

M.Sc. DATA ANALYTICS

Programme Specific Outcome

PSO-1: Will get advanced knowledge in theory and applications in all areas of Data Analytics, Statistical Learning, Machine Learning, Data Base Management, Artificial Intelligence, etc.

PSO-2: Have secured practical skills in statistical methods and computer programming to plan and execute projects and decision making using Data Analytics, Machine Learning etc

PSO-3: Students are well equipped to undertake any work involving exploratory data analysis, fraud analytics, data learning, text mining etc. as future entrepreneurs.

PSO-4: Students have developed skills in advanced computing softwares like R and Python for big data analytics, computing and data analysis.

PSO-5: Students are well trained to take up jobs in reputed firms and MNCs etc as Data Analysts, Data Engineers, Risk Analysts, Business Analysts, Financial Analysts, Decision Makers, Entrepreneurs etc.

PSO-6: Students are motivated to pursue teaching and research in all emerging areas of research in theoretical and applied branches of Data Analytics and related areas.

Course Outcome

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Semester 1. ST 050101 STATISTICAL FOUNDATION FOR DATA ANALYTICS	(i) Demonstrate the concepts of probability theory, random number generation, distribution theory, sampling distributions, point and interval estimation of unknown parameters and their significance using large and small samples. (ii) Apply the idea of sampling distributions of different statistics in testing of hypotheses. (iii) To understand and apply nonparametric tests for single sample and two samples. (iv) To familiarize the students with Bayesian philosophy.
Semester 1. ST 050102 MATHEMATICAL FOUNDATION	(i) to understand basics concepts of Linear Algebra (ii) To understand concepts of vector spaces and matrices

FOR DATA ANALYTICS 1	<p>(iii) use the properties of Linear Maps in solving problems in Linear Algebra</p> <p>(iv) Demonstrate proficiency on the topics Eigen values, Eigen vectors and can apply linear algebra for applications in Data Analytics</p>
<p>Semester 1. ST 050103 REGRESSION ANALYSIS</p>	<p>(i) The students have studied simple linear regression, multiple regression, residual analysis for fitting a suitable model to a given data and to check the suitability.</p> <p>(ii) They have studied necessary transformations and modifications to be made when model assumptions are violated.</p> <p>(iii) They are capable of fitting logistic and Poisson models, non-linear and polynomial models.</p>
<p>Semester 1. ST 050104 DATA BASE TECHNOLOGY</p>	<p>(i) Students understood the basics of SQL and can construct queries using SQL.</p> <p>(ii) Understood the relational database design principles and the basic issues of transaction processing and concurrency control.</p> <p>(iii) Understood database storage structures and access techniques.</p> <p>(iv) Understood object oriented databases, data warehousing and OLAP tools.</p> <p>(v) Understood MongoDB and can evaluate the NoSQL databases.</p>
<p>Semester 1. ST 050105 PROGRAMMING AND DATA STRUCTURES WITH PYTHON</p>	<p>(i) Demonstrate the usage of built-in objects in Python</p> <p>(ii) Analyze the significance of python program development environment by working on real world examples</p> <p>(iii) Implement numerical programming, data handling and visualization through NumPy, Pandas and Matplotlib modules.</p>

<p>Semester 2. ST 050201 MATHEMATICAL FOUNDATION FOR DATA ANALYTICS 2</p>	<p>(i) Demonstrate the properties of multivariate calculus (ii) Know the basic terminologies and properties in Graph Theory (iii) Apply various interpolation methods and finite difference concepts (iv) Apply numerical methods to find solution of algebraic equations.</p>
<p>Semester 2. ST 050202 MULTIVARIATE ANALYSIS</p>	<p>(i) Apply multivariate techniques such as discriminant function and classification rules, principal components, canonical correlations, factor analysis, MANOVA etc. (ii) Apply Hotelling's T² and Mahalanobis D² etc for testing hypotheses in the case of multivariate data.</p>
<p>Semester 2. ST 050203 STOCHASTIC PROCESSES & TIME SERIES ANALYSIS</p>	<p>(i) Students are aware of various stochastic models and time series models (ii) Can apply these to model data for predicting future values to make appropriate planning and decision making</p>
<p>Semester 2. ST 050204 DATA VISUALIZATION</p>	<p>(i) Students are able to use visualization techniques for multidimensional visualization, information visualization applications and systems, visualization packages, grammar of graphics using R etc.</p>
<p>Semester 2. ST 050205 PROGRAMMING USING R</p>	<p>(i) Students have understood the various commands in R and can write programs in R. (ii) They have experienced the importance of R in Data Analytics and can apply this for Data Analytics.</p>
<p>Semester 3. ST 050301 SAMPLING AND DESIGN OF EXPERIMENTS</p>	<p>(i) After undergoing this course, students are aware of different sample survey methods and are capable of planning and implementing sample surveys, consumer satisfaction surveys, public opinion surveys etc.</p>

	(ii) They are aware of different designs in experimentation like CRD, RBD, LSD, BIBD, Factorial Designs, etc. and can apply ANOVA technique to analyse the data using Python or R.
Semester3. ST 050302 OPTIMIZATION TECHNIQUES	(i) Apply the notions of linear programming in solving transportation problems (ii) Understand the theory of games for solving simple games (iii) Use linear programming in the formulation of shortest route problem. (iv) Apply algorithmic approach in solving various types of network problems (v) Create applications using dynamic programming.
Semester3. ST 050303 MACHINE LEARNING	(i) The students have understood different techniques such as unsupervised learning, dimensionality reduction, PCA, SVM, Discriminant function, multilayer perceptrons, cluster analysis etc
Semester3. ST 050304 BIG DATA ANALYTICS AND HADOOP	(i) After undergoing this course students are enabled to use Hadoop, RDBMS, Mapreduce, HDFS, HIVE& PIG etc for big data analytics.
Semester 4 ST 900401 ARTIFICIAL INTELLIGENCE	(i) Able to articulate and exemplify the basic knowledge artificial intelligence (ii) Understand the basics of knowledge representation (iii) Can use AI programming languages and the methods of AI implementation and can recommend AI strategies based on applications.
Semester 4 ST 900402 EPIDEMIOLOGY AND CLINICAL TRIALS	(i) impart basic knowledge & skills in Controlled Clinical Trials && their applications (ii) students should be able to understand basic concepts of clinical trials