

COURSE OUTCOME (CO)

B.Sc. (Honours) Statistics

Serial Number	Semester	Course Name & Code	Course Outcomes	Unit/Chapter	Bloom's Taxonomic Level
1	First	Descriptive Statistics STA-HC-1016	The course learning outcomes for this paper is to ensure students achieve a comprehensive understanding of statistical methods, data analysis techniques, and their practical applications by applying. On successful completion of this paper students will be able to: <ol style="list-style-type: none">1. Define and explain scope of statistics, statistical population and sample, Identify different types of data and scales of measurements2. Students will be familiar with different methods of data collection.3. Present data effectively using tabular and graphical methods assess the consistency and independence of data, especially with regards to attributes.4. Calculate and interpret measures of central tendency and dispersion. Understand concept of correlation and regression.5. Construct and interpret index numbers.	Unit 1: Statistical Methods	Remember, Understand, Apply, Analyze & Evaluate
				Unit 2: Measures of Central Tendency	Remember, Understand, Apply, Analyze & Evaluate
				Unit 3: Bivariate data	Remember, Understand, Apply, Analyze & Evaluate
				Unit 4: Index Numbers	Remember, Understand, Apply, Analyze & Evaluate
2	First	Calculus STA-HC-1026	Upon successful completion of this paper students will be able to understand: <ol style="list-style-type: none">1. Limits on function, continuous function, Partial and total differentiation, , L Hospital's rule	Unit 1: Differential Calculus	Remember, Understand, Apply, Analyze & Evaluate
				Unit 2: Integral Calculus	Remember, Understand, Apply, Analyze & Evaluate

			<ol style="list-style-type: none"> 2. Leibnitz's rule for successive differentiation, Euler's theorem 3. Maxima and minima of functions of one and two variables. 4. Integral Calculus, Definite Integral, Double Integral, Beta and Gamma functions 5. Differential equation of first order and higher order. 6. Partial differential equations, their formation and solution 	Unit 3: Differential Equations	Remember, Understand, Apply, Analyze & Evaluate
				Unit 4: Partial Differential Equations	Remember, Understand, Apply, Analyze & Evaluate
3	Second	Probability and Probability Distributions STA-HC-2016	<p>Students will acquire knowledge:-</p> <ol style="list-style-type: none"> 1. To distinguish between random and non random experiments. 2. On probabilities of events, calculation of probability of event by mathematical approach, calculation of inverse probability by Bayes theorem. 3. On discrete and continuous random variable and their probability distribution including expectation and moments. 4. On discrete distribution such as Binomial, Poisson, Geometric, Negative Binomial, Hyper geometric, and on continuous distribution such as normal, exponential, uniform, etc 	Unit 1: Probability	Remember, Understand, Apply, Analyze & Evaluate
				Unit 2: Random variables	Remember, Understand, Apply, Analyze & Evaluate
				Unit 3: Mathematical Expectation and Generating Functions	Remember, Understand, Apply, Analyze & Evaluate
				Unit 4: Mathematical Expectation and Generating Functions	Remember, Understand, Apply, Analyze & Evaluate
4	Second	Algebra STA-HC-2026	The course will help students to identify the number of rows and columns within a matrix, Modify a matrix through individual operations of adding, multiplying and switching rows. Students will be familiar with different forms of matrices. Students will be able to calculate the rank of a matrix, Eigen values and Eigen vectors. At the end the course will expose students to the different theorems of matrices. Students will acquire knowledge on relation between roots and coefficients of any	Unit 1: Theory of equations	Remember, Understand, Apply, Analyze & Evaluate
				Unit 2: Algebra of matrices	Remember, Understand, Apply, Analyze & Evaluate
				Unit 3: Determinants of Matrices	Remember, Understand, Apply, Analyze & Evaluate

			polynomial equation, to solve bi-quadratic and cubic equations when some conditions on roots of equations are given, knowledge on vector space and linear dependence and independence of vectors, spanning vector space.	Unit 4: Matrices	Remember, Understand, Apply, Analyze & Evaluate
5	Third	Sampling Distributions STA-HC-3016	<p>Students will acquire knowledge on:-</p> <ol style="list-style-type: none"> 1. Order statistic and related sampling distributions. 2. Parameter statistic, statistical hypothesis, basic principles underlying test of significance (large and small sample test) with applications. 3. Derivation of exact sampling distribution of statistics like "t", Chi- square and "F". 	Unit 1: Order Statistics	Remember, Understand, Apply, Analyze & Evaluate
				Unit 2: Sampling Distributions	Remember, Understand, Apply, Analyze & Evaluate
				Unit 3: Exact sampling distributions	Remember, Understand, Apply, Analyze & Evaluate
				Unit 4: Sampling distribution	Remember, Understand, Apply, Analyze & Evaluate
6	Third	Survey Sampling and Indian Official Statistics STA-HC-3026	<p>Students will acquire knowledge on:</p> <ol style="list-style-type: none"> 1. Population, sample, difference Between census and sample survey. 2. Sampling error and non-sampling error. 3. The principles of sample survey and different techniques of drawing random sample such as simple random sampling stratified random sampling, systematic sampling, cluster sampling, double sampling etc and situations where these are applicable. 4. Probability proportional to size sampling 5. Auxiliary variable and the use of it in ratio and regression method of estimation for estimating population parameters. 6. Sources of Official statistics, methods of 	Unit 1: Survey Sampling	Remember, Understand, Apply, Analyze & Evaluate
				Unit 2: Stratified random sampling	Remember, Understand, Apply, Analyze & Evaluate
				Unit 3: Ratio and Regression Method of Sampling	Remember, Understand, Apply, Analyze & Evaluate
				Unit 4: Official Statistics	Remember, Understand, Apply, Analyze & Evaluate

			collection of Official Statistics in India under MoSPI.		
7	Third	Mathematical Analysis STA-HC-3036	<p>Students will acquire knowledge on:-</p> <ol style="list-style-type: none"> 1. Representation of real numbers, identifying sequences of real numbers $\{a_n\}$ and their properties. 2. Sequences and different test to study their convergence and divergence, Limits of sequence 3. Infinite series and their convergence. 4. Limits, continuity and differentiability 5. Finite difference, divided difference, interpolation, extrapolation and different methods of interpolation 6. Difference equation and their solutions. 	Unit 1: Real Analysis	Remember, Understand, Apply, Analyze & Evaluate
				Unit 2: Infinite Series	Remember, Understand, Apply, Analyze & Evaluate
				Unit 3: Limits, Continuity and Differentiability	Remember, Understand, Apply, Analyze & Evaluate
				Unit 4: Numerical Analysis	Remember, Understand, Apply, Analyze & Evaluate
8	Third	Statistical Data Analysis Using Software Packages STA – SE - 3014	<p>Students will acquire knowledge on: -</p> <ol style="list-style-type: none"> 1. How to handle data and its analysis using software packages MS Excel, SPSS. 2. Loading data, plotting a graph, viz. histogram, box plot, stem leaf, frequency polygon, pie chart and ogive. 3. Generating automated reports: - Descriptive Statistics, correlation and line of regression 4. Random number generation and sampling procedures, curves. Application problems based on fitting of suitable distribution, normal probability plot. 5. Creating and managing statistical analysis projects, imports data, code, editing, and basics of statistical inferences, p-values and confidence intervals. 	Unit 1: Graphical Representation	
				Unit 2: Report Generation	
				Unit 3: Fitting Curves	
				Unit 4: Analysis	

9	Fourth	Statistical Inference STA-HC-4016	Students will acquire knowledge on: <ol style="list-style-type: none"> 1. Idea of point estimation and criteria for a good estimator. 2. Cramer Rao inequality, Rao Blackwell and Lehman Scheff theorems and their application in minimum variance bound estimator. 3. Different methods of estimation 4. Statistical hypothesis, type I and type II errors. 5. The concept of optimum tests under different situations. 6. The concept of likelihood ratio test and its important properties. 7. Sequential Probability Ratio Test (SPRT). 	Unit 1: Estimation	Remember, Understand, Apply, Analyze & Evaluate
				Unit 2: Methods of Estimation	Remember, Understand, Apply, Analyze & Evaluate
				Unit 3: Principles of test of significance	Remember, Understand, Apply, Analyze & Evaluate
				Unit 4: Principles of test of significance	Remember, Understand, Apply, Analyze & Evaluate
10	Fourth	Linear Models STA-HC-4026	Students will acquire knowledge on:- <ol style="list-style-type: none"> 1. Linear Estimation, use of Gauss-Markov setup in estimation of parameters, Gauss Markov theorem 2. Regression and simple linear regression model, testing of hypothesis in case of simple regression model. 3. Analysis of variance (ANOVA), Different type of models in ANOVA. 4. How to carryout ANOVA and Analysis of Covariance for one way and two classified data. 	Unit 1: Gauss-Markov Set-up	Remember, Understand, Apply, Analyze & Evaluate
				Unit 2: Regression Analysis	Remember, Understand, Apply, Analyze & Evaluate
				Unit 3: Analysis of Variance	Remember, Understand, Apply, Analyze & Evaluate
				Unit 4: Model Checking	Remember, Understand, Apply, Analyze & Evaluate

			5. How to predict from a fitted model		
11	Fourth	Statistical Quality Control STA-HC-4036	Students will be able to understand: <ul style="list-style-type: none"> 1. The meaning of quality and its dimension. 2. How the concept of quality arises since World War II. 3. How to construct control charts for variables and attributes to determine whether the given quality of the product is under control or not. 4. Sampling inspection plan in product control. 5. The concept of six sigma 	Unit 1: Statistical Process Control	Remember, Understand, Apply, Analyze & Evaluate
				Unit 2: Control Charts for Variables	Remember, Understand, Apply, Analyze & Evaluate
				Unit 3: Acceptance Sampling Plan	Remember, Understand, Apply, Analyze & Evaluate
				Unit 4: Six-Sigma	Remember, Understand, Apply, Analyze & Evaluate
12	Fourth	Statistical Data Analysis using R STA – SE - 4014	Students will be able to learn :- <ul style="list-style-type: none"> 1. How to load data and do analysis through graphical representation. 2. To generate automated reports with detailed descriptive statistics, correlation and lines of regression. 3. Random number generation, sampling procedures viz. SRSWR and SRSWOR and fitting of suitable distributions and their applications. 4. Basics of statistical inference viz. testing of hypothesis and confidence intervals. 	Unit 1: Plotting Graphs	Remember, Understand, Apply, Analyze & Evaluate
				Unit 2: Report Generation	Remember, Understand, Apply, Analyze & Evaluate
				Unit 3: Generation of Random Numbers	Remember, Understand, Apply, Analyze & Evaluate
				Unit 4: Statistical Analysis	Remember, Understand, Apply, Analyze & Evaluate
13	Fifth	Stochastic Processes and Queuing Theory STA-HC- 5016	Students will acquire knowledge on:- <ul style="list-style-type: none"> 1. Generating functions, bivariate probability generating functions, and Stationary Processes 2. Markov chains including the notion of Transition probability matrix, classification of States and chains. 	Unit 1: Probability Distributions	Remember, Understand, Apply, Analyze & Evaluate
				Unit 2: Markov Chains	Remember, Understand, Apply, Analyze & Evaluate
				Unit 3: Poisson	Remember,

			<p>3. Poisson process, its properties and application in real life problem.</p> <p>4. Different types of queuing models and waiting time distribution</p>	<p>Process</p> <p>Unit 4: Queuing System</p>	<p>Understand, Apply, Analyze & Evaluate</p> <p>Remember, Understand, Apply, Analyze & Evaluate</p>
14	Fifth	Statistical Computing Using C/C++ Programming STA-HC- 5026	On the successful completion of this paper students will be able to illustrate the flowchart and design an algorithm for a given problem and to develop C programs using operators, develop conditional and iterative statements to write C programs, use data types to solve problems, decompose a problem into functions and synthesize a complete program, demonstrate the use of arrays, strings and structure in C language and they will be able to understand the concept of pointers.	<p>Unit 1: C Programming</p> <p>Unit 2: Decision making and Arrays</p>	<p>Remember, Understand, Apply, Analyze & Evaluate</p> <p>Remember, Understand, Apply, Analyze & Evaluate</p>
15	Fifth	Operations Research STA-HE- 5016	At the end of this course students will be able to formulate and obtain the optimal solution for Linear Programming Problems by using graphical and simplex method which is used in decision making, Determine the optimal solution for Transportation problems, Determine the best strategy and value of the given game model. Upon successful completion of this course students will understand the need of inventory management, their types, characteristics etc.	<p>Unit 1: Operations Research</p> <p>Unit 2: Transportation Problem</p> <p>Unit 3: Game theory</p> <p>Unit 4: Inventory Management</p>	<p>Remember, Understand, Apply, Analyze & Evaluate</p> <p>Remember, Understand, Apply, Analyze & Evaluate</p> <p>Remember, Understand, Apply, Analyze & Evaluate</p> <p>Remember, Understand, Apply, Analyze & Evaluate</p>
16	Fifth	Time Series Analysis STA-HE- 5026	<p>Students will acquire knowledge on:-</p> <p>1. Time series data, its application to various fields and components of time series.</p> <p>2. Estimation of trend, seasonal variation, cyclical variation and irregular variations using different methods.</p>	<p>Unit 1: Introduction to Time Series</p> <p>Unit 2: Introduction to Time Series</p> <p>Unit 3: Moving averages</p>	<p>Remember, Understand, Apply, Analyze & Evaluate</p> <p>Remember, Understand, Apply, Analyze & Evaluate</p> <p>Remember, Understand, Apply,</p>

			3. Forecasting by exponential smoothing.		Analyze & Evaluate
				Unit 4: Forecasting and smoothing to Time Series	Remember, Understand, Apply, Analyze & Evaluate
17	Sixth	Design of Experiments STA-HC- 6016	Students will acquire knowledge on: 1. Design of experiments, its terminology and basic principles. 2. Construction of standard designs such as Completely Randomized design, Randomized Block Design and Latin Square Design and their application to analyze experimental data using ANOVA technique. 3. Relative efficiency of CRD, RBD and LSD and analysis of RBD and LSD with one missing observation. 4. Strip Plot Design, Split Plot Design and Incomplete Block Design. 5. Construction and analysis of factorial design, Confounding, construction of total and partially confounded design	Unit 1: Design of Experiments	Remember, Understand, Apply, Analyze & Evaluate
				Unit 2: Design of Experiments	Remember, Understand, Apply, Analyze & Evaluate
				Unit 3: Factorial Experiments	Remember, Understand, Apply, Analyze & Evaluate
18	Sixth	Multivariate Analysis and Nonparametric Methods STA-HC- 6026	Students will acquire knowledge on:- 1. Bivariate normal distribution along with their properties. 2. Multivariate normal distribution and their properties. 3. Partial and multiple correlation and their properties. 4. Nonparametric method of testing of hypothesis.	Unit 1: Bivariate and Multivariate Distributions	Remember, Understand, Apply, Analyze & Evaluate
				Unit 2: Multivariate Normal Distributions	Remember, Understand, Apply, Analyze & Evaluate
				Unit 3: Non-parametric Tests	Remember, Understand, Apply, Analyze & Evaluate

19	Sixth	Demography and Vital Statistics STA-HE- 6026	<p>Students will be able to know:</p> <ol style="list-style-type: none"> 1. The different sources for collection demographic data and its errors. 2. The use of balancing equation for population change. 3. Population composition and dependency ratio. 4. The basic measures of mortality, fertility and population growth. 5. The concept of stable and Stationary population. 6. The concept of life table and their construction. 	<p>Unit 1: Population Theory</p> <p>Unit 2: Measurement of Mortality</p> <p>Unit 3: Life Table</p> <p>Unit 4: Measurement of Fertility</p>	<p>Remember, Understand, Apply, Analyze & Evaluate</p> <p>Remember, Understand, Apply, Analyze & Evaluate</p> <p>Remember, Understand, Apply, Analyze & Evaluate</p> <p>Remember, Understand, Apply, Analyze & Evaluate</p>
20	Sixth	Project Work STA-HE- 6046	<p>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</p>		Analyze, Interpret.

COURSE OUTCOME (CO)

B.Sc. (Generic) Statistics

Serial Number	Semester	Course Name & Code	Course Outcomes	Unit/Chapter	Bloom's Taxonomic Level
1	First	Statistical Methods STA-HG-1016	Upon completion of this course, students will have acquired a robust understanding of fundamental statistical concepts and techniques. They will be able to: <ol style="list-style-type: none">1. Understand and distinction between statistical population and sample, and proficiently handle both qualitative and quantitative data using appropriate measures and scales of measurement.2. Calculate and interpret measures of central tendency and dispersion to summarize and describe data distributions, enabling informed decision making.3. Utilize calculus of finite difference techniques, including interpolation and numerical integration, to approximate missing data points and integrate functions accurately.4. Analyze relations between two variable using scatter diagrams, correlation coefficients and linear regression models etc.5. Understand theory of attributes, assess data consistency, independence and association and apply measures to quantify relationships with categorical	Unit 1: Statistical Data Unit 2: Measures of Central Tendency Unit 3: Calculus of Finite Difference Unit 4: Bivariate Data Unit 5: Theory of Attributes	Remember, Understand, Apply, Analyze & Evaluate Remember, Understand, Apply, Analyze & Evaluate Remember, Understand, Apply, Analyze & Evaluate Remember, Understand, Apply, Analyze & Evaluate Remember, Understand, Apply, Analyze & Evaluate

			data sets.		
2	Second	Introductory Probability STA-HG-2016	<p>Upon successful completion of this course, students will possess a comprehensive understanding of advanced probability theory and statistical distributions. They will be able to:</p> <ol style="list-style-type: none"> 1. Understand the foundations of probability theory, including random experiments, sample space, events, and algebra of events. Students will be proficient in calculating probabilities using classical, statistical, and axiomatic definitions, and applying concepts such as conditional probability, laws of addition and multiplication, independent events, and Bayes' theorem to solve real-world problems. 2. Demonstrate a deep understanding of discrete and continuous random variables, including probability mass functions, probability density functions, and cumulative distribution functions. Students will be able to compute expectations, variances, moments, and moment generating functions, and interpret their significance in practical contexts. 3. Grasp the concept of convergence in probability and its applications, including Chebyshev's inequality and the weak law of large numbers. Students will also be familiar with important limit theorems such as the De-Moivre Laplace theorem and the Lindeberg-Levy Central Limit Theorem. 	Unit 1: Probability	Remember, Understand, Apply, Analyze & Evaluate
				Unit 2: Random Variables	Remember, Understand, Apply, Analyze & Evaluate
				Unit 3: Convergence in Probability	Remember, Understand, Apply, Analyze & Evaluate
				Unit 4: Standard Distributions	Remember, Understand, Apply, Analyze & Evaluate

			<p>4. Gain proficiency in standard probability distributions, including binomial, Poisson, geometric, negative binomial, hyper geometric, uniform, normal, exponential, beta, and gamma distributions. Students will learn to identify and apply appropriate distributions to model various real-world phenomena, enabling them to make accurate predictions and statistical inferences.</p>		
3	Third	Basics of Statistical Inference STA-HG-3016	<p>Upon completing this course, students will acquire a profound understanding of statistical inference techniques and experimental design principles. They will be proficient in:</p> <ol style="list-style-type: none"> 1. Estimating population parameters, constructing confidence intervals for parameters of a normal distribution. 2. Grasping the foundational concepts of hypothesis testing. 3. Conducting hypothesis tests for parameters of a normal distribution, including different non-parametric tests. 4. Analyzing categorical data through tests of proportions and tests of association using Chi-Square test along with understanding Yate's correction. 5. Performing ANOVA one way and two-way classifications along with a brief introduction to the fundamental principles of design of 	Unit 1: Tests of Hypothesis	Remember, Understand, Apply, Analyze & Evaluate
				Unit 2: Categorical Data Analysis	Remember, Understand, Apply, Analyze & Evaluate
				Unit 3: Analysis of Variance	Remember, Understand, Apply, Analyze & Evaluate

			experiments, implementing the analysis of completely randomized designs and randomized complete block designs, with a focus on applications in bioassay experiments.		
4	Fourth	Applied Statistics STA-HG-4016	<p>Upon completion of this course, students will have developed a comprehensive understanding of statistical methods and their applications in economics and demography. They will be able to:</p> <ol style="list-style-type: none"> 1. Understand the components of economic time series and decompose them into additive and multiplicative models, evaluating their respective merits and demerits, apply various methods for trend measurement as well as seasonal variations. 2. Define index numbers and evaluate their criteria for quality, constructing index numbers for prices and quantities, including the consumer price index, understand the uses and limitations of index numbers in economic analysis and decision-making. 3. Recognize the importance of statistical methods in industrial research and practice, particularly in controlling variations in product quality, determine tolerance limits, understand causes of variations, and implement control charts for variables and attributes. 4. Gain familiarity with demographic methods, including measuring population, vital events rates and ratios, mortality rates, and fertility rates, interpret life tables and understand their uses in demographic 	<p>Unit 1: Time Series</p> <p>Unit 2: Index Numbers</p> <p>Unit 3: Statistical Quality Control</p> <p>Unit 4: Demography</p> <p>Unit 5: Demand Analysis</p>	<p>Remember, Understand, Apply, Analyze & Evaluate</p> <p>Remember, Understand, Apply, Analyze & Evaluate</p> <p>Remember, Understand, Apply, Analyze & Evaluate</p> <p>Remember, Understand, Apply, Analyze & Evaluate</p> <p>Remember, Understand, Apply, Analyze & Evaluate</p>

			<p>analysis, as well as measure population growth rates.</p> <p>5. Explore the theory of consumption and demand, analyzing demand functions and elasticity of demand, determine elasticity of demand using the family budget method, interpret Lorenz curves and Gini coefficients, Engel's law and curve, and Pareto's law of income distribution.</p>		
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COURSE OUTCOME (CO)
B.Sc. Statistics (Regular)

Serial Number	Semester	Course Name & Code	Course Outcomes	Unit/Chapter	Bloom's Taxonomic Level
1	First	Statistical Methods STA-RC-1016	<p>Upon completion of this course, students will have acquired a robust understanding of fundamental statistical concepts and techniques. They will be able to:</p> <ol style="list-style-type: none"> 1. Understand and distinction between statistical population and sample, and proficiently handle both qualitative and quantitative data using appropriate measures and scales of measurement. 2. Calculate and interpret measures of central tendency and dispersion to summarize and describe data distributions, enabling informed decision making. 3. Utilize calculus of finite difference techniques, including interpolation and numerical integration, to approximate missing data points and integrate functions accurately. 4. Analyze relations between two variable using scatter diagrams, correlation coefficients and linear regression models etc. 	Unit 1: Statistical Data	Remember, Understand, Apply, Analyze & Evaluate
				Unit 2: Measures of Central Tendency	Remember, Understand, Apply, Analyze & Evaluate
				Unit 3: Calculus of Finite Difference	Remember, Understand, Apply, Analyze & Evaluate
				Unit 4: Bivariate Data	Remember, Understand, Apply, Analyze & Evaluate
				Unit 5: Theory of Attributes	Remember, Understand, Apply, Analyze & Evaluate

			5. Understand theory of attributes, assess data consistency, independence and association and apply measures to quantify relationships with categorical data sets.		
2	Second	Introductory Probability STA-RC-2016	<p>Upon successful completion of this course, students will possess a comprehensive understanding of advanced probability theory and statistical distributions. They will be able to:</p> <ol style="list-style-type: none"> 1. Understand the foundations of probability theory, including random experiments, sample space, events, and algebra of events. Students will be proficient in calculating probabilities using classical, statistical, and axiomatic definitions, and applying concepts such as conditional probability, laws of addition and multiplication, independent events, and Bayes' theorem to solve real-world problems. 2. Demonstrate a deep understanding of discrete and continuous random variables, including probability mass functions, probability density functions, and cumulative distribution functions. Students will be able to compute expectations, variances, moments, and moment generating functions, and interpret their significance in practical contexts. 3. Grasp the concept of convergence in probability and its applications, including Chebyshev's inequality and the weak law of large numbers. Students will also be familiar with important limit theorems such as the De-Moivre Laplace theorem 	Unit 1: Probability	Remember, Understand, Apply, Analyze & Evaluate
				Unit 2: Random Variables	Remember, Understand, Apply, Analyze & Evaluate
				Unit 3: Convergence in Probability	Remember, Understand, Apply, Analyze & Evaluate
				Unit 4: Standard Distributions	Remember, Understand, Apply, Analyze & Evaluate

			<p>and the Lindeberg-Levy Central Limit Theorem.</p> <p>4. Gain proficiency in standard probability distributions, including binomial, Poisson, geometric, negative binomial, hyper geometric, uniform, normal, exponential, beta, and gamma distributions. Students will learn to identify and apply appropriate distributions to model various real-world phenomena, enabling them to make accurate predictions and statistical inferences.</p>		
3	Third	Basics of Statistical Inference STA-RC-3016	<p>Upon completing this course, students will acquire a profound understanding of statistical inference techniques and experimental design principles. They will be proficient in:</p> <ol style="list-style-type: none"> 1. Estimating population parameters, constructing confidence intervals for parameters of a normal distribution. 2. Grasping the foundational concepts of hypothesis testing. 3. Conducting hypothesis tests for parameters of a normal distribution, including different non-parametric tests. 4. Analyzing categorical data through tests of proportions and tests of association using Chi-Square test along with understanding Yate's correction. 5. Performing ANOVA one way and two-way classifications along with a brief introduction to 	Unit 1: Tests of Hypothesis	Remember, Understand, Apply, Analyze & Evaluate
				Unit 2: Categorical Data Analysis	Remember, Understand, Apply, Analyze & Evaluate
				Unit 3: Analysis of Variance	Remember, Understand, Apply, Analyze & Evaluate

			the fundamental principles of design of experiments, implementing the analysis of completely randomized designs and randomized complete block designs, with a focus on applications in bioassay experiments.		
4	Fourth	Applied Statistics STA-RC-4016	<p>Upon completion of this course, students will have developed a comprehensive understanding of statistical methods and their applications in economics and demography. They will be able to:</p> <ol style="list-style-type: none"> 1. Understand the components of economic time series and decompose them into additive and multiplicative models, evaluating their respective merits and demerits, apply various methods for trend measurement as well as seasonal variations. 2. Define index numbers and evaluate their criteria for quality, constructing index numbers for prices and quantities, including the consumer price index, understand the uses and limitations of index numbers in economic analysis and decision-making. 3. Recognize the importance of statistical methods in industrial research and practice, particularly in controlling variations in product quality, determine tolerance limits, understand causes of variations, and implement control charts for variables and attributes. 4. Gain familiarity with demographic methods, including measuring population, vital events rates and ratios, mortality rates, and fertility rates, 	Unit 1: Time Series	Remember, Understand, Apply, Analyze & Evaluate
				Unit 2: Index Numbers	Remember, Understand, Apply, Analyze & Evaluate
				Unit 3: Statistical Quality Control	Remember, Understand, Apply, Analyze & Evaluate
				Unit 4: Demography	Remember, Understand, Apply, Analyze & Evaluate
				Unit 5: Demand Analysis	Remember, Understand, Apply, Analyze & Evaluate

			<p>interpret life tables and understand their uses in demographic analysis, as well as measure population growth rates.</p> <p>5. Explore the theory of consumption and demand, analyzing demand functions and elasticity of demand, determine elasticity of demand using the family budget method, interpret Lorenz curves and Gini coefficients, Engel's law and curve, and Pareto's law of income distribution.</p>		
5	Fifth	Operations Research STA-RE-5016	<p>Upon completion of this course, students will be able to:</p> <ol style="list-style-type: none"> 1. Understand the foundational concepts and principles of Operation Research, identify and describe various types of OR problems and their real- world applications. 2. Formulate mathematical models for LPP and apply graphical and simplex methods to find optimal solutions. 3. Solve transportation problem using different methods such as the North West corner rule, Least Cost method and VAM. 4. Analyze and apply game theory principles, including rectangular games and the maximin-minimax principle, to strategic decision-making scenarios. 5. Evaluate inventory management systems and classify items using the ABC inventory system based on their importance and usage. Calculate Economic Order Quantity and determine optimal inventory levels considering various factors such 	<p>Unit 1: Operations Research</p> <p>Unit 2: Transportation Problem</p> <p>Unit 3: Game theory</p> <p>Unit 4: Inventory Management</p>	<p>Remember, Understand, Apply, Analyze & Evaluate</p> <p>Remember, Understand, Apply, Analyze & Evaluate</p> <p>Remember, Understand, Apply, Analyze & Evaluate</p> <p>Remember, Understand, Apply, Analyze & Evaluate</p>

			<p>as shortages and quantity discounts.</p> <p>6. Apply quantitative techniques to optimize decision making processes in business and operational contexts.</p>		
6	Sixth	Demography and Vital Statistics STA-RE-6026	<p>Upon completion of this course, students will have developed a comprehensive understanding of demography. They will be able to:</p> <ol style="list-style-type: none"> 1. Gain familiarity with different sources for collection demographic data and its errors. 2. Understand the use of balancing equation for population change. 3. Understand the concept of Population composition and dependency ratio. 4. Calculate basic measures of mortality, fertility rates and population growth, Crude, Rates of natural increase, Pearl's Vital Index, Gross Reproduction Rate and Net Reproduction Rate. 5. Grasp the concept of stable and Stationary population. 6. Explore concept of life table and their construction. 	<p>Unit 1: Population Theory</p> <p>Unit 2: Measurement of Mortality</p> <p>Unit 3: Life Table</p> <p>Unit 4: Measurement of Fertility</p>	<p>Remember, Understand, Apply, Analyze & Evaluate</p> <p>Remember, Understand, Apply, Analyze & Evaluate</p> <p>Remember, Understand, Apply, Analyze & Evaluate</p> <p>Remember, Understand, Apply, Analyze & Evaluate</p>