DEPARTMENT OF INFORMATION TECHNOLOGY

UNDERGRADUATE PROGRAMME

PROGRAMME OUTCOMES (POs)

PO1: Apply mathematical foundations and computer science theory in the modeling and design of software systems.

PO2: Gain the knowledge of writing algorithms, designing, implementing and testing applications for various domains.

PO3: Apply conceptual knowledge for complex computing problems and arrive at a solution based on user requirements.

PO4: Provide analytical skills necessary for arriving at solutions to socio economic problems.

PO5: Integrate the concepts of networks and security issues in the required fields.

PO6: Inculcate emerging techniques pertinent to industrial requirements that uphold women student empowerment.

PO7: Work in multi-disciplinary teams to develop interpersonal skills and project management techniques.

PO8: Contribute novel ideas to build the nation through research publications.

PO9: Imply ethical principles in building safe and secure systems being a responsible citizen.

PROGRAMME NAME: B.Sc. DATA SCIENCE

Under Graduate Programme in Science with specialisation in Data Science

PROGRAMME SPECIFIC OUTCOMES (PSOs)

On completion of B.Sc. Data Science programme students will be able to

PSO1	Build foundational understanding of key technologies and tools driving data science to develop machine learning models for businesses at global level.
PSO2	Formulate, solve and analyse complex problems using fundamental principles of Mathematics, Statistics, Machine Learning, Deep Learning and Artificial Intelligence to make strategic business decisions for real datasets.
PSO3	Inculcate research skills, develop novel ideas, and discover insights in diverse domains to develop data-driven solutions for sustainable development.
PSO 4	Apply quantitative modelling techniques and develop skills to present inferences using tools that are adaptable to evolving technologies, laying the foundation for lifelong learning.
PSO5	Integrate professional ethics and intellectual integrity in algorithm development to build secured computing systems, contributing to the effort to transform India into a digitally empowered society and knowledge economy.

COURSE OUTCOMES

On completion of the course students will be able to

COURSE COMPONENT	COURSE	COURSE OUTCOMES
CORE I	BASICS OF DATA SCIENCE (THEORY & PRACTICAL)	**CO1:** Analyse the fundamental concepts of data science, distinguish between various data science methods, algorithms and models used in business applications. **CO2:** Discuss and analyse the salient features of Python language and develop applications using different data types and looping constructs. **CO3:** Integrate functions, modules and packages to develop algorithms using built-in libraries and frameworks. **CO4:** Design and create eco-friendly applications using object-oriented programming concepts

		CO5: Combine Database, GUI and CGI concepts to design real time applications and recommend results using various visualisation techniques.
CORE II	DATABASE MANAGEMENT SYSTEMS (THEORY & PRACTICAL)	**CO1:** Analyse the various DBMS architectures, components and their functions. Evaluate the various data models and database representations for sustainable development. **CO2:** Design and build optimised queries using relational algebra operations and non-procedural query languages. **CO3:** Integrate basic commands, functions, procedures and packages to build and recommend databases and administer the data using joins, cursors and triggers. **CO4:** Formulate and construct databases using various normalisation techniques for real-time applications applying integrity and security policies. **CO5:** Classify and construct database system architectures, network types and organise, retrieve and select data effectively adhere to social and environmental concerns.
ALLIED I	PROBABILITY AND STATISTICS	**CO1:** Apply Bayes theorem to compute posterior probabilities and recognise its significance in machine learning and data science. **CO2:** Evaluate the mathematical expectation of random variables, and model any practical situation using the properties of distribution functions. **CO3:** Estimate the measures of location and dispersion for a real data set and use them as an effective tool for data interpretation. **CO4:** Select appropriate tools of hypothesis testing to analyse data in a global environment and derive strategic decisions to transform India into a digitally empowered country. **CO5:** Measure the degree of relationship between variables using correlation and employ regression analysis to predict the effect of environmental changes for sustainable development.
		CO1: Identify and distinguish the software life cycle models and build environment friendly applications using Object-Oriented principles.

CORE III	OBJECT ORIENTED PROGRAMMING WITH JAVA (THEORY & PRACTICAL)	**CO2:** Integrate Packages and process management concepts to develop sustainable software. **CO3:** Design web and mobile applications using Java utilities and Collection APIs. **CO4:** Compare and contrast various networking models and recommend secured communication model for web applications using Java libraries. **CO5:** Construct and Design GUI based Client/Server applications using AWT, database and Applets Classes.
CORE IV	DATA STRUCTURES AND ANALYSIS OF ALGORITHMS (THEORY & PRACTICAL)	**CO1:** Analyse the complexity of algorithms using asymptotic notation and recommend the ordered list suitable for real-time applications. **CO2:** Develop models and build applications to solve real-time societal problems using linear and nonlinear data structures for sustainable development. **CO3:** Evaluate the various sorting and searching techniques and apply in real-time analytics. **CO4:** Identify and distinguish various methods in greedy and dynamic programming approaches and recommend optimal solutions to a global problem. **CO5:** Evaluate and design various optimisation algorithms for complex problems using backtracking and branch and bound techniques and recommend all possible feasible and optimal solutions.
ALLIED II	MATHEMATICS FOR DATA SCIENCE (THEORY & PRACTICAL)	**CO1:** Determine eigen values, eigen vectors for matrices, test linear independency/dependency of vectors and recognise their relevance in data science. **CO2:** Analyse the basic notion of vector spaces and linear transformation and employ them in diversified fields. **CO3:** Evaluate integrals using the methods of integration, compute n^{th} derivatives, obtain maxima/minima off(x, y) and implement techniques of calculus in designing machine learning algorithms **CO4:** Estimate the roots of algebraic equations using appropriate numerical methods and integrate domain-specific knowledge with numerical analysis

		CO5: Select suitable techniques of interpolation for analysing data and apply them in data-driven decision-making and forecasting