

Statistics General Course	
Name of Course	Course Outcomes
CC1/GE1: Descriptive Statistics	<p>CO1: Demonstrate a broad understanding of the definition and scope of Statistics and the concept of data collection and its graphical representation</p> <p>CO2: Illustrate a concrete understanding of the characteristics of data and learn to evaluate measures of central tendency, dispersion, skewness and kurtosis</p> <p>CO3: Learn the notion of bivariate data and idea of correlation and regression and curve fitting</p>
CC2 / GE2: Elementary Probability Theory	<p>CO1: Demonstrate a thorough understanding of Probability Theory- its definitions, and laws, besides the wide range of its applications in problem solving</p> <p>CO2: Develop idea and illustration of random variables and its properties, such as expectation, variance and moments</p> <p>CO3: Discuss and understand standard probability distributions such as Binomial, Poisson, Geometric, Negative Binomial, Uniform, Exponential, and Normal and extend this knowledge with topics like WLLN and Central Limit Theorem</p>
CC3/GE3: Introduction to Statistical Inference	<p>CO1: Students learn the concepts of population, sample, sampling distributions like standard Normal, Chi-Square, t and F distributions, concepts of Statistical Inference</p> <p>CO2: Students understand and discuss good estimators and estimation theory and develop a framework for Hypothesis testing and its procedures.</p> <p>CO3: Students learn and understand Analysis of Variance, and Basic principles of Experimental Design- CRD, RBD</p>
CC4/GE4: Applications of Statistics	<p>CO1: Students learn the notions of sampling, and Basic principles of Sample Survey, concepts of simple random sampling, stratified random sampling</p>

	<p>CO2: Students demonstrate a thorough understanding of Index Numbers and their constructions, and also learn Economic Time Series, their models and measurement</p> <p>CO3: Students understand the applications of Demographic Methods and learn the various measures of Mortality , Fertility, Population Growth and Life tables.</p>
DSE 5.1: Operations Research	<p>CO1: Students discuss and understand the historical background and phases of OR, model building, OR problems and Linear Programming problems</p> <p>CO2: Students illustrate the Simplex Method for solving LPP, Charne's M-technique for solving LPP involving artificial variables, Dual Simplex method.</p> <p>CO3: Students learn transportation problems, Vogel's approximation Method, MODI's method to find Optimal solutions.</p>
DSE 6.1: Survival Analysis	<p>CO1: Students develop the idea and concepts of Survival Analysis, their functions ,distributions and applications.</p> <p>CO2: Students learn the Censoring scheme with biological examples and estimation of mean survival time and variance for Type I and II estimators</p> <p>CO3: Students learn Non-parametric methods, Actuarial and Kaplan-Meier methods for estimating survival functions and variance of Estimators.</p>
SEC 3.1: Statistical Data Analysis using R	<p>CO1: Students learn the concepts of R, open source philosophy, R as a calculator and its standard functions.</p> <p>CO2: Students illustrate the different types of numbers, variables, functions and plotting graphs in R.</p> <p>CO3: Students develop a concrete understanding of Matrix Operations in R, loading data from a file, data frames and others.</p>

<p>SEC 5.1: Research Methodology</p>	<p>CO1: Students explain and illustrate the notions of Research and its Role, know its characteristics, the process and types of Research.</p> <p>CO2: Students develop the ideas of Survey Methodology and Data collection.</p>
<p>SEC 6.1 Monte Carlo Methods</p>	<p>CO1: Students illustrate the use of Computers for Random Number Generation and a brief look at some popular Approaches.</p> <p>CO2: Students know the concept of CDF inversion method and simulation from standard distribution.</p> <p>CO3: Students illustrate a broad understanding of Monte Carlo integration.</p> <p>CO4: Students develop a thorough understanding of Generating from Binomial, Uniform Distributions and Simulating Gaussian Distribution.</p>