

Sant Gadge Baba Amravati University, Amravati

Department of Statistics

Programme Outcomes, Programme Specific Outcomes and Course Outcomes

Course	Programme Outcomes
M.Sc. Statistics	<p>Student will be able to</p> <p>PO-1: use probability theory in various situations of society, daily routine, industry and biological sciences.</p> <p>PO-2: understand the mathematical part of statistics for the fundamental development of subject.</p> <p>PO-3: survey and make schedule needed to research and frame policies of industry, government and non-government as well as semi-government sectors.</p> <p>PO-4: identify the reliability of various industrial products as well as their guarantee and warranty periods using reliability theory and survival analysis.</p> <p>PO-5: have jobs in pharmaceutical industries to conduct clinical trials as well as research related to population genetics</p> <p>PO-6: take decisions and optimize the use of resources using mathematical programming and decision theory.</p> <p>PO-7: analyze incomplete data and conduct the virtual experiments on the basis of simulation.</p>

Course	Course Objectives	Course Outcomes
Semester-I		
Elements Of Mathematics and Measure Theory	<p>CO-1: To study the set theory and measurable sets.</p> <p>CO-2: To know about The measurable functions, convergence and</p>	<p>CO-1: to apply the measure theory and set theory in practice as well as other inter-disciplinary subjects like computer Science.</p> <p>CO-2: to apply aspects of Elements of Mathematics</p>

	dominated convergence theorems and its Applications.	and Measure Theory in Statistics
Elementary Probability And Distribution Theory	CO-1: To Study some discrete and continuous distribution and their applications in analyzing raw data. CO-2: To know the applications Truncated distribution order statistics	CO-1: To apply some of the discrete and continuous distributions for analyzing the data. CO-2: To describe the practical applications of truncated distribution. CO-3: To apply order statistics for distribution theory.
Estimation Theory	CO-1: To Understand problem of statistical inference, problem of point estimation CO-2: Properties of point estimators. CO-3: To study the determination of estimators using various estimation methods. CO-4: Some details about the families of Estimators and confidence interval of estimators	CO-1: Understand problem of statistical inference, problem of point estimation CO-2: Understand concept of Families of the distributions CO-3: Understand problem of statistical inference, problem of Interval estimation
Sampling Theory	CO-1: To Understand problem of Selection of sample from the population and analysis of the properties of sample estimates. CO-2: To learn the various basic sampling schemes in detailed.	CO-1: To select the random of sample from the population and understand the properties of sample estimates. CO-2: To apply the various basic sampling schemes in practice and various sectors of social, industrial economical aspects of society and nation.
Semester-II		
Probability Theory	CO-1: To Study theory of probability in detail and the properties of estimators and their convergence,	CO-1: Student will be able to find the convergence rate and properties of estimators as well as

	<p>convergence rate to parameters.</p> <p>CO-2: To learn laws of convergence of distributions, convergence rate of distributions.</p>	<p>discrete and continuous distribution</p> <p>CO-2: To describe the probabilistic properties of convergence of estimators and distributions.</p> <p>CO-3: To apply different Weak laws and strong laws of large numbers.</p> <p>CO-4: To apply characteristics functions, inversion theorem, central limit theorem, etc</p>
Stochastic Process	<p>CO-1: To study theory of stochastic process in detail and their convergence, convergence rate to parameters.</p> <p>CO-2: To learn matrix theory and probabilistic behavior in matrix form.</p>	<p>CO-1: To understand the stationarity and non-stationarity of the stochastic processes.</p> <p>CO-2: To understand the applications of the birth and death processes in statistics as well as interdisciplinary subjects.</p>
Testing of Hypothesis	<p>CO-1: Student will learn Understand problem of statistical inference, problem of testing of hypothesis</p> <p>CO-2: to learn the construction of MP, UMP test using NP Lemma.</p> <p>CO-3: Understand Generalized Neyman Pearson lemma, unbiased test, UMPUT and their existence in case of exponential family and similar tests and tests with Neyman</p>	<p>CO-1: Student will be able to construct MP, UMP test using NP Lemma.</p> <p>CO-2: Student will be able to determine the existence of MP, UMP test</p> <p>CO-3: Student will be able to Explain Likelihood ratio test., Wald test, Rao's score test, Pearson's chi-square test for goodness of fit, SPRT</p> <p>CO-4: Student will be able to Construct SPRT in case of Binomial, Poisson, Normal Distribution.</p>
Linear Models and Design of Experiments	<p>CO-1: To learn various designs for agricultural data/agricultural field.</p>	<p>CO-1: To apply various designs for agricultural data/agricultural field.</p>

	CO-2: To study the use of factorial experiment and the concept of confounding for different experiment for agriculture data.	CO-2: To explain which design will give the maximum yield of a crop. CO-3: To use factorial experiment for agriculture data. CO-4: To describe the concept of confounding for different experiment.
Semester-III		
Decision Theory and Non- Parametric Methods	CO-1: Student will be able to learn Decision Problem, Bayes Rules and minimax rules to take decision in various environments like deterministic, non-deterministic and risk CO-2: Advantages and disadvantages of Non parametric tests (NPT) CO-3: to study the non-parametric tests to non-normal data Various one and two sample tests.	CO-1: Student will be able to solve Decision Problem , Bayes Rules and minimax rules and take decision with corresponding loss function CO-3: to apply non-parametric tests to non-normal data Various one sample tests NPT such as test of randomness ,Sign test ,Kolmogorov-Smirnov (KS)test CO-4: Various two sample tests such as KS test ,Mann - Whitney U test etc
MULTIVARIATE ANALYSIS	CO-1: to learn Multiple and Partial Correlation Canonical correlation and their tests of significance CO-2: to study Multivariate Normal Distribution and its properties CO-3: To study the classification and discrimination of data and seeking important factors using Principal components analysis.	CO-1: to apply Multiple and Partial Correlation and their tests of significance CO-2: to apply Multivariate Normal Distribution and its properties CO-3: To classify data using the concepts of Classification and Discrimination problem CO-4: To find important factors using Principal components analysis CO-5: Student will be able to apply Canonical

		correlation and its applications
Bioassay	CO-1: to learn the concepts of population genetics and bioassay.	Student will be able to CO-1: apply the concepts of population genetics and bioassay. CO-2: find median effectiveness of the drugs.
Industrial Process And Quality Control	CO-1: Student Will be able to learn various types of control charts and to draw conclusions there from. CO-2: to learn Concept of Six sigma, Evolution of six sigma ,DMAIC approach CO-3: to understand Various sampling inspection techniques.	CO-1: Will be able to draw various types of control charts and draw conclusions there from. Will have knowledge about CO-2: Different performance measures of control chart such as OC,ARL ,ATS etc CO-3: Concept of Six sigma, Evolution of six sigma ,DMAIC approach CO-4: Various sampling inspection techniques.
Semester-IV		
Mathematical Programming	CO-1: Student has to learn the Linear and non-linear programming problems. CO-2: The particular cases of Linear and non-linear programming problems CO-3: to learn basic concepts of game theory and methods of solving game problems.	CO-1: Student will be able to Understand the concept of Optimization problem. CO-2: Solve Assignment and transportation problems to obtain optimum solution. CO-3: Gain knowledge about concave function, convex function, NLPP, Lagrange's Methods for optimality, KT conditions and Beal's and Wolfe's methods to solve QPP. CO-4: Understand basic concepts of game theory and methods of solving game problems .

<p>Computational Statistics</p>	<p>Student has to learn CO-1: Visualization of data and exploratory data analysis and Stochastic simulation techniques CO-2: Handling missing data and Incomplete data problems. CO-3: Non-parametric Density estimation using kernels CO-4: The use of R statistical software.</p>	<p>After learning this course, students would have learnt about CO-1: Visualization of data and exploratory data analysis CO-2: Stochastic simulation techniques including MCMC methods CO-3: Jackknife, Bootstrap and other important methods for handling missing data and Incomplete data problems. CO-4: Non-parametric Density estimation using kernels CO-5: The use of R statistical software will be widely used for solving a wide range of problems based on the concepts learnt.</p>
<p>Survival Analysis And Reliability Theory</p>	<p>Student has to learn CO-1: Reliability of equipments CO-2: survival analysis of data CO-3: Parametric analysis of some continuous distribution in context of reliability theory. CO-4: Types of censoring and their applications in industry.</p>	<p>Student will be able to CO-1: find Reliability of equipments CO-2: analyze the survival data and find expected life times. CO-3: Parametric analysis of some continuous distribution in context of reliability theory. CO-4: Types of censoring and their applications in industry and failure rates</p>
<p>Clinical Trials</p>	<p>Student has to learn CO-1: the basics of clinical trial CO-2: how to find effectiveness of medicines</p>	<p>Student will be able to CO-1: conduct clinical trials statistically CO-2: analyze the survival data and find expected life times of effectiveness of the medicines.</p>

