



Shree Rahul Education Society's (Regd.)

SHREE L. R. TIWARI DEGREE COLLEGE

(Arts | Commerce | Science) Approved By Government of Maharashtra & Affiliated To University Of Mumbai | Recognized Under Section 2(f) of the UGC Act 1956 | ISO Certified 9001: 2015 | Hindi Linguistic Minority Institution | COLLEGE CODE : 1064

BACHELOR OF SCIENCE- DATA SCIENCE

PROGRAM OUTCOMES (PO)

PO1 Knowledge: Gain expertise in mathematical computing using the NumPy and Scikit-Learn package, Gain an in-depth understanding of data structure and data manipulation, Understand the different components of the Hadoop ecosystem and learn to work with HBase, its architecture and data storage, learn the difference between HBase and RDBMS, and use Hive and Impala for partitioning.

PO2 Critical Thinking: Obtain a comprehensive knowledge of supervised and unsupervised learning models such as linear regression, logistic regression, clustering, dimensionality reduction, KNN and pipeline

PO3: Innovation and Creative Thinking: Perform scientific and technical computing using the Python SciPy package and its sub-packages Integrate, Optimize, Statistics, IO, and Weave. Use all the features and new updates of Python and R for data science.

PO4: Effective Communication, Interpersonal Skills and Social Skills: Encourage collaborative projects, provide constructive feedback and integrated communication that focuses on assignments across disciplines. Foster an inclusive environment that promotes active listening, empathy and cultural awareness to enhance interpersonal skills.

PO5 Interdisciplinary and life-long learning: Understand and use linear and non-linear regression models and classifications, Techniques for data analysis

PO6 Employability Skills: Master the concepts of recommendation engine, and time series modelling, gain practical mastery over principles, algorithms, and applications of Machine Learning, Understand deep reinforcement learning techniques applied in Natural Language Processing, Understand MapReduce and its characteristics and learn how to ingest data using Sqoop and Flume

PO7 Environmental Consciousness and Sustainability: Learns to participate in nation-building by adhering to the principles of sovereignty of the nation, developing the practice of gender-sensitive attitudes, environmental awareness, and empathetic social awareness and analysing the business issues and actions that have an impact on environment consciousness and sustainability.

PO8 Ethics : Understand and recognise the value system, moral dimensions and self-responsibility for the nation and society. Demonstrates personal, and intellectual integrity and academic accountability and develops an ability to understand and apply professional ethics.





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SEMESTER I

CO OF SEM I

COURSE NAME – Descriptive Statistics

COURSE CODE – USDS101

CO1: Understand the use and importance of statistical data by tabulating and implementing Sampling methods.

CO2: Able to identify associations between the variables as well as computing consistent and Inconsistent data.

CO3: Able to compute the level of measures and apply as well as interpret data into graphs.

CO4: Apply a measure of central tendency to minimize the sum of squared deviation.

CO5: Able to understand the basic assumption behind regression analysis and determine the

CO6: Model is significant as well as able to apply various techniques for the modelling.

CO OF SEM I

COURSE NAME - Introduction to Programming

COURSE CODE – USDS102

CO1: Proficiency in using and applying various data types including, string, array list, tuple and dictionary.

CO2: Ability to use regular expressions to perform complex operations in less code.

CO3: Learning to make use of date and time in Python for various applications.

CO4: Proficiency in using IPython architecture for Data Science Applications.

CO5: Knowledge about use of various data science tools.

CO OF SEM I

COURSE NAME - Web Technology

COURSE CODE – USDS103

CO1: Understand the meaning of the basic terminologies of web technology and explore, use the HTML5 concepts. Understand the basic requirements of web design.





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CO2: Understand and use the Page layout, Navigation, Tables, Forms and Media features of HTML5.

CO3: Understand and use Cascading Style sheet for beautifying the web pages.

CO4: Understand and use the Java Script for the validation of user forms in web pages.

CO5: Understand and use the technique of transmitting data between a server and web application using JSON.

CO OF SEM I

COURSE NAME – Business Communication and Information Ethics

COURSE CODE – USDS104

CO1: Communicate effectively in a non-verbal way, and draft and write effective business letters.

CO2: Effectively carry communication activities of business by following email etiquettes, drafting memos

CO3: Write elegant business reports and prepare user instruction manuals.

CO4: Apply information ethics in all walks of life.

CO5: Become a good communicator in life.

CO OF SEM I

COURSE NAME - Pre-Calculus

COURSE CODE – USDS105

CO1: Apply the knowledge of numbers, graphs and functions in real life.

CO2: Apply trigonometry in modelling real-life problems.

CO3: Use analytic trigonometry and inverse circular functions to solve a variety of problems.

CO4: Apply complex numbers theory to different domains, use vectors and matrices to solve real-life problems.

CO5: Identify different types of conics from equations, understand sequences and series and basics of limits and derivatives.





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SEMESTER II

CO OF SEM II

COURSE NAME - Probability and Distributions

COURSE CODE – USDS201

CO1: Organize manage and present data

CO2: Analyze statistical data graphically using frequency distributions and cumulative frequency distribution.

CO3: Use the basic probability rules, including additive and multiplicative laws, using the terms, independent and mutually exclusive events.

CO4: Translate real-world problems into probability models.

CO5: Derive the probability density function of the transformation of random variables.

CO6: Calculate the probability and derive the marginal and conditional distributions of bivariate random variables.

CO OF SEM II

COURSE NAME - Database Management

COURSE CODE – USDS202

CO1: Evaluate the business information problem to find the requirements of a problem in terms of data.

CO2: Draw database designs in a logical structure and can identify the entries which exist in a system.

CO3: Construct normalised databases and functional dependencies between attributes and relational algebraic queries.

CO4: Design the database schema with the use of appropriate data types for the storage of data in the database.

CO5: Create, manipulate, query and back up the database with features of SQL.





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CO OF SEM II

COURSE NAME - R Programming

COURSE CODE – USDS203

CO1: Use R studio and explore the features of R programming.

CO2: Use R function and graphics within R programming for solving problems.

CO3: Work hard with advanced graphics of R, import, use the data and represent the data in tables.

CO4: Apply formatting on the table, Pipeline in application and use string, Factors in R programme.

CO5: Manipulate Data frames and make use of Data in R application.

CO OF SEM II

COURSE NAME - Environment Science

COURSE CODE – USDS204

CO1: Ability to recognize the importance of the environment and its resources.

CO2: Knowledge about the insight of ecology and biodiversity

CO3: Recognize the cause and effect of environmental pollution and other social issues

CO4: Knowledge about population and its impact on the environment.

CO5: Insight into environment management and sustainable development.

CO OF SEM II

COURSE NAME - Calculus

COURSE CODE – USDS205

CO1: Quickly and easily find the derivative of a function.

CO2: Perform integration of function with ease.

CO2: Apply the knowledge of derivatives and integration to different domains and obtain the results.

CO2: Apply the knowledge of multiple integrals and polar coordinates to solve real-life problems with ease.

CO2: Use partial derivatives and differential equations to solve a variety of problems.





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SEMESTER III

CO OF SEM III

COURSE NAME – Research Methods and Ethics

COURSE CODE – USDS301

CO1: Understand the reasons for doing research, the application of research, characteristics and requirements of the research process, types of research and research paradigm.

CO2: Apply major approaches to gather information, the relationship between attitudinal and measurement scales, and methods of exploring attitudes in research.

CO3: Analyze quantitative studies and applications in IT in data analysis.

CO4: Write a research report and use Information technology in research.

CO5: Practise ethical codes and practices of conducting research.

CO OF SEM III

COURSE NAME – Data Structures and Algorithms using Python

COURSE CODE – USDS302

CO1: Apply appropriate data structures in Python for specified problems and algorithms.

CO2: Implement Lined list and stack data structures in various domains.

CO2: Implement Tree and Queue data structures and use their operations.

CO2: Apply Harshing Techniques, symbol table and graph algorithms appropriately.

CO2: Implement sorting, searching and pattern matching on various data structures.

CO OF SEM III

COURSE NAME – Economics

COURSE CODE – USDS303

CO1: Understand the basic economic decisions that underline the economic process: What and how to produce goods and services and how they are distributed.

CO2: Apply the concepts of scarcity, choice and opportunity cost to analyze the workings of a market economy.





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CO3: Demonstrate a firm knowledge of the interrelationships among consumers, government, business and the rest of the world in the U.S. macro economy.

CO4: Identify the process of how the nation's output of goods and services is measured through the national income and product accounts; and clearly comprehend the income and expenditure approaches to measuring national output and national income.

CO5: Illustrate the specific roles and functions of monetary and fiscal policy in the economy and explaining how these are applied to the process of shaping economic policy and stabilizing the economy, specifically reading about controlling inflation, promoting full employment and facilitating economic growth.

CO OF SEM III

COURSE NAME – Data Warehousing and Mining

COURSE CODE – USDS304

CO1: Understand the reasons for doing research, the application of research, characteristics and requirements of the research process, types of research and research paradigm.

CO2: Elaborate changing dimensions with respect to current trends & using aggregate tables.

CO3: Handle the processes of data pre-processing, data transformation and data reduction.

CO4: Recognize various data mining techniques for classification and clustering.

CO5: Align the data mining techniques for analyzing the datasets using tools like Weka, R or Python.

CO OF SEM III

COURSE NAME – Linear Algebra and Discrete Mathematics

COURSE CODE – USDS305

CO1: Perform common matrix operations such as addition, scalar multiplication, multiplication, and transposition.

CO1: Describe how the determinant of a product of matrices relates to the determinant of the individual matrices.

CO1: Construct discrete structures like sets, relations, functions, graphs and trees.

CO1: Understand of the concept of a 'solution to a game' and also the limitations on the applicability of the theory.





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SEMESTER IV

CO OF SEM IV

COURSE NAME – Testing of hypothesis

COURSE CODE – USDS401

CO1: Develop null and alternative hypotheses to test for a given situation.

CO2: Differentiate one- and two-tailed hypothesis tests.

CO3: Learner is able to do sampling a normal distribution and random sampling.

CO4: Learner is using statistical models and their associations in performing hypothesis testing.

CO5: Lerner writes the reports and interprets the data using various programming languages and packages.

CO OF SEM IV

COURSE NAME – Big Data

COURSE CODE – USDS402

CO1: Understand the key issues in big data management and its associated applications in intelligent business and scientific computing.

CO2: Acquire fundamental techniques and algorithms like Hadoop, Map Reduce and NO SQL in big data analytics.

CO3: Interpret business models and scientific computing paradigms and apply software tools for big data analytics.

CO4: Understand adequate perspectives of big data analytics in various applications like recommender systems, social media applications etc.

CO OF SEM IV

COURSE NAME – Fundamentals of Accounting

COURSE CODE – USDS403

CO1: Understand the laws governing the business, typical business administration schemes, and the ethics of accountancy, statistics, and accounting theory.





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CO2: Understand the record keeping of financial transactions and further implementations in the relevant areas.

CO3: Prepare analyze and interpret financial statements, including the income statement, balance sheet, statement of cash flows.

CO4: Develop the ability to communicate financial information effectively to various stakeholders, both verbally and in writing.

CO OF SEM IV

COURSE NAME – Artificial Intelligence

COURSE CODE – USDS404

CO1: Understand the building blocks of AI.

CO2: Analyse problems and solve it by implementing suitable techniques.

CO3: Apply logic-based techniques to solve examples.

CO4: Implement Bayesian approaches.

CO5: Use machine learning concepts for solving problems.

CO OF SEM IV

COURSE NAME – Numerical Methods

COURSE CODE – USDS405

CO1: Implement Numerical Methods to solve the problems.

CO2: Compute the numerical results using raw data.

CO3: Solve numerical differentiation and integration and numerical solutions of ordinary and partial differential equations.

CO4: Apply numerical differentiation and integration and numerical solutions of ordinary differential equations.

CO5: Solve problems on partial differential equations.

