

Programme Name: **B. Sc. Applied Statistics & Analytics**

Programme Outcomes:

1. On completion of this program, a student would have in depth understanding of the key statistical, mathematical, computer programming & economics concepts to have a strong knowledge base in Analytics domain.
2. Students will be introduced to the concepts of Data Science and Analytics with an emphasis on the applications.
3. Students will learn to apply various statistical theories to solve real life situations by doing projects.
4. They will be able to perform well in group and develop professional presentation skills.
5. They will develop good oral and written communication skills which will help them for the future career.

Program Specific outcomes:

1. Courses like Introduction to Data Science & R for Data Science are introduced, so as have a strong foundation in Analytics domain.
2. We offer electives as Marketing analytics and Risk analytics to give a better understanding on applications of Statistics in Business domain.
3. Project on the relevant statistical subject is given to the student from third semester. In three years' time student completes five projects.
4. Practicals are conducted on computers using relevant statistical software.
5. Courses on Effective communication, Research Methods, Research writing and Business ethics are introduced to ensure the development of oral and scientific writing skills.

Year	Semester	Course/Module	Course Outcomes
I	I	Descriptive Statistics – I	Students will be able to 1. Understand & prepare different types of data. 2. Display the data using graphical techniques. 3. Derive the basic descriptive statistics of the data. 4. Solve the practicals using Excel.

		Introduction to Probability Theory	<ol style="list-style-type: none"> 1. Students will be able to understand basic elements of probability theory and apply them to solve real life problems.
		Discrete Mathematics	<ol style="list-style-type: none"> 1. Students will understand mathematical foundations for the theory of probability and statistics. 2. They will be able to develop algorithms using programming language to solve complicated mathematical problems.
		Calculus and Differential Equations	<ol style="list-style-type: none"> 1. Students will have understanding of mathematical calculus through visualizations. 2. Will have strong foundations for theory of probability and Statistics
		Programming in C	<ol style="list-style-type: none"> 1. Students will be able to write algorithms as well as programs to solve complicated problems.
		Micro Economics	<ol style="list-style-type: none"> 1. Students will be able to understand the theories, principles and analytical techniques in Microeconomics
		Effective Communication	<ol style="list-style-type: none"> 1. Awareness about self and community 2. Understanding different ways of communication.
	II	Descriptive Statistics - II	<ol style="list-style-type: none"> 1. Understand the concepts of Vital Statistics, Index Numbers 2. Applying them in policy making. 3. Solving the practicals using Excel and R
		Discrete Probability Distributions	<ol style="list-style-type: none"> 1. Theoretical understanding of standard univariate and bivariate discrete probability distributions, properties. 2. Solving real life application oriented problems in practical.
		Continuous Probability Distributions	<ol style="list-style-type: none"> 1. To introduce standard univariate and bivariate

			<p>continuous probability distributions, properties</p> <ol style="list-style-type: none"> 2. Solving real life application oriented problems in practical .
		Numerical Methods	<ol style="list-style-type: none"> 1. To solve transcendental equations, polynomial approximations and integrations by different techniques. 2. Solving the problems by writing the programs on the relevant software.
		Data Base Management Systems	<ol style="list-style-type: none"> 1. Understanding of Data Storage architecture. 2. Write the queries to access the data from various sources in the database.
		Macro Economics	<ol style="list-style-type: none"> 1. Understanding the working on an economy with reference to domestic economy using several analytical methods.
		Environmental Studies	<ol style="list-style-type: none"> 1. Understanding of the working of ecosystem. 2. Exploring the impacts of natural, manmade and legislative events on the natural world and its inhabitants.

Year	Semester	Name of the Subject	Course Outcomes
II	III	Sampling Theory	<ol style="list-style-type: none"> 1. Students will understand theory of various Sampling Techniques used in real life situations. 2. To able to apply various sampling techniques while conducting sample survey in many instances.
		Estimation Theory	<ol style="list-style-type: none"> 1. To develop estimators for population characteristics using different Estimation Techniques.

			<ol style="list-style-type: none"> 2. Study the properties of the developed estimators in sample.
		Sampling Distributions & Applications	<ol style="list-style-type: none"> 1. Understand various sampling distributions and their applications. 2. Solve real life problems in practical.
		Actuarial Science	<ol style="list-style-type: none"> 1. Understand the fundamental concepts of the Life tables, Life insurance, Annuities 2. Apply the learned techniques on real life situations.
		Operations Research - I	<ol style="list-style-type: none"> 1. Understanding of various optimization techniques. 2. Solving problems based on the industrial decision making process by using relevant software.
		Linear Algebra	<ol style="list-style-type: none"> 1. Understanding of the various fundamental concepts of Linear algebra. 2. Understanding its wide applications in Statistics and Analytics. 3. Solving theoretical and application based problems.
		Project	<ol style="list-style-type: none"> 1. Student should be able to solve business / research problem related to any one statistical paper learned in the semester which will enhance data analysis skills.
		Research Methods	<ol style="list-style-type: none"> 1. Student should have an overview of the important concepts of research intent and design. 2. They should be able to understand the process of data collection, statistical and interpretive

		analysis, and final report presentation.
IV	Hypothesis Testing	<ol style="list-style-type: none"> 1. Students will understand concepts of Statistical hypothesis, developing tests to test the hypothesis. 2. Formulation of Statistical hypothesis is real life situations. Apply appropriate test to validate the hypothesis.
	Designs of Experiments	<ol style="list-style-type: none"> 1. Students will be able to understand planning and conducting the experiment and analysing the data collected through the experiment.
	Stochastic Processes	<ol style="list-style-type: none"> 1. Students get introduction to the different stochastic/random processes, theoretical foundations for Stochastic Processes. 2. Applications of Stochastic processes in queuing theory, applied sciences, etc.
	Operations Research - II	<ol style="list-style-type: none"> 1. To introduce to the optimization techniques used in industrial resource management. 2. Solve real life optimization problems by using relevant software.
	Multivariate Calculus	<ol style="list-style-type: none"> 1. Understanding of the mathematical concepts of limit, continuity in higher dimensions with emphasis on applications.
	Financial Economics	<ol style="list-style-type: none"> 1. Student should be understand the microeconomic theory relevant to financial transactions.

		Research Writing	1. Getting an basic understanding essentials of formulating, conducting, and delivering a robust research project.
		Project	1. Student should be able to solve business / research problem related to any one statistical paper learned in the semester which will enhance data analysis skills.

Year	Semester	Name of the Subject	Course Outcomes
III	V	Multivariate Analysis	<ol style="list-style-type: none"> 1. A student will be able to understand and explain what multivariate statistical analysis is and when its application is appropriate. 2. Students will be able to use appropriate multivariate technique on given dataset and interpret the output of a relevant software package.
		Time Series & Forecasting	<ol style="list-style-type: none"> 1. Should be able to decompose and estimate the time series components. 2. Forecasting by using various forecasting models. 3. Assessing the forecasts by various models and choosing the best model. 4. Perform entire time series analysis on relevant software.
		Quality Management	<ol style="list-style-type: none"> 1. Understanding of the concepts of six sigma process which seeks to improve the quality of the output of a process.
		Statistics in Life Sciences	<ol style="list-style-type: none"> 1. Understanding of the concepts of Bioassays,

			Clinical trials and repeated measurement designs and its applications in Pharma domain.
		Visual Analytics	1. Students should be able to explore data and build reports using the concepts & principles of visual analytics
		Applied Economics	1. Understanding of the application of economic theory to data by imparting an ability to understand and interpret results both statistically and economically.
		Project	1. Student should be able to solve business / research problem related to any one statistical paper learned in the semester which will enhance data analysis skills.
		Business Ethics	1. Getting acquainted with basic fundamentals of business ethics.
	VI	Introduction to Data Science	1. Understanding the working of sophisticated machine learning algorithms 2. Understanding the working of supervised and unsupervised learning. 3. Student should know the Applications of the techniques on various business problems.
		R for Data Science	1. Writing the codes to solve complicated problems. 2. Student should be able to load, pre-process, manipulate any dataset in R. 3. Build machine learning models to solve business problems.
		**Elective - Marketing Analytics	
		Principle of Marketing	1. Understanding the marketing domain with specific reference to

		<p>customer behavior and marketing strategy.</p> <p>2. Basic understanding of the key concepts of marketing, use of internal and external data/ information needed for marketing decisions</p>
	Statistical Modelling in Marketing Analytics	1. Student should be able to create marketing strategies by using insights derived from statistical models.
	**Elective - Risk Analytics	
	Fundamentals of Financial Risk	<p>After completion of the course, students would be able to :</p> <ol style="list-style-type: none"> 1. Understand and evaluate complex dimensions of the financial risks 2. Quantify risks 3. Map statistical concepts and techniques to finance for risk assessment, mitigation and monitoring 4. Develop basic financial risks models
	Statistical Modelling in Financial Risk	<p>After completion of the course, students would be able to:</p> <ol style="list-style-type: none"> 1. Understand and evaluate complex dimensions of the financial risks 2. Develop basic financial risk models using statistical techniques
	Project 1	1. Student should be able to solve business / research problem related to Data Science
	Project 2	1. Student should be able to solve business / research problem from any one domain i.e. either marketing analytics or risk analytics