ASD1CJ101(P) Descriptive Statistics

- To understand what Statistics is and what are the uses of Statistics.
- To describe types of data and data collection methods
- To analyse data with the help of concepts form measures of central tendency and variation
- To interpret the relation between more than two variables and to make inferences based on that
- To develop the skills for effectively presenting data using tables and diagrams

ASD2CJ101(P)Probability and Random Variables

- Define and comprehend the fundamental concepts of probability and apply basic probability rules.
- Define random variables,compute their probabilities, and consequently develop probability and cumulative probability Distributions
- Recognize and interpret moments of a distribution through mathematical expectation
- Develop proficiency in handling probability problems using statistical software and analysing probability distributions.
- Communicate the solutions to probability problems effectively and enhance the ability to presentinformation clearly and concisely

ASD3CJ201 (P) Probability Distributions

- Apply probability concepts to the model in real-life data.
- Analyse random phenomena and identify the corresponding distribution and its characterization
- Gain idea about the theoretical and practical aspects of the Probability distribution.
- Apply transformation of random variables to obtain new distributions.
- Uses of moments, cumulates, and characteristic functions.
- Analyse the distributional properties of data using moments, skewness, and kurtosis

ASD3CJ202 Bivariate Random Variables and Limit Theorems

- Calculate Marginal & Conditional Probability
- Examine Independence of two Random Variables
- Examine properties of Bivariate Normal Distribution
- Compute upper and lower bound of Probability
- Discriminate sequences of random variables satisfying law of large number
- Asymptotic behaviour of random variable

ASD4CJ203 (P) Sampling Methods

- Explain need and necessity of sampling
- Distinguish between methods of sampling
- Construct sampling based on nature of population
- Examine the efficiency of estimation
- Construct random samples
- Identify the suitable sampling methods in different contexts

ASD4CJ204 Sampling Distributions and Estimation Theory

- To understand sampling distributions and its applications. The student can identify various methods of estimation and will be able to apply them in practical cases
- Estimate parameters using different methods of estimation
- The students understand the concept of interval estimation and its applications
- Able to estimate parameters of real-life data sets using any statistical software
- Interpret the results and express the conclusion of the analysis

ASD4CJ205(P) Testing of Hypothesis

- Describe the basic concepts and terminologies of testing of hypothesis
- Understand the theory behind the statistical test construction
- Understand some specific statistical tests and their application
- Describe the situations where parametric tests cannot be used
- Understand the non-parametric alternatives of parametric tests

- Develop computational ability to apply parametric and non-parametric tests

ASD5CJ301 (P) Design and Analysis of Experiments

- Identify various causes of variation
- Describe models to express the resulting observation-based effects and errors
- Discuss the fundamental principles of experiments
- Summarize the total variation into sum of fixed and random causes
- Develop the ability to apply different designs in a proper way
- To acquire necessary computational skills for analysing data related with design of experiments

ASD5CJ302(P) Data Mining Techniques

- Understand the concept of data warehouse and its various forms
- Define data mining technique and compare it with other database management techniques
- Explain different association rules related with data mining
- Analyses different clustering algorithms in data mining
- Analyse statistical data using different data mining procedures

ASD5CJ303 Introduction to Time Series and Index Numbers

- Understand the concept of Time series data
- Will get an awareness on various components of time series
- Will develop the ability to fit trend and seasonal pattern from a time series data
- Get an idea on index number and how it function
- Develop the ability to compute different index numbers
- Develop ability to apply statistical software for the computation of index numbers

ASD6CJ304(P) Linear Regression Analysis

- Students will be able to understand the context of regression analysis
- Capable of fitting a linear regression model to the given data
- Able to scrutinize the fitted model using the model adequacy checking
- Capable for forecasting the future values using the fitted model

- Able to understand which type of regression model is appropriate
- Develop skills to predict future situations based on available data Sets

ASD6CJ305(P) Multivariate Analysis

- Analysing Multivariate data using reduction techniques like Principal Component Analysis, Factor Analysis and Canonical correlation.
- Formulate multivariate hypothesis tests and drawing appropriate conclusions
- Discriminate multivariate normal population.
- Identify data reduction techniques
- Develop the ability to apply multivariate distributions like T2 and D
- Analyse multivariate data using statistical software's

ASD6CJ306(P) Statistical Machine Learning

- Students will understand what machine learning is
- Students will recollect some situations where machine learning is applied
- Will be able to recognize the pattern underlying a set of data.
- Develop the ability to apply appropriate methods for the classification of data
- Will be able to apply neural network theories for making proper inferences from data
- Will develop the ability to make proper inferences from complex data sets

STA 7 CJ 401 (P) ADVANCED ANALYTICAL TOOLS

- Evaluate the Riemann-Stieltjes integral and verify the conditions for the existence of the integrals
- Demonstrate an understanding of limits and continuity of various functions
- Develop skills in generalizing the concepts in univariate calculus to multivariate setup
- Demonstrate proficiency in understanding and applying vector space concepts
- Demonstrate proficiency in applying vector space and matrix concepts

STA 7 CJ 402 (P) PROBABILITY THEORY

- Recall sequence of sets and its convergence.
- Explain the concept of field, sigma field, Borel sigma field and monotone class.
- Describe various types of measure and explain its properties.
- Explain decomposition of distribution function, characteristic function and its properties.
- Explain the monotone convergence Theorem, Fatou's Theorem and Lebesgue dominated convergenceTheorem.
- Explain the concept of convergence in probability, Convergence almost surely, Convergence in distribution, Convergence in rth mean and their inter-relations.
- Illustrate the convergence of distribution functions, Helly-Bray Lemma and Helly – Bray theorem, and Levy continuity theorem.

STA7 CJ 403 (P) DISTRIBUTION THOERY

- Distinguish different distributions and illustrate their role in modelling count data
- Describe the properties and applications of multivariate normal distribution.
- Estimate the ML Estimates of the mean vector and dispersion matrix of multivariate normal.
- Evaluate marginal and onditional distribution from multivariate normal distribution.
- Describe the genesis of Wishart distribution with its properties.
- Explain distribution function of random vectors, order statistics and their distributions.
- Compare Hotelling T2 and Mahalanobis D2 statistic and
- able to apply them in testing problems

STA 7 CJ 404 (P) ADVANCED SAMPLING METHODS AND DESIGN OF EXPERIMENTS

- Estimate the population parameters concerning the study variables under auxiliary information (Ratio and regression methods).
- Discuss probability proportional to size (PPS) sampling strategies.
- Explain the concepts of ordered and unordered estimators and its properties.
- Discuss the multi stage and multiphase sampling.
- Apply incomplete block designs and balanced incomplete block designs.
- Explain factorial experiments, total confounding and partial confounding.
- Differentiate between strip plot and split plot designs.

STA 7 CJ 405 (P) ADVANCED STATISTICAL INFERENCE

- Describe the method of finding sufficient statistics, minimum
- variance unbiased estimators, consistent estimators and
- consistent and asymptotically normal estimators
- Relate sufficient statistic and ancillary statistic using Basu's thorem
- Determine UMVUE using complete sufficient statistic using Rao- Blackwell, and Lehmann- Scheffe theorems
- Explain the concept of interval estimation- SELCI, Bayesian and Fiducial Intervals
- Construct most powerful tests using Neyman-Pearson lemma, one-sided and two-sided UMP tests and UMP unbiased tests
- Describe the concept of α-similar tests and construct such tests
- Develop SPRT for different problems

STA 8 CJ 406 (P) APPLIED STOCHASTIC PROCESSES AND TIME SERIES ANALYSIS

- Discuss the basic characteristic of a queuing system and acquire skills in analysing queuing models
- Analyse a network of queues
- Describe the concept of renewal process and
- Brownian motion

- Describe the basics of time series data, its auto- covariance, auto-correlation and autoregressive moving average
- Learn to validate a model using residual analysis

STA 8 CJ 407 APPLIED MULTIVARIATE TECHNIQUES

- Analysing Multivariate data using reduction techniques like Principal Component
- Analysis, Factor Analysis and Canonical correlation.
- Formulate multivariate hypothesis tests and drawing appropriate conclusions
- Discriminate multivariate normal population.
- Identify data reduction techniques
- Analyse multivariate data using statistical software's

STA 8 CJ 408 GENERALIZED LINEAR MODELS

- Identify the general theory of GLM
- Describe the use of binary and multinomial
- Understand and logistic models and apply them for various data sets
- Explain the concepts related to count data GLM
  and apply them for various count data sets.

STA 8 CJ 489 RESEARCH METHODOLOGY

- Identify the Concept of Research in Statistics, Selection of Topics, Perform Literature Review
- Express Scientific Word Processing with LaTeX and MS-Word
- Compute Computer Oriented Numerical Methods
- Describe Plagiarism
- Write Thesis