

Programme Name: M. Sc. Statistics & Data Science

PROGRAMME OUTCOMES:

1. Upon completing the programme, students gain knowledge of statistical theory and multiple programming languages that help in modelling the data that arise in many real-life situations.
2. Students learn quantitative modelling and data analysis techniques to solve real-world business problems, communicate findings, and effectively present results using data visualisation techniques.
3. Students get expertise in applications of statistical techniques so that they can make a career as a Statistician or a data scientist.

PROGRAM SPECIFIC OUTCOMES:

1. Understand and critically apply the statistical methods to solve problems in different sectors like pharmaceuticals, banking, retail, manufacturing, marketing etc.
2. Apart from many theoretical and statistical computing courses, we offer courses on i) Project Management that helps in understanding Project Management/Change Management ii) organisational behaviour, which gives insights into the functioning of a corporate.

Course outcomes:

Year	Semester	Course	Expected Outcomes
			Students would be able to
I	I	Probability Theory	<ol style="list-style-type: none"> 1. Quantify uncertainty in real-life situations 2. Understand the concepts of probability theory in higher-level used in further courses and its applications in real life
		Distribution Theory	<ol style="list-style-type: none"> 1. Understand statistical distributions and their properties 2. Identify appropriate statistical distribution to model data
		Estimation Theory	<ol style="list-style-type: none"> 1. Develop estimators for population characteristics using different estimation techniques 2. Apply suitable estimation techniques that meet the constraints of the given data scenario
		Linear Models & Design of Experiments	<ol style="list-style-type: none"> 1. Understand the theoretical foundations for Linear estimation theory, planning and designing of experiments 3. Analyse data arise from experiments using various models available
		Real Analysis and Linear Algebra	<ol style="list-style-type: none"> 1. Understand mathematical concepts needed to learn the theory of Probability and Statistics 2. Understand mathematical concepts needed in higher dimensions to learn the theory of Multivariate Statistics
		Data Management	<ol style="list-style-type: none"> 1. Apply data management techniques, such as factoring, pivoting, aggregating, merging updates and dealing with missing values 2. Use SQL statements for defining and querying the database

			3. Understand R and R Studio, explore R packages and apply functions, data structures, control flow, and loops using programming
		Programming Analytics	1. Understand Base SAS 2. Perform data Preparation, manipulations and analysis using SAS
		Statistical Computing I	Apply statistical techniques learnt in theory papers to analyse real-life data
		Research Treatise-I	1. Analyse the data by applying concepts and techniques learnt in various courses 2. Evince interest to read journal articles and pose research problems related to the courses studied
	II	Regression Analysis	1. Carry out Multiple Regression Analysis 2. Perform validation of a regression model and interpret the results in practical examples
		Testing of Hypothesis	1. Understand formulation of Statistical hypothesis in real-life situations 2. Apply appropriate test to validate the hypothesis 3. Understand the efficiency of various standard tests available in the literature
		Applied Multivariate Analysis	1. Build a culture of design approach in problem-solving for decision making 2. Develop analytical skills to collect, handle, manipulate and analyse results of multivariate analysis 3. Use suitable software package for analysis of multivariate data
		Machine Learning Techniques	1. Understand a wide variety of high-end machine learning algorithms widely accepted across all industries 2. Apply appropriate learning algorithms to data 3. Evaluate learning algorithms and select an appropriate model
		Python for Data Analysis	1. Understand Python programming language 2. Extract information from data structures 3. Perform data analysis using Python
		Reporting & Correspondence in Data Science	1. Apply storytelling principles to analytics work 2. Improve analytics presentations through storytelling 3. Follow guidelines and best practices for creating high-impact reports and presentations
		Statistical Computing II	Apply statistical techniques learnt in theory papers to analyse real-life data
		Project Management	1. Implementing the project management tools 2. Carryout the project effectively
		Research Treatise – II	1. Analyse the data by applying concepts and techniques learnt in various courses 2. Evince interest to read journal articles and pose research problems related to the courses studied.
II	III	Stochastic Processes	1. Understand theoretical foundations of stochastic/ random processes.

			2. Identify the appropriate stochastic process in a given situation and perform analysis
		Time Series Analysis	1. Understand models used for analysing time-series data and model diagnostics 2. Forecast future values using a suitable model.
		Deep Learning Techniques	1. Choose appropriate deep learning techniques in the context of a problem and interpret the results 2. Use appropriate techniques and software like Python and /or R and interpret the output 3. Formulate proper business strategies
		Pricing & Revenue Optimisation	1. Set and adjust prices to maximise the profitability of a company 2. Use of analytical techniques to determine prices in a complex and dynamic environment 3. Create a pricing strategy by modelling the interplay of supply and demand
		Stochastic Finance	1. Analyse economic and financial data using statistical models. 2. Interpret model results
		Survival Analysis	1. Understand basic principles of survival analysis. 2. Analyse survival data using appropriate statistical software
		Quality Management	1. Understand Lean and Six Sigma techniques 2. Use a set of quality management, empirical and statistical methods to improve the process
		Nonparametric Inference	1. Identify situations where Nonparametric techniques are appropriate 2. Implement Nonparametric techniques for the data analysis
		Introduction to Big Data Technologies & its applications	1. Understand Big Data Management - Tools and Techniques 2. Select tools and put architecture in place for solving specific Big Data processing problems
		Predictive Modelling	1. Understand advanced statistical modelling using SAS predictive modelling. 2. Interpret results, automate the process and prepare reports using SAS predictive modelling.
		Statistical Computing III	Apply statistical techniques learnt in theory papers to analyse real-life data
		Organisational Behaviour	1. Develop awareness about the basics of an organisation 2. Understand the purpose and importance of behavioural skills in organisation life 3. Apply through assignments and/or classroom participation of critical skills to improve the students' skills of operating in a group
		Research Treatise – III	1. Analyse the data by applying concepts and techniques learnt in various courses 2. Evince interest to read journal articles and pose research problems related to the courses studied

	IV	Industry Internship	<ol style="list-style-type: none">1. Handle raw data, formulate objectives to the business problems and find solutions using various statistical techniques2. Develop professional skills that help in contributing to the growth of the organisation3. Improve employability prospects
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