Smt. Durgadevi Sharma Charitable Trust's
Chandrabhan Sharma College
of Arts, Commerce & Science
(Hindi Linguistic Minority Institution)
(Affiliated to the University of Mumbai)
NAAC Re-Accredited 'A' Grade (CGPA 3.10)

Bachelor of Science in Information Technology (Data Science)

Programme Outcome & Course Outcome

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PROGRAMME OUTCOME

PO1: Apply knowledge of mathematics, science, and engineering fundamentals to solve complex data science problems.

PO2: Identify, formulate, and analyze complex data-related problems by applying principles of data science and machine learning.

PO3: Design solutions for complex data science problems, considering the practical constraints and needs of various stakeholders.

PO4: Conduct independent research and investigation to solve data science problems using appropriate techniques and tools.

PO5: Use modern data science tools and techniques, including machine learning frameworks, data visualization software, and big data technologies.

PO6: Understand the social, ethical, and environmental impact of data science solutions and contribute to the responsible use of data.

PO7: Communicate effectively with both technical and non-technical stakeholders in the data science domain.

PO8: Work collaboratively in diverse teams to solve complex data-related problems.

COURSE OUTCOME

FYIT (DS) SEM –I

1	**Descriptive Statistics**	**CO1**-To use graphical techniques as well as to compute various measures of central tendency. **CO2-** To understand the use of data for tabulating and analyze statistical information given in descriptive form with attributes **CO3**-To compute the correlation coefficient for bivariate data and Calculate the simple linear regression equation for a set of data. **CO4-** To describe and verify mathematical considerations for analyzing time series.
2	**Introduction to Programming**	**CO1** -To apply regular expressions to perform complex operations in less code **CO2**-To understand about use of various data science tools **CO3-** To analyze various data types including, string, array list, tuple and dictionary. **CO4-** To create date and time in Python for various applications.
3	**Web Technology**	**CO1** - To apply the concept of Cascading Style sheet for beatifying the web pages. **CO2-** To illustrate the use of Page layout, Navigation, Tables, Forms and Media features of HTML5. **CO3-** Build applications with Java Script for validation of user forms in web pages. **CO4-** Examine the technique of transmitting data between a server and web application using JSON.

4	**Business Communication and Information Ethics**	**CO1 -** To analyze elegant business reports and prepare user instruction manual. **CO2 -** To understand how to communicate effectively in non-verbal way, draft and write effective business letters. **CO3 -** To create a good communicator. **CO4 -** To evaluate effective communication activities of business by following email etiquettes, drafting memos.
5	**Precalculus**	**CO1 -** Apply trigonometry in modelling real life problems. **CO2 -** Apply the knowledge of numbers, graph and functions in real life. **CO3 -** Apply complex numbers theory to different domains, use vectors and matrices to solve real life problems. **C04 -** Identify different types of conics from equations, understand sequences and series and basics of limits and derivatives.

	SYIT (DS) Sem - II	
1	**Probability and Distributions**	**CO1-** Use the basic probability rules, including additive and multiplicative laws, using the terms, independent and mutually exclusive events. **CO2-** It enables the students to understand strategy formulation, implementation & control in an organization. **CO3-** Derive the probability density function of transformation of random variables. **CO4-** Calculate probabilities and derive the marginal and conditional distributions of bivariate random variables.

2	**Database Management**	**CO1 -** To apply and build normalized database and functional dependencies between attributes and relational algebra queries. **CO2 -** To define business information problem and find the requirements of a problem in terms of data. **CO3 -** To analyse database schema with the use of appropriate data types for storage of data in database. **CO4 -** To create and design query and back up the databases with features of SQL.
3	**R Programming**	**CO1 -** To demonstrate use of R functions and graphics with in R programming for solving problems. **CO2 -** To show the working of R Studio and list the features for R programming. **CO3 -** To determine how to manipulate Data Frames and make use of Dates in R application. **CO4 -** To develop applications to demonstrate formatting on table, use Pipelines in application and use strings, factors in R programme.
4	**Environmental Science**	**CO1 -** To apply insights of ecology and biodiversity. **CO2 -** To understand the importance of environment and its resources. **CO3 -** To evaluate impact of population on environment. **CO4 -** To discuss environment management and sustainable development.
5	**Calculus**	**CO1 -** Perform integration of functions with ease. **CO2 –** Quickly and easily find the derivative of a function. **CO3 –** Apply the knowledge of derivatives and integration to different domains and obtain the results. **CO4 -** Use partial derivatives and differential equations to solve variety of problems.

	SYIT (DS) Sem - III	
1	**Research Methods and Ethics**	**CO1-** Learner understands the reasons for doing research, the applications of research, characteristics and requirements of the research process, types of research and Research paradigms. **CO2-** Learner is applying major approaches to information gathering, the relationship between attitudinal and measurement scales Methods for exploring attitudes in research. **CO3-** Learner is able to analyze data in qualitative and quantitative studies, application of IT in data analysis. **CO4-** Learner is able to write a research report and use Information Technology in Research. **CO5 –** Learner is practicing ethical codes and practices of conduct research.
2	**Data Structures and Algorithms Using Python**	**CO 1-** Learner is capable of choosing appropriate data structure in Python for specified problems and algorithms. **CO 2-** Learner is able to implement Linked list and Stack data structure in various domains. **CO 3 -** Learner is able to implement Tree and Queue data structures and use their operation. **CO 4 -** Learner has ability to apply of Hashing techniques, Symbol Table and Graph Algorithms appropriately. **CO 5 -** Learner has skills to handle sorting,
		searching and pattern matching on various data structures.

3	**Economics**	**CO1 -** Learner understands the basic economic decisions that underline the economic process: What and how to produce goods and services and how they are distributed. **CO2 -** Learner is able to apply of the concepts of scarcity, choice and opportunity cost to analyze the workings of a market economy. **CO3 -** Learner is able to demonstrate a firm knowledge of the interrelationships among consumers, government, business and the rest of the world in the U.S. macroeconomy. **CO4 -** Learner is able to identify the process of how the nation's output of goods and services is measured through the national income and product accounts; clearly comprehend the income and expenditure approaches to measuring national output and national income. **CO5 -** Learner is capable to clearly illustrate the specific roles and functions of monetary and fiscal policy in the economy and explain how these are applied to the process of shaping economic policy and stabilizing the economy, specifically regarding controlling inflation, promoting full employment and facilitating economic growth.
4	**Data Warehousing and Mining**	**CO1 -** Learner is able to demonstrate knowledge of business intelligence, data warehouse with clear understanding of architectural types and will be able to establish the relationship between architectural building blocks. **CO2 -** Learner is able to elaborate changing dimensions with respect to current trends & using aggregate tables. **CO3 -** Learner is able to handle the processes of data preprocessing, data transformation and data reduction. **CO4 -** Learner has knowledge of using various Data Mining techniques for classification and clustering. **CO5 -** Learner is able to align the Data Mining techniques for analyzing the datasets using tools like Weka, R or Python
5	**Linear Algebra and Discrete Mathematics**	**CO 1:** Learner is able to perform common matrix operations such as addition, scalar multiplication,

		multiplication, and transposition. **CO 2:** Learner is able to describe how the determinant of a product of matrices relates to the determinant of the individual matrices. **CO 3:** Learner expresses clear understanding of the concept of a solution to a game and also the limitations on the applicability of the theory.

	SYIT (DS) Sem - IV	
1	**Testing of Hypothesis**	**CO 1:** Learner is developing null and alternative hypotheses to test for a given situation. **CO 2:** Learner is able to differentiate one- and two-tailed hypothesis tests. **CO 3:** Learner is able to do sampling a normal distribution and random sampling. **CO 4:** Learner is using statistical models and their associations in performing hypothesis testing. **CO 5:** Learner is writing the reports and interpreting the data using the various programming languages and packages.
2	**Big Data**	**CO 1:** Learner understands the key issues in big data management and its associated applications in intelligent business and scientific computing. **CO 2:** Learner is acquiring fundamental techniques and algorithms like Hadoop, Map Reduce and NO SQL in big data analytics. **CO 3:** Learner is able to interpret business models and scientific computing paradigms, and apply software tools for big data analytics. **CO 4:** Learner understands adequate perspectives of big data analytics in various applications like recommender systems, social media applications etc.
3	**Fundamentals of Accounting**	**CO 1:** Learner understands the laws governing the business, typical business administration schemes, and the ethics of accountancy, statistics, and accounting theory. **CO 2:** Learner understands the record keeping of financial transactions and further implementations in relevant area.

4	**Artificial Intelligence** (AICTE Model Curriculum 2017)	**CO 1:** Learner understands building blocks of AI. **CO 2:** Learner is analyzing problem and solving it by implementing suitable techniques. **CO 3:** Learner is applying logic based techniques to solve examples. **CO 4:** Learner is able to implement Bayesian approaches. **CO 5:** Learner is using machine learning concepts for solving problems.
5	**Numerical Methods**	**CO 1:** Learner implementing Numerical Methods to solve the problems. **CO 2:** Learner is computing the numerical results using raw data. **CO 3:** Learner will learn numerical different and integration. **CO 4:** Learner will learn Numerical Solution of Initial-Value **CO 5:** Learner will learn Matrix Eigenvalue