DEPARTMENT OF STATISTICS

COURSE OUTCOME

UNDER CBCS

STATISTICS HONOURS

Sem -1

CC 1 : Descriptive Statistics

CO 1 : different types of data and the art of data handling.

CO 2 : the techniques of summarization, representation and identification of the salient features of the data through graphical displays and other descriptive measures.

CO 3 : correlation and regression of bivariate data, including rank correlation.

CO4 : analysis of categorical data and finding association, dissociation and independence of attributes.

CC 2 : Probability and Probability Distributions I

CO 1 : understand different definitions and meaning of Probability.

CO 2 : know different laws of probability and the theorems connecting them.

CO 3 : apply the laws of probability.

CO 4 : know the notion of conditional probability.

CO 5 : understand what is a random variable and its probability distribution.

Sem -2

CC 3 : Mathematical Analysis

CO 1: understand sequences of real numbers and their properties.

CO 2: learn series of real numbers and apply tests to study their convergence; learn sequences and series of real functions (with special focus on power series), apply tests to identify their various modes of convergence.

CO 3 : understand the properties of real valued functions through the concepts of limit, continuity and differentiation.

CO 4 : understand and apply Mean Value theorems in various problems, solve indefinite forms of limits; able to optimize and find saddle points of univariate and bivariate functions; find partial differentiation and solve constrained optimization problems.

CO 5 : understand and apply Riemann and Darboux integration, apply various Fundamental Theorems of integration, find Jacobian of transformations and solve various types of double integral problems .

CC 4 : Probability and Probability Distributions II

CO 1: understand different aspects of univariate discrete and continuous probability distribution.

CO 2 : understand bivariate random variable and bivariate probability distribution.

Sem-3

CC 5 : Linear Algebra

CO 1: matrix algebra and determinants.

CO 2 : vector spaces, subspaces, their dimensions and basis.

CO 3 : theory of equations, quadratic form, characteristics equation.

CC 6 : Demography and Vital Statistics

CO 1 : have an idea about a population and population study.

CO 2 : know some of the basic as well as derived measures for the study of the human population.

CO 3 : understand the measures of mortality and fertility.

CO 4 : understand the concept of a life table and its significance in real life.

CO 5 : have a concept of logistic curve.

CO 6 : be familiar with the notion of growth of a population along with methods of estimating and forecasting.

CC 7 : Statistical Computing and Numerical Analysis using C Programming

CO 1 : have an idea about numerical approximations to functions which are analytically intractable.

CO 2 : have an idea about numerical differentiation, integration & solution of equations.

CO 3 : acquire knowledge on C Programming and its applications with Numerical Methods.

CO 4: learn how to write C-programs using conditional statements, loops, arrays and rebuild programs using multiple functions.

CO 5: use C-programing codes to perform various statistical analysis, fitting, modeling, prediction, solving and finding statistical measures using raw data.

Sem-4

CC 8 : Survey Sampling and Indian Official Statistics

CO 1 : the need for probability sampling when we cannot assume any population distribution.

CO 2 : different sampling schemes and situations where these are applicable.

CO 3 : the importance of introducing auxiliary variables in the improvement of estimation procedures under certain situations.

CO 4 : the sources and mechanisms of collecting official statistics in India.

CC 9 : Statistical Inference -I and Sampling distributions

CO 1 : the notion of sampling distribution of a statistic.
CO 2 : the importance of sampling distributions in Statistical Inference.

CO 3 : the basics of Testing of Hypotheses.

CO 4 : the basic principle underlying tests of significance with application to different distributions.

CC 10: Index Numbers and Time Series Analysis

CO 1 : about Index Number, construction as well as interpretation of different indices and their use in real life data.

CO 2 : about time series data, application of time series in various fields.

CO 3 : how to decompose time series data into classical components and how to estimate these components.

CO 4 : about stochasting modeling .

Sem-5

CC 11: Statistical Inference-II

CO 1 : understand the basic idea of Statistical Inference.
CO 2 : the criteria of a good estimator.

CO 3 : understand the Neyman Pearson approach and Likelihood approach to tests of significance.

CO 4 : have an idea about interval estimation.

CO 5 : able to apply the estimation and testing procedure in different distributions.

CO 6 : have an idea about large sample theory.

CC 12 : Linear Models and Regression

CO 1 : have an idea about the theory of linear estimation and Gauss –Markov model.

CO 2 : have an idea about ANOVA models to test for the differential effects of factors and interaction effects between two factors.

CO 3 : deal with testing problems related to regression models.

 CO 4 : understand the use of concomitant variables in ANCOVA models and test different effects of factors.

Sem-6

CC 13: Design of Experiments

 CO 1 : understand Randomization and Replication as essential principles and Local Control as a desirable principle in statistical designing of experiments.

 CO 2 : construct standard designs – CRD, RBD and LSD and apply ANOVA techniques to   analyse these designs.

CO 3 : compare relative efficiency of one design with respect to the other.

CO 4 : analyse the standard designs if one observation is missing in the layout.

CO 5 : construct and analyse un-confounded and confounded Factorial Designs.

CO 6 : construct split plot, strip plot design and groups of experiments.

CC 14: Multivariate Analysis and Non Parametric Methods

CO 1 : about multiple regression, multiple and partial correlations.

CO 2 : about Multivariate Probability Distribution.

CO 3 : Multinomial and Multivariate Normal distributions along with their properties.

CO 4 : application of multivariate techniques in Principal Component Analysis and Factor   analysis.

CO 5 : different nonparametric tests for location, scale and randomness.

SKILL ENHANCEMENT COURSE (2 CREDITS PER WEEK) Sem-3

SEC A : Statistical Data Analysis using R

CO 1 : understanding of solving programming related problems using the R language.

CO 2 : get an exposure to basic concepts in R apart from use of different libraries in R, basic statistics concepts using R Commander.

CO 3 : use their knowledge in real-life projects, R Cloud Labs and case studies.

Sem-4

SEC B : Monte Carlo Methods

CO 1 : generation of random numbers.

CO 2 : simulation.

CO 3 : approximation of functions and moments of a distribution.

DISCIPLINE SPECIFIC ELECTIVE COURSE (6 CREDITS PER WEEK)

Sem -5

DSE A1: Statistical Quality Control

CO 1 : have an exposure to the application of statistical theory in the industry.

CO 2 : distinguish the various phases of SQC and capture the variation in quality of the manufactured items.

CO 3 : learn about Statistical Techniques used in various phases, namely Control Charts in Process Control and Sampling Inspection Techniques in Product Control. Learn to measure process capability.

 CO 4 : learn about recent developments in SQC – Six Sigma Plans, Total Quality Management, Lean Management.

DSE B1 : Stochastic Processes & Queueing Theory

CO 1 : the fundamental concepts of stochastic processes.

CO 2 : tools needed to analyze stochastic processes.

CO 3 : Markov chains and stability of Markov chains

CO 4 : Queuing system.

DSE A2 : Survival Analysis

CO 1 : understand the elements of reliability, hazard function and its applications.

CO 2 : understand the concept of censoring, life distributions and ageing classes.

CO 3 : understand competing theory.

DSE B2 : Project Work

CO 1 : It gives opportunities to develop and practice research related skills.

CO 2 : The project work will provide hands-on training to the students to deal with real life data.

GENERAL ELECTIVE (6 CREDITS PER WEEK)

Sem -1

GE 1: Descriptive Statistics

CO 1 : different types of data and the art of data handling.

CO 2 : the techniques of summarization and identification of the salient features of the data through graphical displays and other descriptive measures.

CO 3 : the salient features of the data related to a single variable, two variables.

GE 2 : Elementary Probability Theory

CO 1 : understand different definitions and meaning of Probability.

CO 2 : know different laws of probability and the theorems connecting them.

CO 3 : apply the laws of probability.

CO 4 : know the notion of conditional probability.

CO 5 : understanding the random variable and its probability distribution.

CO 6 : understand different aspects of univariate probability distribution and bivariate   probability distribution.

Sem -3

GE 3 : Introduction to Statistical Inference

CO 1 : the notion of sampling distribution of a statistic.
CO 2 : the importance of sampling distributions in Statistical Inference.

CO 3 : the basics of estimation and testing of hypotheses and their application on different distributions.

CO 4 : the basics of ANOVA and design.

Sem -4

GE 4 : Application of Statistics

CO 1 : understand different concepts of population statistics.

CO 2 : understand different concepts of time series.

CO 3 : understand different concepts of sample survey.
CO 4 : understand different concepts of time series.