

S P Mandali's
R. A. PODAR COLLEGE OF COMMERCE AND
ECONOMICS (AUTONOMOUS),
Matunga, Mumbai-400019

Course Structure
Bachelor of Science (Data Science and Analytics)

Semester III and IV

College Website: www.rapodar.ac.in

S P Mandali's
R. A. PODAR COLLEGE OF COMMERCE AND
ECONOMICS (AUTONOMOUS),
Matunga, Mumbai-400019

Bachelor of Science (Data Science and Analytics)
SYBSc Semester III and IV

Syllabus
And
Question paper pattern of Course

As per National Education Policy 2020
To be implemented from Academic Year 2024- 2025

College Website: www.rapodar.ac.in

Bachelor of Science (Data Science and Analytics) Programme
Syllabus as per National Education Policy 2020
Course Structure
S.Y.B.S.C (Data Science and Analytics) (Level 5)
(To be implemented from Academic Year 2024-25)

No of Courses	Course Code	Semester III	Credits
1		Major (09 credits)	
1.A		Data Science & Analytics - III	
1.A.a	PUF103201	Advanced Programming using Python	03
1.A.b	PUF103202	Linear Algebra	03
1.A.c	PUF103203	Data Warehousing	03
2		Minor (03 credits)	
2.A.a	PUF203201	Economics	03
3		General Elective (GE)/ OpenElective (OE) (03 Credits)	
3.A.a	PUD303201 PUD303202 PUD303203	Digitalization of Money Markets Blockchain Technology Data Visualization using Power BI	03
4		Vocational & Skill Enhancement Courses (VSEC) (03 credits)	
4.A		Skill Enhancement Course	
4.A.a	PUF403201	Exploratory Data Analysis	03
5		Ability Enhancement Course, Value Enhancement Course, Indian Knowledge System (02 credits)	
5.A		Ability Enhancement Course(AEC)	
5.A.a	PUA503201 PUF503202 PUA503202	Linguistic Studies I Sanskrit-I Marathi-I Hindi-I	02

6		Internship/Field Project / Research Project / Community Engagement (02 credits)	
6.A.a	PUA603201	Foundation of Research Skills (Internship/Field Project/Research Project/Community Engagement)	02
Total		CUMULATIVE CREDITS	22

Exit option at the end of the Second year (on completion of semester III and semester IV):
Under Graduate Certificate in Data Science and Analytics will be awarded to a learner on fulfillment of the following conditions:

1. The learner should have acquired 44 credits in Semester III and IV considered together.
2. The learner should acquire an additional 4 credits as per norms by completing recognized courses under the National Skill Qualification Framework (NSQF) such as a certificate course on Introduction to Data Warehousing, a Course on Artificial Intelligence concepts, and an Internship.

Semester III

**Syllabus of courses of SY BSc(Data Science & Analytics) Programme
(With effect from the Academic Year 2024-2025)**

1.Major

1.A. Data Science & Analytics -III

**1.A.a Advanced Programming using Python (3 Credits)
Semester III**

1. Major	
1.A Data Science & Analytics - III	
1.A.a Advanced Programming using Python	
Course Objectives and Course Outcomes	
Course Objectives	
CObj 1	To learn advanced programming concepts in Python
CObj 2	To learn about Threads and its types
CObj 3	To perform coding practices to implement modules such as DateTime & Calendar
CObj 4	To acquire knowledge of how to use python for Exception handling and develop GUI interface
Course Outcomes	
COut 1	Learners will be able to implement basic knowledge in complex structure.
COut 2	Learners will be able to implement OOP concepts in coding.
COut 3	Learners will acquire knowledge of various modules and their application.
COut 4	Learners will be able to use the exception handling in Python.
COut 5	Learners will be able to design GUI using Python.

Modules at a Glance

Advanced Programming using Python		
Sr. No.	Modules	No. of Lectures
1	OOP Concepts	15
2	Threads, Date and Time	15
3	Exception handling in Python	15
Total		45

Sr. No.	Modules
1	OOP Concepts
	<p>OOPs in python: Features of Object Oriented Programming system (oops), Classes and objects, encapsulation, abstraction, inheritance, polymorphism, constructors and destructors</p> <p>Classes and objects: Creating a class, the self-variable, types of variables, namespaces, types of methods, instance methods, class methods, static methods, passing members of one class to another class, inner classes</p> <p>Inheritance and Polymorphism: Inheritance in python, types of inheritance- single inheritance, multilevel inheritance, hierarchical inheritance, multiple inheritance, constructors in inheritance, overriding superclass constructors and methods, the super() method, method resolution order (mro), polymorphism, duck typing, operator overloading, method overloading, method overriding,</p> <p>Abstract classes and interfaces: Abstract class, abstract method, interfaces in python, abstract classes vs. Interfaces</p>
2	Threads, Date and Time
	<p>Threads in python: Difference between process and thread, types of threads, benefits of threads, creating threads, single tasking and multitasking, thread synchronization, deadlock in threads, daemon threads</p> <p>Date and time in Python: Date and time now, combining date and time, formatting dates and times, finding durations using “time delta”, comparing two dates, sorting dates, stopping execution temporarily, knowing the time taken by a program, calendar module</p>
3	Exception handling in Python
	<p>Exceptions in python: Errors in a python program, compile & run-time errors, logical error, exceptions-exception handling, types of exceptions, the except block, the assert</p>

	<p>statement, user-defined exceptions, logging the exceptions</p> <p>Database in python: Using SQL with python, retrieving rows from a table, inserting rows into a table, deleting rows from a table, updating rows in a table, creating database tables through python, Exception handling in databases.</p> <p>Networking: Protocols, server-client architecture, tcp/ip and udp communication</p> <p>Graphical user interface: Creating a GUI in python, Widget classes, Working with Fonts and Colours, working with Frames, Layout manager, Event handling</p>
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Practical Work (20 Marks)

List of Practicals to be Conducted	
1	Write a Python program to implement concepts of OOP such as
	<ul style="list-style-type: none"> a. Types of Methods b. Inheritance c. Polymorphism
2	Write a Python program to implement concepts of OOP such as
	<ul style="list-style-type: none"> a. Abstract methods and classes b. Interfaces
3	Write a Python Program to implement advance linked list.
4	Write Python Program to create application which uses date and time in Python
5	Write a Python program to create server-client and exchange basic information
6	Write a Program to demonstrate concept of threading and multitasking in Python
7	Write a Python Program to demonstrate different types of exception handling
8	Write a Python Program to work with databases in Python to perform operations such as
	<ul style="list-style-type: none"> a. Connecting to database b. Creating and dropping tables c. Inserting and updating into tables.
9	Write a GUI Program in Python to design application that demonstrates
	<ul style="list-style-type: none"> a. Different fonts and colors b. Different Layout Managers c. Event Handling

Question Paper Pattern (Academic Year: 2024-2025)
Advanced Programming using Python
Semester End Examination and Practical Examination – 100 Marks
SEMESTER III

A] Semester End Examination (SEE)- 60 Marks

Maximum Marks: 60

Duration: 2 Hours

- Note: 1. All questions are compulsory.
2. All questions carry equal marks.

Question No.	Particulars (Nature of Questions)	Marks (Given)	Marks (To be Attempted)
Q1.	Answer the following questions (Any 4) A. Theory/Concept Based question B. Theory/Concept Based question C. Theory/Concept Based question D. Theory/Concept Based question E. Theory/Concept Based question	5 5 5 5 5	20
Q2.	Answer the following questions (Any 4) A. Theory/Concept Based question B. Theory/Concept Based question C. Theory/Concept Based question D. Theory/Concept Based question E. Theory/Concept Based question	5 5 5 5 5	20
Q3.	Answer the following questions (Any 4) A. Theory/Concept Based question B. Theory/Concept Based question C. Theory/Concept Based question D. Theory/Concept Based question E. Theory/Concept Based question	5 5 5 5 5	20
	Total	75	60

B] Practical Examination - 40 Marks

A Certified copy journal is essential to appear for the practical examination.

1.	Practical Work	20
2.	Journal	10
3.	Viva Voce	10

Books and References:					
Sr. No.	Title	Author/s	Publisher	Edition	Year
1	Python 3 Object-oriented Programming	Dusty Phillips	Packt	-	2015
2	Python Standard Library	Fredrik Lundh	O'reilly	-	2001
3	Python Threading Jump-Start	Jason Brownlee	SuperFastPython	-	2020

**Syllabus of courses of SY BSc(Data Science & Analytics) Programme
(With effect from the Academic Year 2024-2025)**

1.Major

1.A. Data Science & Analytics -III

1.A.b Linear Algebra (3 Credits)

Semester III

1. Major	
1.A Data Science & Analytics - III	
1.A.b Linear Algebra	
Course Objectives and Course Outcomes	
Course Objectives	
CObj 1	To develop proficiency in matrix operations and solution methods and understand their geometric interpretation in the context of vector spaces.
CObj 2	To comprehend the concepts of orthogonality, inner products, and eigenvalues, and learn the process of diagonalizing matrices.
CObj 3	To apply numerical methods, including SVD, for solving real-world problems involving matrices.
Course Outcomes	
COut 1	Learners will perform matrix operations and solve linear equations, demonstrating mastery of matrix algebra.
COut 2	Learners will apply advanced eigenvalue and eigenvector concepts to successfully diagonalize matrices.
COut 3	Learners will apply numerical methods, including direct and iterative approaches, to solve real-world problems.

Modules at a Glance

Linear Algebra		
Sr. No.	Modules	No. of Lectures
1	Systems of Linear Equations and Vector Spaces	15
2	Orthogonality and Diagonalization	15
3	Numerical Linear Algebra	15
Total		45

Sr. No.	Modules
1	Systems of Linear Equations and Vector Spaces
	<p>Prerequisite: Matrices and matrix Operations, Types of matrices: zero matrix, identity matrix, scalar matrices, diagonal matrices, upper triangular matrices, lower triangular matrices, symmetric matrices, skew-symmetric matrices, Invertible matrices. (No questions to be asked)</p> <p>Systems of Linear Equations: Introduction to Systems of Linear Equations (homogeneous and non-homogeneous), solution of a system by elimination and their geometrical interpretation. System of linear equations in matrix form, elementary row operations, row echelon matrix, Gaussian elimination method, and Gauss-Jordan Method</p> <p>Vector Spaces: Definition of real vector space, examples of real vector space, Definition of subspace, examples of subspace, the space of all solutions of the system of linear equations. Linear Independence, Basis and Dimension, The Fundamental Matrix Spaces</p> <p>Linear Transformation: Linear Transformation, Properties of linear transformation, Rank Nullity theorem (statement only) and examples; Matrix associated with linear transformation, Invertible linear transformations, Linear operator, Effect of change of bases on matrices of linear operator; Rank of a matrix and the rank of the associated linear transformation, Similar matrices.</p>
2	Orthogonality and Diagonalization
	<p>Determinants: Definition, properties of determinants, Linear dependence and independence of vectors using determinants, the existence, and uniqueness of the system $Ax = b$; Cofactor, Minor, and Adjoint of a matrix; Cramer's rule and Applications.</p> <p>Orthogonality: Dot product, Definition of an inner product on a vector space over \mathbb{R}, examples of an inner product; Norm of a vector, Angle between two vectors, Orthogonality of vectors. Pythagoras theorem. Orthogonal sets, Orthonormal sets. Gram-Schmidt orthogonalization process, QR decomposition. Orthogonal basis and</p>

	<p>orthonormal basis for a finite-dimensional inner product space. Orthogonal complements and Orthogonal Projections.</p> <p>Diagonalization: Eigenvalues and Eigenvectors of a matrix, properties of Eigenvalues and Eigenvectors. Diagonalization of a matrix, Orthogonal diagonalization, diagonalization of real symmetric matrices. Power of a matrix, Differential Equations and Matrix Exponential, Complex Matrices, Similarity Transformations.</p>
3	Numerical Linear Algebra
	<p>Positive Definite Matrices: Quadratic Forms, Quadratic Forms in Geometry, Optimization Using Quadratic Forms, Positive Definite, Semi Positive Definite.</p> <p>Singular Value Decomposition: Singular Values, Singular vectors, Singular Value Decomposition (SVD). Principal Component Analysis (PCA).</p> <p>Numerical Methods: Norm of a matrix, Direct Methods: Triangularization Methods, Condition Numbers, Iteration Methods: Jacobi Iteration Method, Gauss-Seidel Iteration Method, Eigenvalue Problems: Gerschgorin theorem, and Brower's theorem for bounds of eigenvalues of matrices, Power Method and Inverse Power Method.</p>

Practical Work (40 Marks)

List of Practicals to be Conducted	
1	Matrices and Gaussian Elimination
2	Vectors
3	Determinants
4	Orthogonality
5	Diagonalization
6	Singular Value Decomposition

Question Paper Pattern (Academic Year: 2024-2025)
Linear Algebra
Semester End Examination and Practical Examination – 100 Marks
SEMESTER III

A] Semester End Examination (SEE)- 60 Marks

Maximum Marks: 60

Duration: 2 Hours

Note: 1. All questions are compulsory.
 2. All questions carry equal marks.

Question No.	Particulars (Nature of Questions)	Marks (Given)	Marks (To be Attempted)
Q1.	Answer the following questions (Any 4) F. Theory/Concept Based question G. Theory/Concept Based question H. Theory/Concept Based question I. Theory/Concept Based question J. Theory/Concept Based question	5 5 5 5 5	20
Q2.	Answer the following questions (Any 4) F. Theory/Concept Based question G. Theory/Concept Based question H. Theory/Concept Based question I. Theory/Concept Based question J. Theory/Concept Based question	5 5 5 5 5	20
Q3.	Answer the following questions (Any 4) F. Theory/Concept Based question G. Theory/Concept Based question H. Theory/Concept Based question I. Theory/Concept Based question J. Theory/Concept Based question	5 5 5 5 5	20
	Total	75	60

B] Practical Examination - 40 Marks**A Certified copy journal is essential to appear for the practical examination.**

1.	Practical Work	20
2.	Journal	10
3.	Viva Voce	10

Books and References:					
Sr. No.	Title	Author/s	Publisher	Edition	Year
1	Elementary Linear Algebra: Applications Version	H. Anton	Wiley Plus Products, Wiley	1st	2010
2	Linear algebra done right	Sheldon Axler	Springer, New York	3rd	1996
3	Linear algebra	Kenneth Hoffman and Ray Kunze	Prentice-Hall, Englewood Cliffs, NJ	1st	1971
4	Numerical methods for scientific and engineering computation	M. K. Jain, S. R. K. Iyengar, and R. K. Jain	New Age International Publications, New Delhi	1st	2007
5	Linear algebra: A geometric approach	S. Kumaresan	CRC Press, Boca Raton, FL	1st	2018
6	Linear algebra	Serge Lang	Springer, New York	3rd	1987

**Syllabus of courses of SY BSc(Data Science & Analytics) Programme
(With effect from the Academic Year 2024-2025)**

1.Major

1.A. Data Science & Analytics -III

1.A.c Data Warehousing (3 Credits)

Semester III

1. Major	
1.A Data Science & Analytics - III	
1.A.c Data Warehousing	
Course Objectives and Course Outcomes	
Course Objectives	
CObj 1	To understand business intelligence for an enterprise and review data warehouses with architectural types and architectural building blocks.
CObj 2	To discuss and understand changing dimensions and learn about aggregate tables and determine their usage.
CObj 3	To study the use of classification and clustering techniques for Data Mining.
CObj 4	To appreciate the use of various data mining algorithms and learn about their specific applications.
Course Outcomes	
COut 1	Learner is able to demonstrate knowledge of business intelligence, data warehouses with clear understanding of architectural types and will be able to establish the relationship between architectural building blocks.
COut 2	Learner is able to elaborate changing dimensions with respect to current trends & using aggregate tables.
COut 3	Learner is able to handle the processes of data preprocessing, data transformation and data reduction.
COut 4	Learner has knowledge of using various Data Mining techniques for classification and clustering.
COut 5	Learner is able to align the Data Mining techniques for analyzing the datasets using Python.

Modules at a Glance

Data Warehousing		
Sr. No.	Modules	No. of Lectures
1	Introduction to Data Warehousing	15
2	Architecture of Warehouse and Role of Metadata	15
3	Dimensional Modeling and ETL	15
Total		45

Sr. No.	Modules
1	Introduction to Data Warehousing
	The Compelling Need For Data Warehousing: Escalating Need For Strategic Information, Failures of Past Decision-Support Systems, Operational Versus Decision-Support Systems, Data Warehousing—The Only Viable Solution, Data Warehouse Defined, The Data Warehousing Movement, Evolution of Business Intelligence Data Warehouse The Building Blocks: Defining Features, Data Warehouses And Data Marts, Architectural Types, Overview of The Components, Metadata in The Data Warehouse
2	Architecture of Warehouse And Role of Metadata
	Trends in Data Warehousing: Continued Growth in Data Warehousing, Significant Trends, Emergence of Standards, Web-Enabled Data Warehouse Architectural Components: Understanding Data Warehouse Architecture, Distinguishing Characteristics, Architectural Framework, Technical Architecture, Architectural Types The Significant Role of Metadata: Why Metadata Is Important, Metadata Types By Functional Areas, Business Metadata, Technical Metadata, How To Provide Metadata
3	Dimensional Modeling And ETL
	Principles of Dimensional Modeling: From Requirements To Data Design, The Star Schema, Star Schema Keys, Advantages of The Star Schema, Star Schema: Examples Dimensional Modeling: Advanced Topics: Updates To The Dimension Tables, Miscellaneous Dimensions, The Snowflake Schema, Aggregate Fact Tables, Families of Stars Data Extraction, Transformation, And Loading: ETL Overview, ETL Requirements And Steps, Data Extraction, Data Transformation, Data Loading, ETL Summary, Other Integration Approaches

Practical Work (40 Marks)

List of Practical's to be Conducted	
1	Data warehouse design
	a. Design dimension tables. b. Design fact tables. c. Create an indexed view and rebuild column store indexes.
2	Data Warehouse with Azure
	a. Create an Azure SQL Data Warehouse Project. b. Develop tables in Azure SQL Data Warehouse. c. Migrate Data Warehouse to Azure. d. Pause and remove Azure data warehouse.
3	Data Warehouse implementation and use
	a. Cleanse data with SQL Server Data Quality Services. b. Create a custom knowledge base. c. Install Master Data Services and IIS. d. Configure MDS and deploy sample MDS models. e. Install MDS excel add-in and Update master data in excel. f. Consume the data from the warehouse.
4	Working with Data and Data Preprocessing-I
	a. Demonstrate the use of ARFF files taking input and display the output of the files. b. Create your own excel file. Convert the excel file to .csv format and prepare it as ARFF files. c. Preprocess and classify Customer dataset.
5	Working with Data and Data Preprocessing-II
	a. Perform Preprocessing, Classification techniques on Agriculture dataset. (http://archive.ics.uci.edu/ml/) b.. Preprocess and classify Weather dataset. http://archive.ics.uci.edu/ml/ c. Perform data Cleansing of customer dataset. http://archive.ics.uci.edu/ml/ www.kdnuggets.com/datasets/

Question Paper Pattern (Academic Year: 2024-2025)
Data Warehousing
Semester End Examination and Practical Examination – 100 Marks
SEMESTER III
A] Semester End Examination (SEE)- 60 Marks

Maximum Marks 60

Duration: 2 Hours

- Note: 1. All questions are compulsory.
 2. All questions carry equal marks.

Question No.	Particulars (Nature of Questions)	Marks (Given)	Marks (To be Attempted)
Q1.	Answer the following questions (Any 4) A. Theory/Concept Based question B. Theory/Concept Based question C. Theory/Concept Based question D. Theory/Concept Based question E. Theory/Concept Based question	5 5 5 5 5	20
Q2.	Answer the following questions (Any 4) A. Theory/Concept Based question B. Theory/Concept Based question C. Theory/Concept Based question D. Theory/Concept Based question E. Theory/Concept Based question	5 5 5 5 5	20
Q3.	Answer the following questions (Any 4) A. Theory/Concept Based question B. Theory/Concept Based question C. Theory/Concept Based question D. Theory/Concept Based question E. Theory/Concept Based question	5 5 5 5 5	20
	Total	75	60

B] Practical Examination - 40 Marks**A Certified copy journal is essential to appear for the practical examination.**

1.	Practical Work	20
2.	Journal	10
3.	Viva Voce	10

Books and References:					
Sr. No.	Title	Author/s	Publisher	Edition	Year
1	Data Warehousing Fundamentals For It Professionals	Paulraj Ponniah	Wiley	Second	2010
2	Data Mining And Data Warehousing : Principles And Practical Techniques	Parteek Bhatia	Cambridge University Press	First	2019
3	The Data Warehouse Toolkit	Ralph Kimball Margy Ross	Wiley	Third	2013
4	Encyclopedia Of Data Warehousing And Mining	John Wang	Information Science Reference	Second	2008
5	Data Mining And Data Warehousing	S.K.Mourya , Shalu Gupta	Alpha Science International Ltd	First	2013

**Syllabus of courses of SY BSc(Data Science & Analytics) Programme
(With effect from the Academic Year 2024-2025)**

2. Minor

2.A.a Economics (3 Credits)

Semester III

2. Minor	
2.A.a Economics	
Course Objectives and Course Outcomes	
Course Objectives	
CObj 1	To understand the basic concepts and microeconomics
CObj 2	To understand the demand function with the help of numerical illustration on trend analysis and simple linear regression
CObj 3	To understand the concept of supply, production function and cost of production and different market structures
CObj 4	To acquaint the learners related to pricing practices in today's business world
Course Outcomes	
COout 1	Learners can relate to concepts such as opportunity cost principle, basic economic relations- functional relations, concept of demand
COout 2	Learner can determine the determinants & nature of demand under different markets is well understood
COout 3	Learners is acquainted with Short run production function, long run production function, optimization, increasing & decreasing returns & returns to the scale is well understood
COout 4	The learners can distinguish between different costs concepts such as accounting cause and economic costs, implicit and explicit cost, fixed and variable costs, average and marginal costs
COout 5	The learners have a fair view on different market structures such as monopolistic competition and oligopolistic markets and understand the concepts of cost-oriented pricing method
COout 6	The learners understand the concepts of cost-oriented pricing method
COout 7	The learner is able to comprehend and work on numerical illustration on concepts

	such as trend analysis and simple linear regression
COut 8	Learner is able to acquire substantive knowledge on Cost of Production
COut 9	Learners are able to calculate the elasticity of demand and supply
COut 10	Learners are able to evaluate the various microeconomic theories

Modules at a Glance

Economics		
Sr. No.	Modules	No. of Lectures
1	Introduction & Demand Analysis	15
2	Supply and Production Decisions and Cost of Production	15
3	Market Structure	15
Total		45

Sr. No.	Modules
1	Introduction & Demand Analysis
	<p>Scope and Importance of Business Economics: Basic tools, Opportunity Cost principle, Incremental and Marginal Concepts. Basic economic relations, Functional relations, Equations, Total & Average and Marginal relations, Use of Marginal analysis in decision making, The basics of market demand, market supply and equilibrium price, shifts in the demand and supply curves and equilibrium</p> <p>Demand Function: Meaning, significance, types and measurement of elasticity of demand (Price, Income cross and promotional, Numerical Measurement)</p> <p>Demand estimation and forecasting: Meaning and significance, Methods of demand estimation, Survey and statistical methods, Numerical Illustrations</p>
2	Supply & Production Decisions and Cost of Production
	<p>Production function: Short run analysis with Law of Variable Proportions, Production function with two variable inputs.</p> <p>Cost concepts: Accounting cost and economic cost, Implicit and explicit cost, fixed and variable cost, Total, average and marginal cost, Cost Output Relationship in the Short Run and Long Run (Hypothetical numerical problems to be discussed), Break even analysis with business applications (using Statistical Methods)</p>
3	Market Structure
	<p>Short run and long run equilibrium of a competitive firm and of industry,</p> <p>Monopoly: Short run and long run equilibrium of a firm under Monopoly, Monopolistic competition, Features of monopolistic competition, Role of advertising (topics to be taught using case studies from real life examples)</p> <p>Oligopolistic markets: Key attributes of oligopoly, Collusive and non-collusive oligopoly market, Price rigidity (only concepts to be explained)</p>

Question Paper Pattern (Academic Year 2024-2025)

Economics

Semester End Examination and Practical Examination – 100 Marks

SEMESTER III

A] Semester End Examination (SEE)- 60 Marks

Maximum Marks 60

Duration: 2 Hours

- Note: 1. All questions are compulsory.
2. All questions carry equal marks.

Question No.	Particulars (Nature of Questions)	Marks (Given)	Marks (To be Attempted)
Q1.	Answer the following questions (Any 4) A. Theory/Concept Based question B. Theory/Concept Based question C. Theory/Concept Based question D. Theory/Concept Based question E. Theory/Concept Based question	5 5 5 5 5	20
Q2.	Answer the following questions (Any 4) A. Theory/Concept Based question B. Theory/Concept Based question C. Theory/Concept Based question D. Theory/Concept Based question E. Theory/Concept Based question	5 5 5 5 5	20
Q3.	Answer the following questions (Any 4) A. Theory/Concept Based question B. Theory/Concept Based question C. Theory/Concept Based question D. Theory/Concept Based question E. Theory/Concept Based question	5 5 5 5 5	20
	Total	75	60

B] Practical Examination - 40 Marks
Students has to submitted Case studies

Books and References:					
Sr. No.	Title	Author/s	Publisher	Edition	Year
1	Managerial Economics Analysis, Problem and Cases	Mehta, P.L	S. Chand & Sons, N. Delhi	-	2000
2	Managerial Economics	Hirchey M.	Thomson South western	-	2003
3	Managerial Economics in a global economy	Salvatore D.	Thomson South Western Singapore	-	2001
4	Principles of Economics	Frank Robert.H, Bernanke. Ben S.	Tata McGraw Hill	Third	2012
5	Principles of Economics	Gregory Mankiw	Thomson South western	-	2002
6	Economics	Samuelson & Nordhas	Tata McGraw Hills, New Delhi	-	2002
7	Managerial Economics cases and concepts	Pal Sumitra	Macmillan, New Delhi	-	2004

**Syllabus of courses of SY BSc(Data Science & Analytics) Programme
(With effect from the Academic Year 2024-2025)**

3. General Elective / Open Elective

**3.A.a Data Visualization using Power BI (3 Credits)
Semester III**

3. General Elective / Open Elective	
3.A.a Data Visualization using Power BI	
Course Objectives and Course Outcomes	
Course Objectives	
CObj 1	To Learn how to integrate Excel and Power BI
CObj 2	To learn different usage of Power Bi Reporting
CObj 3	To learn how to manage relationships between data
CObj 4	To learn about filters and dashboards in Power BI
Course Outcomes	
COut 1	Learner should acquire knowledge of using Power Bi with Excel
COut 2	Learners should be able to aggregate data in one location saving time and effort.
COut 3	Learners should be able to use different filters Power BI
COut 4	Learners should be able to create visualizations to display the analytics you need to answer crucial business questions.
COut 5	Learners should be able to create a dashboard for KPI growth tracking.

Modules at a Glance

Data Visualization using Power BI		
Sr. No.	Modules	No. of Lectures
1	Introduction to Power BI	15
2	Data Modeling	15
3	Filters and Dashboards	15
Total		45

Sr. No.	Modules
1	Introduction to Power BI
	BI Reporting, parts of Power BI, architecture of Power BI, Power BI Components, Licensing in Power BI, overview on creation of report Transformation of imported data, use of query editor for shaping data, combine data from multiple sources, Apply filter on data in query editor / Parameter based filtering, Power BI query editor functionalities
2	Data Modeling
	How to manage your data relationships, Data modeling, Cardinality options/ Types of relationships, Calculated measures, Difference between calculated column and measures, Evaluation of measures, Creation of calculated table, Creation of master calendar table, Explore time-based data, Exploring Drill down functionality of data Creation of Custom hierarchy apart from date hierarchy
3	Filters and Dashboards
	Types of Filters, applying Filter to a Visual, applying Filter to a Page Applying Filter to a Report, How to manage action of visuals onto another visual/ Edit interactions, managing RLS(Row level security) in Power BI, Manage Roles, page navigation in Power BI Make use of bookmarks, Clearing drill through, Clearing slicer, KPI Identification, Dashboard Design Principles, Clarity and Hierarchy

Practical Work (20 Marks)

List of Practicals to be Conducted	
1	Data Acquisition and Cleaning
	a. Excel PivotTables & Power Query b. Data Cleansing in Power Query c. Merge & Filter in Power Query
2	Data Modeling
	a. Relationship Diagram tool b. Calculated Columns & Measures c. Dates in Power BI
3	Visual Storytelling with Power BI
	a. Dashboard Design b. Slicers and report filters in Power BI c. Choosing Maps and Chart acc to data
4	Navigation and Collaboration:
	a. Bookmarks & Drill Down b. Excel Linkages c. Power BI Service Sharing
5	KPI Dashboard
	a. Identify and Define KPIs b. Create a Dashboard using appropriate Visualizations c. Use conditional Formatting

Question Paper Pattern (Academic Year: 2024-2025)
Data Visualization using Power BI
Semester End Examination and Practical Examination – 100 Marks
SEMESTER III

A] Semester End Examination (SEE)- 60 Marks

Maximum Marks: 60

Duration: 2 Hours

Note: 1. All questions are compulsory.
 2. All questions carry equal marks.

Question No.	Particulars (Nature of Questions)	Marks (Given)	Marks (To be Attempted)
Q1.	Answer the following questions (Any 4) A. Theory/Concept Based question B. Theory/Concept Based question C. Theory/Concept Based question D. Theory/Concept Based question E. Theory/Concept Based question	5 5 5 5 5	20
Q2.	Answer the following questions (Any 4) A. Theory/Concept Based question B. Theory/Concept Based question C. Theory/Concept Based question D. Theory/Concept Based question E. Theory/Concept Based question	5 5 5 5 5	20
Q3.	Answer the following questions (Any 4) A. Theory/Concept Based question B. Theory/Concept Based question C. Theory/Concept Based question D. Theory/Concept Based question E. Theory/Concept Based question	5 5 5 5 5	20
	Total	75	60

B] Practical Examination - 40 Marks**A Certified copy journal is essential to appear for the practical examination.**

1.	Practical Work	20
2.	Journal	10
3.	Viva Voce	10

Books and References:					
Sr. No.	Title	Author/s	Publisher	Edition	Year
1	Power BI Data Analysis and Visualization	Suraj Gaurav, Suren Machiraj	De G Press	_	2018
2	Analyzing Data with Power BI and Power Pivot for Excel	Alberto Ferrari	Microsoft Press	First	2017
3	Basics of Power BI Modeling	Reza Rad	Radacad Systems Ltd.	_	2020
4	Power BI Data Analysis and Visualization	Suraj Gaurav, Suren Machiraj	De G Press	_	2018

**Syllabus of courses of SY BSc(Data Science & Analytics) Programme
(With effect from the Academic Year 2024-2025)**

3. General Elective / Open Elective

3.A.a Digitalization of Money Markets (3 Credits)

Semester III

3. General Elective / Open Elective	
3.A.a Digitalization of Money Markets	
Course Objectives and Course Outcomes	
Course Objectives	
CObj 1	To enable learners to gain insights into the evolution of financial systems and the impact of technology on money markets, and the role of digital currencies.
CObj 2	To understand practical applications and critical analysis of the digitalization trends shaping financial landscapes.
CObj 3	To enable learners, understand the concepts and the role of digital currencies.
Course Outcomes	
COut 1	The learner understands the basics of digitalization in finance.
COut 2	The learner understands the relationship between Fintech and its Impact.
COut 3	Learner develops skills to evaluate digital currencies and Blockchain Technology.
COut 4	There is awareness of the Regulatory framework and its challenges.
COut 5	The learner learns about Big Data and Analytics in Money markets.
COut 6	The learner is familiar with the digital concepts of money markets.
COut 7	Learners will gain a better understanding of the framework of money market digitalization.
COut 8	The learner is aware of the tools and methodology involved in digitization concepts.
COut 9	Learners will gain a greater level of financial literacy.
COut 10	The learner is able to take informed investment decisions

Modules at a Glance

Digitalization of Money Markets		
Sr. No.	Modules	No. of Lectures
1	Foundations of Digital Money Markets	15
2	Digital Currencies and Blockchain Technology	15
3	Applications and Future Trends	15
Total		45

Sr. No.	Modules
1	Foundations of Digital Money Markets
	Introduction to Money Markets Basics of Digitalization in Finance Historical Perspective on Money Markets Fintech and its Impact
2	Digital Currencies and Blockchain Technology
	Cryptocurrencies: Bitcoin, Ethereum, and beyond Blockchain Technology and Distributed Ledger Central Bank Digital Currencies (CBDCs) Regulatory Frameworks and Challenges
3	Applications and Future Trends
	Digital Payment Systems Smart Contracts and Decentralized Finance (DeFi) Big Data and Analytics in Money Markets Future Trends in Digital Money Markets

Question Paper Pattern (Academic Year: 2024-2025)
Digitalization of Money Markets
Internal Examination and Semester End Examination – 100 Marks
SEMESTER III
A] Internal Examination - 40 Marks

Method of Evaluation	Marks
Practical Work	20
Assignment	20
Total	40

B] Semester End Examination (SEE)- 60 Marks

Maximum Marks: 60

Duration: 2 Hours

- Note: 1. All questions are compulsory.
2. All questions carry equal marks.

Question No.	Particulars (Nature of Questions)	Marks (Given)	Marks (To be Attempted)
Q1.	Answer the following questions (Any 4) A. Theory/Concept Based question B. Theory/Concept Based question C. Theory/Concept Based question D. Theory/Concept Based question E. Theory/Concept Based question	5 5 5 5 5	20
Q2.	Answer the following questions (Any 4) A. Theory/Concept Based question B. Theory/Concept Based question C. Theory/Concept Based question D. Theory/Concept Based question E. Theory/Concept Based question	5 5 5 5 5	20
Q3.	Answer the following questions (Any 4) A. Theory/Concept Based question B. Theory/Concept Based question C. Theory/Concept Based question D. Theory/Concept Based question	5 5 5 5	20

	E. Theory/Concept Based question		
	Total	75	60

Books and References:					
Sr. No.	Title	Author/s	Publisher	Edition	Year
1	Digital Gold: Bitcoin and the Inside Story of the Misfits and Millionaires Trying to Reinvent Money	Nathaniel Popper	Harper	First	2015
2	The Age of Cryptocurrency: How Bitcoin and Digital Money are Challenging the Global Economic Order	Paul Vigna and Michael J. Casey	Microsoft Press	First	2017
3	Blockchain Basics: A Non-Technical Introduction in 25 Steps	Daniel Drescher	Apress	First	2017
4	The Basics of Bitcoins and Blockchains	Antony Lewis	Mango Media		2018

**Syllabus of courses of SY BSc(Data Science & Analytics) Programme
(With effect from the Academic Year 2024-2025)**

**3. General Elective / Open Elective
3.A.a Blockchain Technology (3 Credits)
Semester III**

3. General Elective / Open Elective	
3.A.a Blockchain Technology	
Course Objectives and Course Outcomes	
Course Objectives	
CObj 1	To understand core concepts and technologies underlying blockchain technology.
CObj 2	To gain in-depth knowledge of cryptocurrencies, their fundamentals, and the surrounding ecosystem.
CObj 3	To explore the diverse applications of blockchain technology across various sectors.
Course Outcomes	
COut 1	Acquire knowledge of Fundamentals of Blockchain and its different components
COut 2	Understand the role of cryptocurrencies and working of wallets
COut 3	Understand Role and how to implement Blockchain in various sectors

Modules at a Glance

Blockchain Technology		
Sr. No.	Modules	No. of Lectures
1	Blockchain fundamentals	15
2	Cryptocurrency	15
3	Blockchain Applications	15
Total		45

Sr. No.	Modules
1	Blockchain Fundamentals
	<p>Distributed Ledger Technology (DLT): Concept of DLT, its advantages over centralized databases, use of DLT in blockchain</p> <p>Demystifying Blockchain: Define Blockchain, its core components (blocks, hash functions, consensus mechanisms), and the chain structure.</p> <p>Security and Transparency: Encryption and immutability inherent in blockchain, Data security and transparent record-keeping.</p> <p>Consensus Mechanisms: Compare popular consensus mechanisms like PoW, PoS, and their impact on performance and energy consumption.</p> <p>DApps: Decentralized Applications, Ethereum dApps, Advantages and Disadvantages.</p>
2	Cryptocurrency
	<p>Introduction: History of Cryptocurrency, Types of Cryptocurrencies based on their purpose, consensus mechanisms, and unique features</p> <p>Understanding Cryptography and Mining: Cryptographic basis, Public Key, Private Key, Digital signatures, Mining process for securing transactions</p> <p>Wallets and Cryptocurrency Exchanges: Different types of cryptocurrency wallets (hot, cold, hardware) and explore centralized and decentralized exchanges for buying, selling, and trading digital assets</p> <p>Smart Contracts and DeFi Applications: Smart contracts for decentralized finance (DeFi), Applications like lending, borrowing, and trading on blockchain platforms.</p>
3	Blockchain Applications
	<p>Financial Applications: Role of blockchain in revolutionizing areas like cryptocurrencies, digital payments, and secure financial transactions.</p>

	<p>Supply Chain Management: Blockchain to track and verify the provenance of goods, enhance transparency, and combat counterfeiting in supply chains.</p>
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	<p>Healthcare and Identity Management: Blockchain to secure patient data, facilitate medical record sharing, and enable secure digital identities.</p>
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Question Paper Pattern (Academic Year: 2024-2025)
Blockchain Technology
Semester End Examination and Practical Examination – 100 Marks
SEMESTER III
A] Internal Examination - 40 Marks

Method of Evaluation	Marks
Assignment/ Project/ Case study / PowerPoint presentation	20
Report on guest lecture/ activity	20
Total	40

B] Semester End Examination (SEE)- 60 Marks

Maximum Marks: 60

Duration: 2 Hours

- Note: 1. All questions are compulsory.
2. All questions carry equal marks.

Question No.	Particulars (Nature of Questions)	Marks (Given)	Marks (To be Attempted)
Q1.	Answer the following questions (Any 4) A. Theory/Concept Based question B. Theory/Concept Based question C. Theory/Concept Based question D. Theory/Concept Based question E. Theory/Concept Based question	5 5 5 5 5	20
Q2.	Answer the following questions (Any 4) A. Theory/Concept Based question B. Theory/Concept Based question C. Theory/Concept Based question D. Theory/Concept Based question E. Theory/Concept Based question	5 5 5 5 5	20
Q3.	Answer the following questions (Any 4) A. Theory/Concept Based question B. Theory/Concept Based question C. Theory/Concept Based question D. Theory/Concept Based question	5 5 5 5	20

	E. Theory/Concept Based question		
	Total	75	60

Books and References:					
Sr. No.	Title	Author/s	Publisher	Edition	Year
1	Essentials of Blockchain Technology	Elisa Bertino, Hai Jiang, Kuan-Ching Li, Xiaofeng Chen,	CRC Press	First	2019
2	Blockchain Technology Fundamentals, Applications, and Case Studies	E. Golden Julie, J. Jesu Vedha Nayahi, Noor Zaman Jhanjhi	CRC Press	First	2020
3	Cryptocurrencies and Blockchains	Quinn DuPont	Polity Press	First	2019
4	Applications of Blockchain Technology An Industry Focus	Anita Ravani, Sashi Edupuganti, Jeannette Pugh, Sooraj Sushama	CRC Press	First	2024

**Syllabus of courses of SY BSc(Data Science & Analytics) Programme
(With effect from the Academic Year 2024-2025)**

4. Vocational & Skill Enhancement Courses (VSEC)

4.A Skill Enhancement Courses

4.A.a Exploratory Data Analysis (3 Credits)

Semester III

4. Vocational & Skill Enhancement Courses (VSEC)	
4.A Skill Enhancement Courses	
4.A.a Exploratory Data Analysis	
Course Objectives and Course Outcomes	
Course Objectives	
CObj 1	To understand the importance of data and its types in Exploratory Data Analysis.
CObj 2	To understand difference between EDA and summary statistics in context of interpretation.
CObj 3	To understand the importance of data pre-processing for Exploratory Data Analysis.
CObj 4	To understand the importance of central tendency in describing the quick view of a data set.
Course Outcomes	
COut 1	Understand the importance of data and its types in Exploratory Data Analysis.
COut 2	Classify EDA and summary statistics in context of interpretation.
COut 3	Understand the significance of missing value imputations in better EDA interpretations.
COut 4	Analyze the measure of central tendency in describing the quick view of a data set.
COut 5	Categorize measure of dispersion and its interpretation in spreadness of data.

Modules at a Glance

Exploratory Data Analysis		
Sr. No.	Modules	No. of Lectures
1	Introduction to Exploratory Data Analysis	15
2	Data Preparation	15
3	Data Analysis	15
Total		45

Sr. No.	Modules
1	Introduction To Exploratory Data Analysis
	Definition of EDA, Difference Between EDA With Classical And Bayesian Analysis, Comparison of EDA With Classical Data Summary Measures, Goals of EDA, Underlying Assumptions in EDA, Importance of EDA in Data Exploration Techniques, Introduction To Different Techniques To Test The Assumptions Involved in EDA, Role of Graphics in Data Exploration, Introduction To Unidimensional, Bidimensional And Multidimensional Graphical Representation of Data.
2	Data Preparation
	Introduction To Data Exploration: Process For Data Preparation, Data Discovery, Issues Related With Data Access, Characterization of Data, Consistency And Pollution of Data, Duplicate Or Redundant Variables, Outliers And Leverage Data, Noisy Data, Missing Values, Imputation of Missing And Empty Places, With Different Techniques, Missing Pattern And Its Importance, Handling Non Numerical Data in Missing Places.
3	Data Analysis
	<p>Univariate Data Analysis: Description And Summary of Data Set, Measure of Central Tendency – Mean: Arithmetic, Geometric And Harmonic Mean – Raw And Grouped Data, Confidence Limit of Mean, Median, Mode, Quartile And Percentile, Interpretation of Quartile And Percentile Values</p> <p>Bivariate Data Analysis: Introduction To Bivariate Distributions, Association Between Two Nominal Variables, Contingency Tables, Chi-Square Calculations, Phi Coefficient, Scatter Plot And Its Causal Interpretations, Correlation Coefficient, Regression Coefficient</p>

Question Paper Pattern (Academic Year 2024-2025)
Exploratory Data Analysis
Internal Examination and Semester End Examination – 100 Marks
SEMESTER III
A] Internal Examination - 40 Marks

Method of Evaluation	Marks
Case Studies Based on real world problem	20
PowerPoint Presentation / Assignment	20
Total	40

B] Semester End Examination (SEE)- 60 Marks

Maximum Marks: 60

Duration: 2 Hours

Note: 1. All questions are compulsory.

2. All questions carry equal marks.

Question No.	Particulars (Nature of Questions)	Marks (Given)	Marks (To be Attempted)
Q1.	Answer the following questions (Any 4) F. Theory/Concept Based question G. Theory/Concept Based question H. Theory/Concept Based question I. Theory/Concept Based question J. Theory/Concept Based question	5 5 5 5 5	20
Q2.	Answer the following questions (Any 4) F. Theory/Concept Based question G. Theory/Concept Based question H. Theory/Concept Based question I. Theory/Concept Based question J. Theory/Concept Based question	5 5 5 5 5	20
Q3.	Answer the following questions (Any 4) F. Theory/Concept Based question G. Theory/Concept Based question H. Theory/Concept Based question I. Theory/Concept Based question	5 5 5 5	20

	J. Theory/Concept Based question		
	Total	75	60

Books and References:

Sr. No.	Title	Author/s	Publisher	Edition	Year
1	Exploratory Data Analysis	John W Tukey	AddisonWesley	-	1977
2	Exploratory Data in Business and Economics	Thomas Cleff	Springer	First	2014
3	Graphical Exploratory Data Analysis	S.H.C. du Toit A.G.W. Steyn R.H. Stumpf	Springer	First	1986
4	Hand book of Data Visualization	Chun-houh Chen, Wolfgang Härdle	Springer	First	2008

**Syllabus of courses of SY BSc(Data Science & Analytics) Programme
(With effect from the Academic Year 2024-2025)**

5. Ability Enhancement Course, Value Enhancement Course, Indian Knowledge System

5.A Ability Enhancement Courses

5.A.a. Linguistic Studies - I (2 credits)

Sanskrit-I

Semester III

5. Ability Enhancement Course, Value Enhancement Course, Indian Knowledge System	
5.A Ability Enhancement Courses	
5.A.Linguistic Studies- I Sanskrit-I	
Course Objectives and Course Outcomes	
Course Objectives	
CObj 1	To create curiosity in the minds of learners about the chosen language
CObj 2	To help the learners understand the need to learn the chosen language
CObj 3	To introduce learners to the structure of the chosen language
CObj 4	To understand the richness of Indian selected languages with reference to consonants and vowels
CObj 5	To understand unique characteristics of the chosen language
CObj 6	To understand the use of gender and tenses
CObj 7	To understand the use of idioms and phrases
CObj 8	To know the various dialects of the chosen language
CObj 0	To understand the application of technology for communication by alternatively abled
CObj 10	To understand the need of learning functional language To understand the need of learning functional language

CObj 11	To get familiarized with the literature of the chosen language
CObj 12	To get familiarized with the literature translated to the chosen language from other languages
CObj 13	To learn to appreciate the other literary forms of the chosen language
Course Outcomes	
COut 1	The learner will be curious to learn the chosen language
COut 2	The learner will be able to understand the need to learn the chosen language
COut 3	The learner will get familiar with the structure of the chosen language
COut 4	To understand the richness of Indian selected languages with reference to constants and vowels
COut 5	To understand unique characteristics of the chosen language
COut 6	To understand the use of gender and tenses
COut 7	To understand the use of idioms and phrases
COut 8	To know the various dialects of the chosen language
COut 9	To understand the application of technology for communication by alternatively abled
COut 10	To understand the need of learning functional language
COut 11	To get familiarized with the literature of the chosen language
COut 12	To get familiarized with the literature translated to the chosen language from other languages
COut 13	To learn to appreciate the other literary forms of the chosen language

Modules at Glance

Linguistic Studies I Sanskrit-I		
Module. No.	Modules	No. of Lectures
1.	Introduction to Linguistic Studies	10
2.	Languages in Communication	10
3.	Select Studies in the chosen Language (Sanskrit/Marathi/Hindi)	10
	Total	30

Modules at Details

Sr. No.	Modules	No. of Lectures
1.	Introduction to Linguistic Studies	10
	<p>Structure of languages English language compared with the select Indian languages – viz, Marathi, Hindi and Sanskrit Richness of Indian languages with reference to Vowels, consonants (maatras) Rhythmic characteristic of Indian languages. Unique characteristics of language (such as Repeat words like Sarsarahat) Logic behind numbers in regional languages Use of Tenses and Gender</p>	
2.	Languages in Communication	10
	<p>Use of Idioms and Phrases Oral and Written Dialects Communication for alternatively abled Use of Sign language Language learning – Use of Technology Need for learning functional language</p>	
3.	Select Studies in the chosen Language (Sanskrit/Marathi/Hindi)	10
	<p>The faculty member shall discuss with the learners about the richness of literature of chosen language. Subsequently the entire class will choose two authors and two poets. The chosen literary work needs to be read and discussed in the class. Based on this module, internal evaluation shall be done.</p>	
	Total	30

Total marks: 50
Evaluation Pattern- 60:40
Internal Evaluation: 20 Marks
The faculty will decide the means of taking internal evaluation. It can be oral quiz, dialogue exchange, role play, reading comprehension, listening comprehension etc.

External evaluation:

Marks: 30

Duration: 1 hours

Note: (1) All questions are compulsory

(2) The learners can write answers in the chosen language or in English/Marathi/Hind

Question No.	Particulars (Nature of question)	Marks
Questions with sub questions	Flexibility is given to the faculty to decide the paper pattern and depending on learner's ability will design the question paper. It can contain questions like identifying or changing gender, identifying or changing tenses, making rhythmic words, answer in one sentence etc.	30
	Total	30

Syllabus of courses of SY BSc(Data Science & Analytics) Programme

(With effect from the Academic Year 2024-2025)

5. Ability Enhancement Course, Value Enhancement Course, Indian Knowledge System

5.A Ability Enhancement Courses

5.A.a. Linguistic Studies - I (2 credits)

Marathi-I

Semester III

5. Ability Enhancement Course, Value Enhancement Course, Indian Knowledge System	
5.A Ability Enhancement Courses	
5.A.Linguistic Studies- I Marathi-I	
Course Objectives and Course Outcomes	
Course Objectives	
CObj 1	To create curiosity in the minds of learners about the chosen language
CObj 2	To help the learners understand the need to learn the chosen language
CObj 3	To introduce learners to the structure of the chosen language
CObj 4	To understand the richness of Indian selected languages with reference to consonants and vowels
CObj 5	To understand unique characteristics of the chosen language
CObj 6	To understand the use of gender and tenses
CObj 7	To understand the use of idioms and phrases
CObj 8	To know the various dialects of the chosen language
CObj 9	To understand the application of technology for communication by alternatively abled
CObj 10	To understand the need of learning functional language To understand the need of learning functional language

CObj 11	To get familiarized with the literature of the chosen language
CObj 12	To get familiarized with the literature translated to the chosen language from other languages
CObj 13	To learn to appreciate the other literary forms of the chosen language
Course Outcomes	
COut 1	The learner will be curious to learn the chosen language
COut 2	The learner will be able to understand the need to learn the chosen language
COut 3	The learner will get familiar with the structure of the chosen language
COut 4	To understand the richness of Indian selected languages with reference to constants and vowels
COut 5	To understand unique characteristics of the chosen language
COut 6	To understand the use of gender and tenses
COut 7	To understand the use of idioms and phrases
COut 8	To know the various dialects of the chosen language
COut 9	To understand the application of technology for communication by alternatively abled
COut 10	To understand the need of learning functional language
COut 11	To get familiarized with the literature of the chosen language
COut 12	To get familiarized with the literature translated to the chosen language from other languages
COut 13	To learn to appreciate the other literary forms of the chosen language

Modules at Glance

Linguistic Studies I Marathi-I		
Module. No.	Modules	No. of Lectures
1.	Introduction to Linguistic Studies	10
2.	Languages in Communication	10
3.	Select Studies in the chosen Language (Sanskrit/Marathi/Hindi)	10
	Total	30

Modules at Details

Sr. No.	Modules	No. of Lectures
1.	Introduction to Linguistic Studies	10
	<p>Structure of languages English language compared with the select Indian languages – viz, Marathi, Hindi and Sanskrit Richness of Indian languages with reference to Vowels, consonants (maatras) Rhythmic characteristic of Indian languages. Unique characteristics of language (such as Repeat words like Sarsarahat) Logic behind numbers in regional languages Use of Tenses and Gender</p>	
2.	Languages in Communication	10
	<p>Use of Idioms and Phrases Oral and Written Dialects Communication for alternatively abled Use of Sign language Language learning – Use of Technology Need for learning functional language</p>	
3.	Select Studies in the chosen Language (Sanskrit/Marathi/Hindi)	10
	<p>The faculty member shall discuss with the learners about the richness of literature of chosen language. Subsequently the entire class will choose two authors and two poets. The chosen literary work needs to be read and discussed in the class. Based on this module, internal evaluation shall be done.</p>	
	Total	30

Total marks: 50
Evaluation Pattern- 60:40
Internal Evaluation: 20 Marks
The faculty will decide the means of taking internal evaluation. It can be oral quiz, dialogue exchange, role play, reading comprehension, listening comprehension etc.

External evaluation:

Marks: 30

Duration: 1 hours

Note: (1) All questions are compulsory

(2) The learners can write answers in the chosen language or in English/Marathi/Hind

Question No.	Particulars (Nature of question)	Marks
Questions with sub questions	Flexibility is given to the faculty to decide the paper pattern and depending on learner's ability will design the question paper. It can contain questions like identifying or changing gender, identifying or changing tenses, making rhythmic words, answer in one sentence etc.	30
	Total	30

**Syllabus of courses of SY BSc(Data Science & Analytics) Programme
(With effect from the Academic Year 2024-2025)**

5. Ability Enhancement Course, Value Enhancement Course, Indian Knowledge System

5.A Ability Enhancement Courses

5.A.a. Linguistic Studies - I (2 credits)

Hindi-I

Semester III

5. Ability Enhancement Course, Value Enhancement Course, Indian Knowledge System	
5.A Ability Enhancement Courses	
5.A.Linguistic Studies- I Hindi-I	
Course Objectives and Course Outcomes	
Course Objectives	
CObj 1	To create curiosity in the minds of learners about the chosen language
CObj 2	To help the learners understand the need to learn the chosen language
CObj 3	To introduce learners to the structure of the chosen language
CObj 4	To understand the richness of Indian selected languages with reference to consonants and vowels
CObj 5	To understand unique characteristics of the chosen language
CObj 6	To understand the use of gender and tenses
CObj 7	To understand the use of idioms and phrases
CObj 8	To know the various dialects of the chosen language
CObj 0	To understand the application of technology for communication by alternatively abled
CObj 10	To understand the need of learning functional language To understand the need of learning functional language
CObj 11	To get familiarized with the literature of the chosen language
CObj 12	To get familiarized with the literature translated to the chosen language from other languages

CObj 13	To learn to appreciate the other literary forms of the chosen language
Course Outcomes	
COut 1	The learner will be curious to learn the chosen language
COut 2	The learner will be able to understand the need to learn the chosen language
COut 3	The learner will get familiar with the structure of the chosen language
COut 4	To understand the richness of Indian selected languages with reference to constants and vowels
COut 5	To understand unique characteristics of the chosen language
COut 6	To understand the use of gender and tenses
COut 7	To understand the use of idioms and phrases
COut 8	To know the various dialects of the chosen language
COut 9	To understand the application of technology for communication by alternatively abled
COut 10	To understand the need of learning functional language
COut 11	To get familiarized with the literature of the chosen language
COut 12	To get familiarized with the literature translated to the chosen language from other languages
COut 13	To learn to appreciate the other literary forms of the chosen language

Modules at Glance

Linguistic Studies I Hindi-I		
Module. No.	Modules	No. of Lectures
1.	Introduction to Linguistic Studies	10
2.	Languages in Communication	10
3.	Select Studies in the chosen Language (Sanskrit/Marathi/Hindi)	10
	Total	30

Modules at Details

Sr. No.	Modules	No. of Lectures
1.	Introduction to Linguistic Studies	10
	<p>Structure of languages English language compared with the select Indian languages – viz, Marathi, Hindi and Sanskrit Richness of Indian languages with reference to Vowels, consonants (maatras) Rhythmic characteristic of Indian languages. Unique characteristics of language (such as Repeat words like Sarsarahat) Logic behind numbers in regional languages Use of Tenses and Gender</p>	
2.	Languages in Communication	10
	<p>Use of Idioms and Phrases Oral and Written Dialects Communication for alternatively abled Use of Sign language Language learning – Use of Technology Need for learning functional language</p>	
3.	Select Studies in the chosen Language (Sanskrit/Marathi/Hindi)	10
	<p>The faculty member shall discuss with the learners about the richness of literature of chosen language. Subsequently the entire class will choose two authors and two poets. The chosen literary work needs to be read and discussed in the class. Based on this module, internal evaluation shall be done.</p>	
	Total	30

Total marks: 50
Evaluation Pattern- 60:40
Internal Evaluation: 20 Marks
The faculty will decide the means of taking internal evaluation. It can be oral quiz, dialogue exchange, role play, reading comprehension, listening comprehension etc.

External evaluation:

Marks: 30

Duration: 1 hours

Note: (1) All questions are compulsory

(2) The learners can write answers in the chosen language or in English/Marathi/Hind

Question No.	Particulars (Nature of question)	Marks
Questions with sub questions	Flexibility is given to the faculty to decide the paper pattern and depending on learner's ability will design the question paper. It can contain questions like identifying or changing gender, identifying or changing tenses, making rhythmic words, answer in one sentence etc.	30
	Total	30

Syllabus of courses of SY BSc Programme
(With effect from the Academic Year 2024-2025)

6. Internship / Field Project / Research Project / Community Engagement

(02 credits)

Semester III

. Internship / Field Project / Research Project / Community Engagement
Foundation of Research Skills (Internship/Field Project/Research Project/Community Engagement) (02 credits)

CRITERIA FOR EVALUATING POWER POINT PRESENTATION/CASE STUDY/ APPLICATION BASED ACTIVITY:

MARKS: 20

FY/SY/TYBSc

Semester: _____

Name of the Topic			Date of Presentation:				
Sr. No	Roll No	Name of the student	Content (5)	Team building (5)	Presentation skills		Total (20)
					Verbal (5)	Non Verbal (5)	
1							
2							
3							
4							
Sign: 1 _____ 2. _____ 3. _____ 4. _____ Faculty Sign: _____ -----							
Name of the Topic			Date of Presentation:				
						Presentation skills	

Sr. No	Roll No	Name of the student	Content (5)	Team building (5)	Verbal (5)	Non Verbal (5)	Total (20)
1							
2							
3							
4							

Sign: 1_____2._____3._____4._____ Faculty Sign:_____

-

Name of the Topic

Date of Presentation:

Sr. No	Roll No	Name of the student	Content (5)	Team building (5)	Presentation skills		Total (20)
					Verbal (5)	Non Verbal (5)	
1							
2							
3							
4							

Sign: 1_____2._____3._____4._____ Faculty Sign:_____

