COURSE OUTCOMES: STATISTICS

Bloom's Taxonomy: Remember, Understand, Apply, Analyze, Evaluate, Create (R, U, Ap, Az, E, C)

SEMESTER - I

Title of the Course: Descriptive Statistics and Probability				
Sem-I	**Credits: 4**	**Course Code: STAT102**	**Year/Group: I MSCS & MSDS**	**HPW: 4**

	Course Outcomes	Blooms Level
CO1	Understand the collection and presentation of data and analyze statistical data using measures of central tendency, dispersion and skewness.	**U, Ap**
CO2	Use the basic probability rules, including additive and multiplicative laws, using the terms, independent and mutually exclusive events. Also translate real-world problems into probability models.	**U, Ap**
CO3	Define functions of random variables and derive the probability density function of transformation of random variables.	**R, Ap, C**
CO4	Understand the concepts of mathematical expectation, various generating functions and evaluate moments for the random variable.	**U, Ap**

Title of the Course: Descriptive Statistics and Probability (Practical)				
Sem-I	**Credits: 1**	**Course Code: STAT102P**	**Year/Group: I MSCS & MSDS**	**HPW: 2**

	Course Outcomes	Blooms Level
CO1	Organize, manage and present statistical data graphically and diagrammatically.	**U, Ap, Az**
CO2	Analyze Statistical data using MS-Excel and R-software and prepare basic statistical reports.	**Az, E, C**

SEMESTER - II

Title of the Course: Probability Distributions				
Sem-II	**Credits: 4**	**Course Code: STAT202**	**Year/Group: I MSCS & MSDS**	**HPW: 4**

Course Outcomes		Blooms Level
CO1	Understand, define and use discrete and continuous probability distributions, including requirements, mean and variance, and make decisions.	**R, U, Ap**
CO2	Understand and derive generating functions of various discrete and continuous distributions.	**U, Ap**
CO3	Use the normal probability distribution including standard normal curve calculations of appropriate areas.	**U, Ap**
CO4	Identify the real time applications in various domains to which different distributions can be applied.	**U, Ap**

Title of the Course: Probability Distributions (Practical)				
Sem-II	**Credits: 1**	**Course Code: STAT202P**	**Year/Group: I MSCS & MSDS**	**HPW: 2**

Course Outcomes		Blooms Level
CO1	Identify and fit various distributions to the statistical data.	**U, Ap,**
CO2	Fit various discrete and continuous distributions to the Statistical data using MS-Excel and R-software.	**Ap, E, C**

SEMESTER - III

Title of the Course: Statistical Methods and Estimation				
Sem-III	**Credits: 4**	**Course Code: STAT302**	**Year/Group: II MSCS & MSDS**	**HPW: 4**

Course Outcomes		Blooms Level
CO1	Understand the concepts of multivariate distributions and correlation analysis. Calculate and interpret the correlation between two variables.	**R, U, Az**
CO2	Apply the principles of simple and multiple linear regression, including least square method.	**U, Ap**
CO3	Understand and determine the association between the attributes.	**U, Az**
CO4	Evaluate the properties of estimators and estimate the parameters of various distributions.	**U, E**

Title of the Course: Statistical Methods and Estimation (Practical)				
Sem-III	**Credits: 1**	**Course Code: STAT302P**	**Year/Group: II MSCS & MSDS**	**HPW: 2**

Course Outcomes		Blooms Level
CO1	Calculate and interpret the relationship between variables and also between attributes using appropriate statistical tools.	**Ap, Az**
CO2	Analyze Statistical data using MS-Excel & R-software and prepare basic statistical reports.	**U, Az, E**

SEMESTER - IV

Title of the Course: Statistical Inference

Sem-IV	Credits: 4	Course Code: STAT402	Year/Group: II MSCS & MSDS	HPW: 4
Course Outcomes				**Blooms Level**
CO1	Understand the exact sampling distributions, their properties and applications.			**R, U**
CO2	Define basic terminology of statistical hypothesis. Able to derive the critical region for various distributions using NP-Lemma.			**R, U, Ap**
CO3	State and define the inference from large and small samples tests.			**U, Ap, Az**
CO4	Use in practice the parametric and non-parametric statistical methods.			**U, Ap, Az**

Title of the Course: : Statistical Inference (Practical)				
Sem-IV	**Credits: 1**	**Course Code: STAT402P**	**Year/Group: II MSCS & MSDS**	**HPW: 2**
Course Outcomes				**Blooms Level**
CO1	Identify and perform the four steps of hypothesis testing for the data and interpret the results using the most common inference procedures.			**U, Ap, Az**
CO2	Analyze Statistical data using MS-Excel and R-software and prepare basic statistical reports.			**U, Az, E**

SKILL ENHANCEMENT COURSE (SEC)

SEMESTER - III

Title of the Course: Data Collection, Presentation and Interpretation

Sem-III	Credits: 2	Course Code: STAT202SEC2A	Year/Group: II MSCS & MSDS	HPW: 2
Course Outcomes				**Blooms Level**
CO1	Define the population, sample, sampling units and design a questionnaire under the objectives of the study.			**R, U**
CO2	Organize, manage and present data graphically and diagrammatically. Also understand the data interpretation techniques and precautions of interpretation.			**U, Az**

Title of the Course: Statistical Computing with R-Programming				
Sem-III	**Credits: 2**	**Course Code: STAT302SEC2B**	**Year/Group: II MSCS & MSDS**	**HPW: 2**
Course Outcomes				**Blooms Level**
CO1	Understand and create graphical representations of data using various packages.			**U, Az**
CO2	Analyze various data sets and prepare basic statistical reports.			**Ap, Az, E**

SEMESTER - IV

Title of the Course: Data Scaling Techniques and Report Writing				
Sem-IV	**Credits: 2**	**Course Code: STAT402SEC4A**	**Year/Group: II MSCS & MSDS**	**HPW: 2**
Course Outcomes				**Blooms Level**
CO1	Define and identify qualitative and quantitative data and apply various scaling techniques.			**U, Ap**
CO2	Understand the meaning and techniques of interpretation, mechanics of report wring and present the reports orally.			**U, Az**

SEMESTER - V

Title of the Course: Applied Statistics				
Sem-V	**Credits: 4**	**Course Code: STAT502**	**Year/Group: III MSCS & MSDS**	**HPW: 4**
Course Outcomes				**Blooms Level**
CO1	Define the key concepts sample surveys and apply appropriate sampling techniques to estimate population parameters and compute their variances.			**U, Ap**

CO2	Explain proportional and Neyman allocation in stratified random sampling and compare the relative efficiencies of different sampling methods.	**U, Ap**
CO3	Define components of time series, and analyse time series data using trend determination and seasonal index calculation methods.	**R, Az, C**
CO4	Explain and compute different mortality, fertility and reproductive rates, construct life tables. Recall the functions of CSO, NSSO, and the methods of computing national income.	**R, U, Ap**

Title of the Course: Applied Statistics (Practical)				
Sem-V	**Credits: 1**	**Course Code: STAT502P**	**Year/Group: III MSCS & MSDS**	**HPW: 2**
Course Outcomes				**Blooms Level**
CO1	Apply various sampling techniques, time series methods, and demographic measures to analyze and interpret statistical data effectively.			**U, Ap, Az**
CO2	Analyze Statistical data using MS-Excel & R-software and prepare statistical reports.			**Az, E, C**

SEMESTER – V (GE)

Title of the Course: Basic Statistics				
Sem-V	**Credits: 4**	**Course Code: STAT502GE**	**Year/Group: III Year**	**HPW: 4**
Course Outcomes				**Blooms Level**
CO1	Define basic statistical concepts, and explain measurement scales and their applications.			**R, U**
CO2	Compute measures of central tendency and dispersion, evaluate skewness and kurtosis to understand data distribution.			**U, Ap**
CO3	Define and calculate correlation coefficients and fit regression lines.			**R, Ap, Az**
CO4	Identify and apply methods for testing consistency and association of attributes.			**U, Ap**

SEMESTER - VI

Title of the Course: Analytical Statistics				
Sem-VI	**Credits: 4**	**Course Code: STAT602**	**Year/Group: III MSCS & MSDS**	**HPW: 4**
Course Outcomes				**Blooms Level**
CO1	Explain and apply ANOVA techniques, CRD, RBD and LSD for statistical analysis.			**U, Ap**

CO2	Define SQC and describe the importance of Shewhart's control charts. Explain the construction and interpretation of control charts for variables and attributes.	**R, U, Ap, C**
CO3	Calculate various index numbers including CLI. Explain and test consistency of good index numbers.	**R, Ap, C**
CO4	Explain multivariate statistical techniques such as PCA, factor analysis, LDA and clustering for pattern recognition and image processing.	**R, U**

Title of the Course: Analytical Statistics (Practical)				
Sem-VI	**Credits: 1**	**Course Code: STAT602P**	**Year/Group: III MSCS & MSDS**	**HPW: 2**
Course Outcomes				**Blooms Level**
CO1	Apply ANOVA techniques and design of experiments (CRD, RBD, LSD), and construct control charts for variables and attributes to monitor and improve process quality.			**U, Ap, Az**
CO2	Analyze Statistical data using MS-Excel & R-software and prepare statistical reports.			**Az, E, C**