name: Statistical Data Analysis Using R

Course Code: STA- SE-4014

Course Outline

1. Graphical Representation

- Load data
- Plot a graph namely histograms, boxplot, etc.

2. Report Generation

- Generate automated reports giving detailed descriptive statistics
- Correlation and lines of regression

3. Fitting Curves

- Random number generation and sampling procedures
- Fitting of polynomials and exponential curves
- Application Problems based on fitting of suitable distributions
- Normal Probability plot

4. Analysis

- Simple analysis
- Create and manage statistical analysis projects
- Import data
- Code editing
- Basics of statistical inference

Course Outcome:

1. To have the ability of graphical representation of data in R programming.
2. To get the knowledge of curve fitting and statistical analysis in R programming.