



JAI HIND COLLEGE

Basantsing Institute of Science & J. T. Lalvani College of Commerce.

And Sheila Gopal Raheja College of Management

Affiliated to University of Mumbai

Autonomous

Master of Science (MSc in Big Data Analytics)

Semester I

Course Code: SBDA101	Course Title: Statistical Methods
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Learning Objectives :

1. To make them train in Data Collection & Visualization
2. To help them with Basic Statistics
3. To train them with Contingency Tables

Learning Outcomes:

1. use Data Collection & Visualization
2. Solve Basic Statistics
3. Analyse the Contingency Tables

Semester I

Course Code: SBDA102	Course Title: Probability & Stochastic Process
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Learning Objectives :

1. To make them aware about Random Variables: discrete and continuous probability models, some probability distributions:
2. To familiarize with Binomial, Poisson, Geometric, Hypergeometric, Normal, exponential,
3. To make them aware about Chi-square, expectation, variance and other properties of the distribution.

Learning Outcomes:

1. Use Random Variables: discrete and continuous probability models, some probability distributions:
2. Solve problem in Binomial, Poisson, Geometric, Hypergeometric, Normal, exponential,
3. Use Chi-square, expectation, variance and other properties of the distribution.

Semester I

Course Code: SBDA103	Course Title:Linear Algebra &Linear Programming
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Learning Objectives:

- 1.To make them aware about Linear equations and matrices, matrix operations, solving system of linear equations, Gauss-Jordan method, Concept & Computation of determinant and inverse of matrix,Eigen values and eigen vectors, Illustrations of the methods, Positive semi definite and position definite matrices, illustrations. Lab – using R programming
- To train them with Linear Programming: Definition of the problem, convex sets, corner points,
- TO help them to understand feasibility, basic feasible solutions, Simplex method

Learning Outcomes:

- solve Linear equations and matrices, matrix operations, solving system of linear equations, Gauss-Jordan method, Concept & Computation of determinant and inverse of matrix,Eigen values and eigen vectors, Illustrations of the methods, Positive semi definite and position definite matrices, illustrations. Lab – using R programming
- Implement Linear Programming:
- Definition of the problem, convex sets, corner points, Summerize feasibility, basic feasible solutions,Simplex method

Semester I

Course Code: SBDA104	Course Title: Database Management
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Learning Objective:

- To train them with Different data models, ER and EER diagram, schema, table, Big Data Concepts and Hadoop Ecosystem
- To help them to differentiate Relational and Non-Relational Databases: Structure, various operations, normalization, SQL, No-SQL, Graph Database, Parallel and distributed data base, Map-Reduce.
- To make them aware about Lab using SQL/Oracle/MySQL for Relational databases; Hadoop(any), MangoDB, GraphDB for Big Data

Learning Outcome:

1. define Different data models, ER and EER diagram, schema, table, Big Data Concepts and Hadoop Ecosystem
2. differentiate Relational and Non-Relational Databases: Structure, various operations, normalization, SQL, No-SQL, Graph Database, Parallel and distributed data base, Map-Reduce.
3. Analyse SQL/Oracle/MySQL for Relational databases; Hadoop(any), MangoDB, GraphDB for Big Data

Semester I

Course Code: SBDA105	Course Title: Computing for Data Sciences
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Learning Objective:

- To demonstrate proficiency with statistical analysis of data.
- To apply data science concepts and methods to solve problems in real-world contexts
- To understand different libraries of python for data analysis.

Learning Outcome:

- Be proficient in using libraries for data analysis in R and Python.
- Understand how to use data visualization.
- Understand simple statistical summaries using software designed for statistical analyses.

Semester I

Course Code: SBDA101PR	Course Title: Practical-I based on SBDA101(Statistical Methods), SBDA102 (Probability &Stochastic Process)
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Learning Objective:

- To help them with Basic Statistics
- To train them with Contingency Tables
- To familiarize with Binomial, Poisson, Geometric, Hypergeometric, Normal, exponential.

Learning Outcome:

- Solve Basic Statistics
- Analyse the Contingency Tables
- Use Random Variables: discrete and continuous probability models, some probability distributions:

Semester I

Course Code: SBDA102PR	Course Title: Practical-II based on SBDA103(Linear Algebra & Linear Programming), SBDA104 (Database Management)
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Learning Objective:

- To teach students how to use linear algebra as a powerful tool for computation.
- The second goal is to show how these computations can be conceptualized in a geometric framework.
- To understand Big Data and its applications

Learning Outcome:

- Communicate mathematical ideas orally and in writing, with precision, clarity and organization, using proper terminology and notation.
- Demonstrate a solid understanding of rigorous mathematical proof. Students will be able to write clear well-organized and logical mathematical arguments.
- Able to perform the basic elements of a relational database management system.

Semester I

Course Code: SBDA103PR	Course Title: Practical-III based on SBDA105(Computing for Data Sciences)
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Learning Objective:

- To demonstrate proficiency with statistical analysis of data.
- To apply data science concepts and methods to solve problems in real-world contexts
- To understand different libraries of python for data analysis.

Learning Outcome:

- Be proficient in using libraries for data analysis in R and Python.
- Understand how to use data visualization.
- Understand simple statistical summaries using software designed for statistical analyses.

Semester II

Course Code: SBDA201	Course Title: Enabling Technologies for Data Science-I
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Learning Objective:

- To Be familiar with mathematical foundations of data mining tools.
- To Understand and implement classical models and algorithms in data warehouses and data mining
- To Finding knowledge discovery from data warehouse.

Learning Outcome:

- Understand the functionality of the various data mining and data warehousing component
- Explain the analyzing techniques of various data
- Describe different methodologies used in data mining and data warehousing.

Semester II

Course Code: SBDA202	Course Title: Machine Learning - I
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Learning Objective:

To understand the basic theory underlying machine learning.

- To be able to formulate machine learning problems corresponding to different applications.
- To understand a range of machine learning algorithms along with their strengths and weaknesses.

Learning Outcome:

- pre-process and analyze the characteristics of different types of standard data, work on scikit-learn, a standard machine learning library,
- Evaluate the performance of different machine learning techniques for a particular application and validate the significance of the results obtained.
- Build skills to implement different classification and clustering techniques as per requirement to extract valuable information from any type of data set.

Semester II

Course Code: SBDA203	Course Title: Advanced Statistical Methods
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Learning Objective:

- To describe the rationale behind the formulation and components of a statistical model.
- To compare and contrast statistical models in the context of a particular scientific question.
- To communicate statistical ideas to a diverse audience.

Learning Outcome:

- The appropriate statistical analysis technique for a business problem,
- The appropriateness of statistical analyses, results, and inferences , and, advance data analysis in R
- Interpret the findings from the data analysis, and the implications of those finding.

Semester II

Course Code: SBDA204	Course Title: Foundations of Data Science
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Learning Objective:

- To understand and apply the fundamental concepts in graph theory
- To apply graph theory based tools in solving practical problems
- To improve the proof writing skills

Learning Outcome:

- Comprehend fundamental concepts in Data Science and Analytics.
- Understand fundamentals of Graph data and apply them to Relational Databases.
- Learn Read/Write data of various formats using R.

Semester II

Course Code: SBDA205C	Course Title: Cloud Computing
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Learning Objective:

- To provide the students basic understanding about cloud and virtualization along with it how one can migrate over it.
- To Understand the concept of Cloud Security.
- To Learn the Concept of Cloud Infrastructure Model.

Learning Outcome:

- Understand Platform as a Service, Infrastructure as a service and Software as Service
- Understand the new ways you can use to program, develop, deploy and provide application access to the users
- Able to identify problems, and explain, analyze, and evaluate various cloud computing solutions.

Semester II

Course Code: SBDA206	Course Title: Value Thinking
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Learning Objective:

- To Understand key concepts of critical thinking.
- To Clarify the difference in cognition, reasoning and logics.
- To Improve their decision making based on facts, assumptions, arguments etc.

Learning Outcome:

- Recognize explicit and tacit assumptions and their consequences.
- Distinguish relevant from non-relevant data, fact from opinion.
- Identify, evaluate and synthesize information (obtained through library, world-wide web, and other sources as appropriate) in a collaborative environment.

Semester II

Course Code: SBDA201PR	Course Title: Practical-I based on SBDA201(Enabling Technologies for Data Science-I), SBDA202(Machine Learning - I)
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Learning Objective:

- To Be familiar with mathematical foundations of data mining tools.
- To Understand and implement classical models and algorithms in data warehouses and data mining
- To understand a range of machine learning algorithms along with their strengths and weaknesses.

Learning Outcome:

- Understand the functionality of the various data mining and data warehousing component
- Explain the analyzing techniques of various data
- pre-process and analyze the characteristics of different types of standard data, work on scikit-learn, a standard machine learning library,

Semester II

Course Code: SBDA202PR	Course Title: Practical-II based on SBDA203(Advanced Statistical Methods), SBDA204(Foundations of Data Science)
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Learning Objective:

- To describe the rationale behind the formulation and components of a statistical model.
- To understand and apply the fundamental concepts in graph theory
- To apply graph theory based tools in solving practical problems

Learning Outcome:

- Interpret the findings from the data analysis, and the implications of those finding.
- Comprehend fundamental concepts in Data Science and Analytics.
- Understand fundamentals of Graph data and apply them to Relational Databases.

Semester II

Course Code: SBDA203PR	Course Title: Practical-III based on SBDA205C (Cloud Computing)
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Learning Objective:

- To provide the students basic understanding about cloud and virtualization along with it how one can migrate over it.
- To Understand the concept of Cloud Security.
- To Learn the Concept of Cloud Infrastructure Model.

Learning Outcome:

- Understand Platform as a Service, Infrastructure as a service and Software as Service
- Understand the new ways you can use to program, develop, deploy and provide application access to the users
- Able to identify problems, and explain, analyze, and evaluate various cloud computing solutions.

Semester III

Course Code: SBDA301	Course Title: Enabling Technologies for Data Science-II
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Learning Objective:

- To Understand the basics of functional programming in Scala
- To Become comfortable writing Scala code through hands-on labs
- To Understand the basics of spark

Learning Outcome:

- Be proficient in using libraries for data analysis in Spark and PySpark
- Understand what a machine learning model is and how to use a given model.
- Apply data science concepts and methods to solve problems in real-world contexts and communicate these solutions effectively

Semester III

Course Code: SBDA302	Course Title: Machine Learning-II
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Learning Objective:

- To understand the basic theory underlying machine learning.
- To be able to formulate machine learning problems corresponding to different applications.
- To understand a range of machine learning algorithms along with their strengths and weaknesses.

Learning Outcome:

- Students learn the different possibilities to deploy large scale machine learning.
- Students explore the different ensemble learning techniques.
- Students also understand several preprocessing, cross validation and evaluation techniques for different machine learning algorithms

Semester III

Course Code: SBDA303	Course Title: Exploratory Data Analysis
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Learning Objective:

- To Identifying trends in time and space
- To Uncover patterns related to the target
- To Identifying new sources of data

Learning Outcome:

- Detecting patterns of interest, generating hypotheses,
- Creative visualization for decision making data
- Embedding programming scripts to implement the interactive visualization

Semester III

Course Code: SBDA304A	Course Title: Introduction to Econometrics and Finance
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Learning Objective:

- To introduce regression analysis to students so that they are able to understand its applications in different fields in economics.
- to establishing trends between datasets
- to get a specific pattern or result from cluttered data.

Learning Outcome:

- Optimize portfolio on the collected historical Sensex data of different company for giving maximum return with minimum risk.
- Analyze the pattern of return of different company from historical Sensex data.
- Apply Binomial Model in real life Put Call parity problems and also understand model working procedure by simulated data.

Semester III

Course Code: SBDA305B	Course Title: Big Data Technologies and Architecture and Introduction to Bioinformatics
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Learning Objective:

- To Apply reasoning about core biological concepts with emphasis on the cellular and molecular scale of biology
- To Design, implement and evaluate computer-based systems, processes, components or programs in relation to the contexts of molecular and cellular biology and genomics research.
- To Analyze and evaluate bioinformatics data to discover patterns, critically evaluate conclusions and generate predictions for subsequent experiments.

Learning Outcome:

- Optimize portfolio on the collected historical Sensex data of different company for giving maximum return with minimum risk.
- Apply Binomial Model in real life Put Call parity problems and also understand model working procedure by simulated data.
- Apply Black Sholes formula in real life scenarios and also on simulated data

Semester IV

Course Code: SBDA401PJ	Course Title: Internship based project
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Course Objectives:

- To Serve as an archival record of the internship experience.
- Give the student an opportunity to reflect on the professional aspects of the internship experience and the skills that were learned.
- To build an understanding of the knowledge and skills in an industry or workplace

Learning Outcomes:

- Knowledge to examine information using data analysis tools so that they can help their employers make important decisions
- student can practice and improve their industry skills while also gaining industrial experience
- Help a student start to build a professional network that can be a resource for the student.