

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

Bachelor of Science (Data Science and Analytics)

Syllabus
And
Question paper pattern of Course

HYPERLINK "http://www.rapodar.ac.in" www.rapodar.ac.in

Bachelor of Science (Data Science and Analytics) Programme**Syllabus as per National Education Policy 2020***Course Structure***F.Y.B.S.C (Data Science and Analytics) (Level 4.5)****(To be implemented from Academic Year- 2023-24)**

No. of Courses	Semester I	Credits	No. of Courses	Semester II	Credits
1	Major (06 credits)		1	Major (06 credits)	
1.A	Data Science & Analytics -I		1.A	Data Science & Analytics -II	
1.A.a	Introduction to Programming	03	1.A.a	Data Base Management	03
1.A.b	Descriptive Statistics	03	1.A.b	Probability and Distribution	03
2	Minor (03 credits)		2	Minor (03 credits)	
2.A.a	Precalculus	03	2.A.a	Calculus	03
3	General Elective (GE)/ OpenElective (OE) (03 Credits)		3	General Elective (GE)/ OpenElective (OE) (03 Credits)	
3.A.a	Web Technology	03	3.A.a	Data Structures and Algorithms using Python	03
4	Vocational & Skill Enhancement Courses (VSEC) (02 credits)		4	Vocational & Skill Enhancement Courses (VSEC) (04 credits)	
4.A	Skill Enhancement Course		4.A	Skill Enhancement Course	
4.A.a	Office Automation	02	4.A.a	Introduction to Data Science	02
4.B	Vocational Skill Course (VSC)		4.B	Vocational Skill Course (VSC)	
	-		4.B.b	Intellectual Property Rights	02
5	Ability Enhancement Course, Value Enhancement Course, Indian Knowledge System (08 credits)		5	Ability Enhancement Course, Value Enhancement Course, Indian Knowledge System (06 credits)	
5.A	Ability Enhancement Course(AEC)		5.A	Ability Enhancement Course (AEC)	
5.A.a	Language & Literature-I	03	5.A.a	Language & Literature -II	03
5.B	Value Enhancement Course (VEC)		5.B	Value Enhancement Course (VEC)	
5.B.a	Computer Application	03	5.B.a	Cyber Security	03
5.C	Indian Knowledge System (IKS)				
5.C.a	Indian traditional approach in conservation and sustainability	02		-	
TOTAL	CUMULATIVE CREDITS		TOTAL	CUMULATIVE CREDITS	
		22			22

Exit option at the end of the first year (on completion of semester I and semester II):

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 I and II 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 Cyber security, a Course on computer concepts, and an Internship.

**Syllabus of courses of FY BSc(Data Science & Analytics) Programme
(With effect from the Academic Year 2023-2024)**

1.Major

1.A. Data Science & Analytics -I

1.A. a Introduction to Programming (3 Credits)

Semester I

1.Major	
1. A . Data Science &Analytics -I	
1.A.a Introduction to Programming	
Course Objectives and Course Outcomes	
Course Objectives	
CObj 1	Learn Programming fundamentals using Python
CObj 2	Understand the concepts and usage data types, variables, operators and Control Statement
CObj 3	Learn about using arrays, strings, lists and Dictionaries.
CObj 4	Learn about Numpython and Pandas in Python.
Course Outcomes	
COut 1	Learner will able to apply various data types including, string, array list,tuple and dictionary.
COut 2	Learners will able to use regular expressions to perform complex operations in less code.
COut 3	Learners will able to Work with user input to create function and interactive programs.
COut 4	Learners will able to build basic programs using fundamental programming constructs like variables, conditional logic, looping, and functions.
COut 5	Learners will able to use Arrays in Data structures.
COut 6	Learners able to understand and interpret the fundamental Python syntax and semantics and be fluent in the use of Python control flow statements.
COut 7	Learners will able to apply to implement Loops ,break and continuous statement for Python Programs
COut 8	Learners will apply the use of functions and represent Compound data using Lists, Tuples and Dictionaries
COut 9	Learners will able to use Numpy concepts in Python program
COut 10	Learners will apply data manipulation with Pandas

Modules at a Glance

Introduction To Programming		
Sr.No	Modules	No. of Lectures
1	Introduction to Python Language:	15
2	Control Statements, Functions, Arrays, Strings:	15
3	Lists and Tuples, Dictionaries, Regular Expressions, NumPy, Pandas	15
Total		45

Sr. No.	Modules	No. of Lectures
1	Introduction to Python Language:	15
	Overview, Features of Python, Execution of a Python Program, Innards of Python, Frozen Binaries, Python Interpreter, Comparison of Python with C and Java, Installing Python, Writing & Executing, IDLE Data Types, Variables, and Other Basic Elements: Comments, Docstrings, Data types-Numeric, Compound, Boolean, Dictionary, Sets, Mapping, Basic Elements of Python, Input and Output Operations: Input Function, Output Statements, Command Line Arguments Operators: Arithmetic operators, Assignment operators, Unary minus operator, Relational operators, Logical operators, Bitwise operators, Membership operators, Identity operators, Precedence of Operators, Associativity of Operators	
2	Control Statements, Functions, Arrays, Strings:	15
	Control Statements, Loop Statement, break Statement, continue Statement, return Statement Functions: Defining and calling a Function, Returning Results, Returning Multiple Values, Built-in Functions, Parameters and Arguments, Recursive Functions, Anonymous or Lambda Functions Arrays: Creating Arrays, Indexing and Slicing, Basic Array Operations, Arrays Processing, Mathematical Operations on Array, Aliasing Arrays, Slicing and Indexing in NumPy Arrays, Basic Slicing. Advanced Indexing. Dimensions of Arrays, Attributes of an Array Creating Strings, Functions of Strings, Working with Strings, Length of a String, Indexing & Slicing, Repeating & Concatenation of Strings, Checking Membership, Comparing Strings, Removing Spaces, Finding Substrings, Counting Substrings, Strings are Immutable, Splitting and Joining Strings, Changing Case, Checking Starting and Ending of a String, Sorting & Searching in the Strings, Formatting the Strings, Working with Characters	

3	Lists and Tuples ,Dictionaries, Regular Expressions, NumPy, Pandas:	15
	<p>Lists, List Functions and Methods, List Operations, Tuples</p> <p>Dictionaries: Creating a Dictionary, Operators in Dictionary, Dictionary Methods, Using for Loop with Dictionaries, Operations on Dictionaries, Ordered Dictionaries</p> <p>Regular Expressions: What is a Regular Expression? Sequence Characters in Regular Expressions, Quantifiers in Regular Expressions, Special Characters in Regular Expressions, Using Regular Expression on Files, Retrieving Information from an HTML File.</p> <p>Introduction to NumPy: Understanding Data Types in Python, The Basics of NumPy Arrays, Computation on NumPy.</p> <p>Data Manipulation with Pandas: Introducing Pandas Objects, Data Indexing and Selection, Operating on Data in Pandas</p>	
Total No. of Lectures:		45

Practical Work (20 Marks)

Practical To be Conducted	
1	Introduction to Python Language
a	Write a Python program to explore various data types including numeric types, Boolean types and compound types.
b	Write a Python program to perform Input and Output Operations.
c	Write a Python program to demonstrate looping in python and use of break statement and continue statement
2	Functions
a	Write a Python program to define and use functions
b	Write a Python program to demonstrate the use of Built-in Functions.
c	Write a Python Program to implement Lambda Functions.
3	Arrays and String
a	Write a Python Program to implement arrays for storing homogeneous data items. Apply indexing and slicing operations to access elements of array.
b	Write a Python Program to demonstrate operations and properties of string data types.
c	Write a Python Program implement and demonstrate the use of Membership operators and Identity operators
	Write a Python Program to implement Numpy for handling multidimensional arrays.
4	List and Tuples
a.	Write a Python Program to create list, apply various functions to it.
b	Write a Python Program to demonstrate concept of aliasing and cloning.
c	Write a Python Program to implement tuples for storing data. Verify the immutability property on tuples.
5	Dictionaries and Sets
a.	Write a Python Program to implement Dictionary and operations on dictionaries
b	Write a Python Program to create sets and various operations on it.

Question Paper Pattern (Academic Year: 2023-2024)**Introduction to Programming****Semester End Examination and Practical Examination – 100 Marks****SEMESTER I****A] Semester End Examination (SEE)- 60 Marks**

Maximum Marks 60

Duration: 2 Hours

Note: 1. All questions are compulsory

1.All questions carry equal marks

Question No.	Particulars (Nature of Questions)	Marks (Given)	Marks (To Be Attempted)
Q-1	Answer the following questions (Any 4)		
	A. Theory/Concept-based question	5	20
	B. Theory/Concept-based question	5	
	C. Theory/Concept-based question	5	
	D. Theory/Concept-based question	5	
	E. Theory/Concept-based question	5	
Q-2	Answer the following questions (Any 4)		
	A. Theory/Concept-based question	5	20
	B. Theory/Concept-based question	5	
	C. Theory/Concept-based question	5	
	D. Theory/Concept-based question	5	
	E. Theory/Concept-based question	5	
Q-3	Answer the following questions (Any 4)		
	A. Theory/Concept-based question	5	20
	B. Theory/Concept-based question	5	
	C. Theory/Concept-based question	5	
	D. Theory/Concept-based question	5	
	E. Theory/Concept-based question	5	
	Total		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.	Programming through Python	M. T. Savaliya, R.KMaurya, G.M Magar	Staredu Solutions	1	2018
2.	Python Data Science Handbook	Jake VanderPlas	O'Reilly Media	1	2016
3.	Let Us Python	Y. Kanetkar,	BPB	1	2019
4.	Programming in Python3	Mark Summerfield	Pearson Education	2	2018
5.	Learning Python	Lutz M	O'Reilly-Shroff	5	2013
6.	Beginning Python	Magnus Lie Hetland	Apress	2	2009
7.	Star Python	Star Certification	Star Certification	1	2018

**Syllabus of courses of FY BSc(Data Science & Analytics) Programme
(With effect from the Academic Year 2023-2024)**

1.Major

1. A. Data Science & Analytics -I

1.A.b Descriptive Statistics (3 Credits)

Semester I

1.Major	
1.A Data Science & Analytics -I	
1.A.b Descriptive Statistics	
Course Objectives and Course Outcomes	
Course Objectives	
CObj 1	To use graphical techniques as well as to compute various measures of central tendency, measures of dispersion, skewness and kurtosis and to calculate range of variables and the deviation of specific data point.
CObj 2	To compute the correlation coefficient for bivariate data and calculate the simple linear regression equation for a set of data, and understand multiple linear regression
CObj 3	To make students analyze and interpret time-dependent data in order to make informed business and economic decisions.
Course Outcomes	
COut 1	Learners will be able to understand the role of statistics
COut 2	Learner will be able to analyse how to organize and summarize data using appropriate graphical and numerical techniques.
COut 3	Learners will be able to apply measures of central tendency and measure of dispersion with use of graphical and numerical techniques
COut 4	Learners will be able to understand various measures of skewness and kurtosis.
COut 5	Learners will be able to develop a clear understanding of correlation as a measure of the strength and direction of the linear relationship between two variables.
COut 6	Learners will be able to perform simple linear regression analysis, including estimating the regression equation, interpreting the coefficients, and making predictions based on the regression model.
COut 7	Learners will be able to apply statistical software or programming languages to perform regression analysis
COut 8	Learners will be able to understand concepts of Multiple regression
COut 9	Learners will be able to understand patterns, trends, and dependencies within historical data in order to make forecasts and informed decisions about future events or phenomena
COut 10	Learners will be able to understand how to build and interpret time series models, such as autoregressive integrated moving average (ARIMA) models, seasonal ARIMA (SARIMA) models, and exponential smoothing models.

Modules at a Glance

Descriptive Statistics		
Sr. No	Modules	No.of Lectures
1	Introduction to statistics	15
2	Correlation and regression	15
3	Time series analysis	15
Total		45

Sr. No.	Modules	No. of Lectures
1	Introduction to statistics	15
	Statistics, What are descriptive statistics Measures of dispersion (Mean, median mode) Measures of central tendency (variance, Std. Dev) Quartiles, Deciles, percentiles, Skewness, kurtosis Graphical representations	
2	Correlation and regression	15
	Correlation- Scatter plot, Types of correlation (spurious, Karl Pearson, Spearman rank) Regression- Simple linear regression and its properties, method of least square Introduction to multiple regression	
3	Time series analysis	15
	Introduction to time series and forecasting Method of moving average, method of least square, method of Exponential smoothing Estimation of seasonal component ARMA & ARIMA model	
Total No. of Lectures:		45

Practical Work (20 Marks)**Practical to be done using Excel**

1	Introduction to Excel:- Understating data tools, Ribbon, Tabs, Add-ins
2	Formula :- summary statistics
3	Graphical representations and interpretation
4	Find the correlation between two data sets
5	Perform regression analysis
6	Understand the difference and importance between MA and AR model
7	Data Validation
8	Lookup functions, Pivot table and chart

Question Paper Pattern (Academic Year: 2023-2024)**Descriptive Statistics****Semester End Examination and Practical Examination – 100 Marks****SEMESTER I****A] Semester End Examination (SEE)- 60 Marks**

Maximum Marks 60

Duration: 2 Hours

Note: 1.All questions are compulsory

1.All questions carry equal marks

Question No.	Particulars (Nature of Questions)	Marks (Given)	Marks (To Be Attempted)
Q-1	Attempt any four of the following. A. Numerical / Case study-based question B. Numerical / Case study-based question C. Numerical / Case study-based question D. Numerical / Case study-based question E. Numerical / Case study-based question	25	20
Q-2	Attempt any four of the following. A. Numerical / Case study-based question B. Numerical / Case study-based question C. Numerical / Case study-based question D. Numerical / Case study-based question E. Numerical / Case study-based question	25	20
Q-3	Attempt any four of the following. A. Numerical / Case study-based question B. Numerical / Case study-based question C. Numerical / Case study-based question D. Numerical / Case study-based question E. Numerical / Case study-based question	25	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	Authors	Publishers	Edition
1.	Statistical Methods, An Introductory Text,	Medhi J.	New Age International Ltd.	Second Edition
2.	Basic Statistics	Agarwal B.L.	New Age International Ltd.	
3.	Theory and Problems of Statistics,	Spiegel M.R.	Tata McGraw-Hill.	
4.	Fundamentals Of Statistics, Volume II	Goon A.M., Gupta M.K., Dasgupta B.	The World Press Private Limited, Calcutta.	
5.	Complete Business Statistics	Aczel Sounderpandian	Tata McGraw Hill	
6.	Excel Data Analysis Modeling and simulation	Hector Gurrero	Springer	Second Edition
7.	Data Analysis And Decision Making	Albright, Wilston, Zappe	Thomson	
8	Statistics for business and economics	Paul Newbold, William L. Carlson, Betty Thorne	Pearson	10 Edition

**Syllabus of courses of FY BSc (Data Science & Analytics) Programme
(With effect from the Academic Year 2023-2024)**

2. Minor

2A.a. Precalculus (3 Credits)

Semester I

2.Minor	
2A.a. Precalculus	
Course Objectives and Course Outcomes	
Course Objectives	
CObj 1	To master the number fundamentals, equations and different types of mathematical functions
CObj 2	To review and explain the Exponential and Logarithmic Functions.
CObj 3	To understand Polar Coordinates and Parametric Equation.
Course Outcomes	
COut 1	Learner will apply the knowledge of numbers, graph and functions in real life.
COut 2	Learners will able to Identify and evaluate functions
COut 3	Learners able to Evaluate Exponential functions and Graph exponential functions
COut 4	Learner able to apply Exponential and Logarithmic functions in real life problems.
COut 5	Learners will able to understand Trigonometric Functions
COut 6	Learners will able to evaluate sine and cosine functions
COut 7	Learners able to Identify and use polar coordinates
COut 8	Learners able to evaluate the polar form of complex numbers
COut 9	Learners able to understand concepts of Vectors
COut 10	Learners able to Understand concepts of Conic section.

Modules at a Glance

Precalculus		
Sr.No	Modules	No. of Lectures
1	Fundamentals	15
2	Exponential and Logarithmic Functions	15
3	Polar Coordinates and Parametric Equations	15
Total		45

Sr. No.	Modules	No. of Lectures
1	Fundamentals:	15
	Real Numbers, Exponents and Radicals, Algebraic Expressions, Rational Expressions, Equations, Modeling with Equations, Inequalities, Coordinate Geometry, Making Models Using Variation. Functions: What is function? Graphs of Functions, Getting Information from the Graph of a Function, Average Rate of Change of a Function, Transformations of Functions, Combining Functions, One-to-One Functions and Their Inverses. Polynomial and Rational Functions: Quadratic Functions and Models, Polynomial Functions and Their Graphs, Dividing Polynomials, Real Zeros of Polynomials, Complex Numbers, and Complex Zeros and the Fundamental Theorem of Algebra, Rational Functions.	
2	Exponential and Logarithmic Functions	15
	Exponential Functions, The Natural Exponential Function, Logarithmic Functions, Laws of Logarithms, Exponential and Logarithmic Equations, Modeling with Exponential and Logarithmic Functions. Trigonometric Functions: Unit Circle Approach: The Unit Circle, Trigonometric Functions of Real Numbers, Trigonometric Graphs, Inverse Trigonometric Functions and Their Graphs Trigonometric Functions: Right Triangle Approach: Angle Measure, Trigonometry of Right Triangles, Trigonometric Functions of Angles, The Law of Sines, The Law of Cosines. Analytic Trigonometry: Trigonometric Identities, Addition and Subtraction Formulas, Double-Angle, Half-Angle, and Product-Sum Formulas	

3	Polar Coordinates and Parametric Equations:	15
	Polar Coordinates, Graphs of Polar Equations, Polar Form of Complex Numbers; Plane Curves, and Parametric Equations Vectors in Two and Three Dimensions: Vectors in Two Dimensions, The Dot Product, Three-Dimensional Coordinate Geometry, Vectors in Three Dimensions, The Cross Product, Equations of Lines and Planes Conic Sections: Parabolas, Ellipses, Hyperbolas Limits: Finding Limits Numerically and Graphically, Finding Limits Algebraically, Tangent Lines and Derivatives	
Total No. of Lectures:		45

Question Paper Pattern (Academic Year: 2023-2024)

Precalculus

Internal Examination and Semester End Examination – 100 Marks

SEMESTER I

A] Internal Examination – 40 Marks

Method of evaluation	Total marks
Class Test -I	20
Class Test -II	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)
Q-1	Attempt any four of the following. A. Numerical / Case study-based question B. Numerical / Case study-based question C. Numerical / Case study-based question D. Numerical / Case study-based question E. Numerical / Case study-based question	25	20
Q-2	Attempt any four of the following. A. Numerical / Case study-based question B. Numerical / Case study-based question C. Numerical / Case study-based question D. Numerical / Case study-based question E. Numerical / Case study-based question	25	20
Q-3	Attempt any four of the following. A. Numerical / Case study-based question B. Numerical / Case study-based question C. Numerical / Case study-based question D. Numerical / Case study-based question E. Numerical / Case study-based question	25	20
	Total	75	60

Books and References:				
Sr. No.	Title	Author/s	Publisher	Year
1.	Precalculus–Mathematics for Calculus	James Stewart, Lothar Redlin, Saleem Watson	Cengage Learning	2013
2.	Precalculus Demystified	Rhonda Huettenmueller	Tata McGrawHill	2005
3.	Contemporary Precalculus: A Graphing Approach	Thomas W. Hungerford, Douglas J. Shaw	Thomson Higher Education	2009
4.	Precalculus	David H. Collingwood, K.David Prince, Matthew M. Conroy	Free Software Foundation	2011

**Syllabus of courses of FY BSc(Data Science & Analytics) Programme
(With effect from the Academic Year 2023-2024)**

3.General Elective / Open Elective

3.A.a Web Technology (3 Credits)

Semester I

3.General Elective /Open Elective	
3.A.a Web Technology	
Course Objectives and Course Outcomes	
Course Objectives	
CObj 1	Introducing the basic concepts of Internet ,web design and HTML5 to learners
CObj 2	Giving insight of the Page layout and navigation with HTML5.
CObj 3	Making students aware about use of Tables, Forms and Media with HTML5.
CObj 4	Providing knowledge of web page design using CSS and giving knowledge of JavaScript.
Course Outcomes	
COut 1	Learners will be able to understand the use of HTML5 concepts
COut 2	Learners will able to understand and use the Page layout and navigation features of HTML5.
COut 3	Learners are able to understand and use tables, Forms and, Media features of HTML5.
COut 4	Learners are able to understand and use Cascading sheets for the web pages.
COut 5	Learners will understand graphics concepts in HTML5
COut 6	Learners able to understand the basic requirements of web design
COut 7	The learner will analyze a web page and identify its elements and attributes
COut 8	Learners will able to understand JavaScript Language programming concepts and techniques

Modules at a Glance

Web Technology		
Sr.No	Module	No .of Lectures
1	Introduction to Internet	15
2	HTML 5	15
3	Introduction to Style Sheet and Javascrpts	15
Total		45

Sr. No.	Modules	No. of Lectures
1	Introduction to Internet:	15
	<p>Internet and the World Wide Web: What is the Internet? Introduction to the internet and its applications, E-mail, telnet, FTP, e-commerce, video conferencing, and e-business. Internet service providers, domain name server, internet address, World Wide Web (WWW): World Wide Web and itsevolution, uniform resource locator (URL), browsers –Internet Explorer, Netscape Navigator, Opera, Firefox,Chrome, Mozilla. search engine, web saver – Apache, IIS,proxy server, HTTP protocol</p> <p>What Is Web Design? Defining Web Design, Web DesignThemes, Learning Web Design.</p> <p>User-Centered Design: Usability, Who Are Web Users? Common User Characteristics, Memory, Response and Reaction Times, Dealing with Stimulus, Movement Capabilities, The User’s World, General Types of Users, Web Conventions, Accessibility, Building a Usable Site</p> <p>HTML5: Introduction, Why HTML5? Formatting text by using tags, lists and backgrounds and creating hyperlinksand anchors.</p>	
2	HTML 5:	15
	<p>HTML5 Page layout and navigation: Creating navigational aids: planning site organization, creating the text-based navigation bar, creating the graphics-based navigation bar, creating the graphical navigation bar, creating an image map, redirecting to another URL, creating division based layouts:HTML5 semantic tags, creating divisions, creating HTML5 semantic layout, positioning and formatting divisions.</p> <p>HTML5 Tables, Forms and Media: Creating tables: creating simple table, specifying the size of the table, specifying the width of the column, merging table cells, using tables for page layout, formatting tables: applying table borders, applying background and foreground fills, changing cell padding, spacing and alignment, creating user</p>	

	forms: creating basic form, using checkboxes and option buttons, creating lists, additional input types in HTML5, Incorporating sound and video: audio and video in HTML5, HTML multimedia basics, embedding video clips, incorporating audio on web page.	
3	Introduction to Style Sheets and Java Script	15
	<p>Understanding Styles, Constructing Style Rules, Creating Styles for Nested Tags, Creating Classes and IDs for Applying Styles, Applying Styles to Hyperlinks, Creating and Linking to External Style Sheets</p> <p>Formatting Text by Using Style Sheets: Specifying a Font Family, Specifying a Font Size and Color, Applying Bold and Italics, Applying Strikethrough and Underlining, Creating Inline Spans, Adjusting Spacing Between Letters</p> <p>Formatting Paragraphs by Using Style Sheets: Indenting Paragraphs, Applying a Border to a Paragraph, Specifying a Border Style, Setting Border Padding, Specifying Border Width and Color, Formatting Border Sides Individually, Setting All Border Attributes at Once, Specifying the Horizontal Alignment of a Paragraph, Specifying Vertical Space within a Paragraph</p> <p>Displaying Graphics: Selecting a Graphics Format, Preparing Graphics for Web Use, Inserting Graphics, Arranging Elements on the Page, Controlling Image Size and Padding, Hyperlinking from Graphics, Using Thumbnail Graphics, Including Alternate Text for Graphics, Adding Figure Captions</p> <p>Java Script: Introduction, Client- Side JavaScript, Server-Side JavaScript, JavaScript Objects, JavaScript Security</p> <p>Core JavaScript (Properties and Methods of Each) : Array, Boolean, Date, Function, Math, Number, Object, String, RegExp Document and its associated objects: document, documentobject methods, Link, Area, Anchor, Image, Layer</p>	
Total No. of Lectures:		45

Practical Work (20 Marks)

List of Practical:	
1.	Use of Basic Tags:
a.	Design a web page using different text formatting tags.
b.	Demonstrate use of Font tag with its attributes and HTML various color options in web page.
c.	Design a web page with links to different pages and allow navigation between web pages.
2.	Navigation, list and paragraph:
a.	Design a web page to demonstrate text-based navigation bar.
b.	Demonstrate use of lists and backgrounds in web page.
c.	Demonstrate use of paragraph and its associated tags in web page.
3.	Lists, images and semantics:
a.	Demonstrate use of multiple image tag in web page.
b.	Design a web page with Imagemaps.
c.	Design a web page demonstrating use of various semantics tags
4.	Multimedia and User controls:
a.	Design a web page with a form that uses all types of user controls.
b.	Design a web page embedding with multimedia features.
c.	Design a 3 page static website with appropriate tags and attributes.
5.	CSS with list, links and table:
a.	Create and use different style rules with available types of lists.
b.	Create and use different style rules with hyperlinks.
c.	Create and use different style rules with tables.

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	Year
1.	Precalculus–Mathematics for Calculus	James Stewart, Lothar Redlin, Saleem Watson	Cengage Learning	2013
2.	Precalculus	David H. Collingwood, K. David Prince, Matthew M. Conroy	Free Software Foundation	2011
3.	Precalculus Demystified	Rhonda Huettenmueller	Tata McGrawHill	2005
4.	Contemporary Precalculus: A Graphing Approach	Thomas W. Hungerford, Douglas J. Shaw	Thomson Higher Education	2009

Syllabus of courses of FY BSc(Data Science & Analytics) Programme**(With effect from the Academic Year 2023-2024)****4. Vocational & Skill Enhancement Courses (VSEC)****4.A Skill Enhancement Course****4.A.a.Office Automation Course I (2 Credits)****Semester I**

4. Vocational & Skill Enhancement Courses (VSEC)	
4.A Skill Enhancement Course	
4.A.a Office Automation	
Course Objectives and Course Outcomes	
Course Objectives	
CObj 1	To build an understanding of how to use excel from scratch and then gradually scale up to higher levels of competence
CObj 2	To equip the students with MS Excel features which will develop their foundation of using spreadsheets
CObj 3	To provide insights into the data analysis tools in Excel so that they can extract meaningful information from vast arrays of data
CObj 4	To familiarize students with the important functions and data visualization features available in Excel which help in performing data mining
Course Outcomes	
COut 1	The learner can prevent unintended or malicious intrusions over the workings.
COut 2	The learners are able to assign validations and protections excel based templates and Files
COut 3	Learners are able to create Pivot Tables and Pivot Charts
COut 4	The learner acquires knowledge about Conditional formatting
COut 5	The learners can analyze Charts of various kinds
COut 6	Learners is able to analyze more about Data Validation
COut 7	The learner knows how to Protect Workbook and Worksheet
COut 8	The learner learns to assign read /write access passwords to files
COut 9	Learner creates and opens workbooks
COut 10	The learner is aware of modification of columns, rows and cells

Module at Glance

Office Automation		
Sr.No	Module	No .of Lectures
1	Introduction to Excel	10
2	Essential Functions	10
3	Data Analysis, validation and Visualizations	10
Total		30

Sr. No.	Modules	No. of Lectures
1	Introduction to Excel	10
	<ul style="list-style-type: none"> • Creating and opening workbooks • Cell basics • Modifying columns, rows and cells • Worksheet basics • Introduction to formulas Freeze Panes <ul style="list-style-type: none"> • Formatting features of cells • Sort • Filters • Fill Handle • Copy a sheet • Find and Replace • Relative and Absolute Cell Referencing • Text to columns • Paste Special • Subtotals • Comments 	
2	Essential Functions	10
	<ul style="list-style-type: none"> • Sum, Count, Min, Max, Average, Median, Subtotal • Date, Today, Now • If, And, Or • Vlookup and Hlookup • Round, Roundup and Rounddown • Sumif and Sumifs • Countif and Countifs • Averageif and Averageifs • Concatenate and Trim 	
3	Data Analysis, validation and Visualization	10
	<ul style="list-style-type: none"> • Pivot Tables and Pivot Charts • Remove Duplicates • Conditional formatting • Charts of various kinds 	

Books and References			
Sr.No	Book Title	Author Name	Publisher
1	Slaying Excel Dragons	Mike Girvin	Holy Macro! Books
2	Ctrl+Shift+Enter Mastering Excel Array Formulas	Mike Girvin	Holy Macro! Books
3	Excel for Beginners (Excel Essentials Book 1)	M.L. Humphrey	Independently Published

**Syllabus of courses of FY BSc(Data Science & Analytics) Programme
(With effect from the Academic Year 2023-2024)**

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

5.A. Ability Enhancement Course

5.A.a. Language & Literature -I (3 Credits)

Semester I

5. Ability Enhancement Courses, Value Enhancement Course, Indian Knowledge System	
5.A Ability Enhancement Course (AEC)	
5.A.a Language and Literature-I	
Course Objectives and Course Outcomes	
Course Objectives	
CObj 1	To understand the effective use of power point presentation, relevance and importance of interpersonal communication skills
CObj 2	To enhance written communication skills
CObj 3	To enable the learners to adapt to the requirements of the industry.
Course Outcomes	
COut 1	The learners learn to use statistical tools in PowerPoint presentations, write letters of enquiry and letters of complaint.
COut 2	Practical application of preparing flyers and leaflets help the learners demonstrate their creativity.
COut 3	Nonverbal communication skills of learners are enhanced.
COut 4	The learner is able to analyze the components of letter writing
COut 5	Learners can understand the theories of communication
COut 6	Learners can differentiate between the different modes of communication
COut 7	Learners is trained to apply ethics at work place
COut 8	Learners is able to create a resume and face job interviews with ease
COut 9	Learners can relate to the barriers of communication and are able to cope with the same
COut 10	Learners can apply the most appropriate and effective mode of communication

Module at Glance

Language & Literature I		
Sr.No	Module	No .of Lectures
1	Theory of Communication & Obstacles to Communication in Business World	15
2	Business Correspondence	15
3	Language and Writing Skills	15
Total		45

Sr. No.	Modules	No. of Lectures
1	Theory of Communication & Obstacles to Communication in Business World	15
	<p>Concept of Communication: Meaning, Definition, Process, Need, Feedback Emergence of Communication as a key concept in the Corporate and Global world Impact of technological advancements on Communication Channels and Objectives of Communication: Channels- Formal and Informal- Vertical, Horizontal, Diagonal, Grapevine Objectives of Communication: Information, Advice, Order and Instruction, Persuasion, Motivation, Education, Warning, and Boosting the Morale of Employees (A brief introduction to these objectives to be given) Methods and Modes of Communication: Methods: Verbal and Nonverbal, Characteristics of Verbal Communication Characteristics of Non-verbal Communication, Business Etiquette Computers and E- communication: Organizing and use of Video and Satellite. Problems in Communication /Barriers to Communication: Physical/ Semantic/Language / Socio-Cultural / Psychological /Barriers, Ways to Overcome these Barriers Listening: Importance of Listening Skills, Cultivating good Listening Skills Introduction to Business Ethics: Concept and Interpretation, Importance of Business Ethics.</p>	
2	Business Correspondence	15
	<p>Theory of Business Letter Writing: Parts, Structure, Layouts— Full Block, Principles of Effective Letter Writing, Principles of effective Email Writing, Personnel Correspondence: Statement of Purpose, Job Application Letter and Resume, Letter of Acceptance of Job Offer, Letter of Resignation [Letter of Appointment, Promotion and Termination, Letter of Recommendation</p>	

3	Language and Writing Skills	15
	<p>Commercial Terms used in Business Communication Paragraph Writing: Developing an idea, using appropriate linking devices, etc Cohesion and Coherence, etc [Interpretation of technical data, Composition on a given situation, a short informal report & improvisation Activities] Listening, Comprehension, Speaking Skills: Presenting a News Item, Dialogue and Speeches Paragraph Writing: Preparation of the first draft, Revision and Self Editing, Rules of spelling. Reading Comprehension: Analysis of texts from the fields of Commerce and Management</p>	
Total No. of Lectures:		45

Question Paper Pattern (Academic Year: 2023-2024)**Language & Literature -I****Internal Examination and Semester End Examination – 100 Marks****SEMESTER I****A] Internal Examination – 40 Marks**

Method of evaluation	Marks
Activity in Language lab	20
Translation of newspaper article	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)
Q-1	Answer the following questions (Any 4)		
	A. Theory/Concept-based question	5	20
	B. Theory/Concept-based question	5	
	C. Theory/Concept-based question	5	
	D. Theory/Concept-based question	5	
	E. Theory/Concept-based question	5	
Q-2	Answer the following questions (Any 4)		
	A. Theory/Concept-based question	5	20
	B. Theory/Concept-based question	5	
	C. Theory/Concept-based question	5	
	D. Theory/Concept-based question	5	
	E. Theory/Concept-based question	5	
Q-3	Answer the following questions (Any 4)		
	A. Theory/Concept-based question	5	20
	B. Theory/Concept-based question	5	
	C. Theory/Concept-based question	5	
	D. Theory/Concept-based question	5	
	E. Theory/Concept-based question	5	
	Total		60

Reference Books

1. Agarwal, AnjuD(1989) A Practical Handbook for Consumers, IBH.
2. Alien, R.K.(1970) Organisational Management through Communication. Podar : Nurturing Intellect Creating Personalities
3. Ashley,A(1992) A Handbook Of Commercial Correspondence, Oxford University Press.
4. Aswathapa, K (1991)Organisational Behaviour, Himalayan Publication, Mumbai.
5. Atreya N and Guha (1994) Effective Credit Management, MMC School of Management, Mumbai.
6. Bahl,J.C. and Nagamia,S.M. (1974) Modern Business Correspondence and Minute Writing.
7. Balan,K.R. and Rayudu C.S. (1996) Effective Communication, Beacon New Delhi.
8. Bangh, LSue, Fryar,Maridell and Thomas David A. (1998) How to Write First Class Business Correspondence, N.T.C. Publishing Group USA
9. Banerjee, Bani P (2005) Foundation of Ethics in Mangement Excel Books 10.Businessworld Special Collector's Issue: Ethics and the Manager
10. Barkar, Alan(1993) Making Meetings Work, Sterling Publications Pvt. Ltd., New Delhi.
11. Basu,C.R.(1998) Business Organisation and Management, T.M.H.New Delhi.
12. Benjamin, James (1993) Business and Professional Communication Concepts and Practices, Harper Collins College Publishers, New York.
13. Bhargava and Bhargava(1971) Company Notices, Meetings and Regulations
14. Black, Sam (1972) Practical Public Relations, E.L.B.S. London.
15. BoveeCourtland,L and Thrill, John V(1989) Business Communication, Today McGraw Hill, New York, Taxman Publication.
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17. Darrow, Richard, Forrstal, Dan and Coolman, Aubrey (1967) Public Relations Handbook, TheDartwell Co., Chicago. □ Dayal, Ishwar(1981) Managing Large Organizations: A Comparative Study.
18. Drucher,P.F.(1970) Technology, Management and Society, Pan Books London.
19. Drucher,P.F.(1974)Management Responsibilities Practices, Heinemann, London. 22.Eyre, E.C. (1985) Effective Communication Made Simple, Rupa and Co.Calcutta
20. Ecouse Barry, (1999), Competitive Communication: A Rhetoric for Modern Business, OUP.
21. Ecouse Barry, (1999), Competitive Communication: A Rhetoric for Modern Business, OUP.
22. Fisher Dalmar, (1999), Communication in Organisation, Jaico Pub House, Mumbai, Delhi.
23. Frailley, L.E. (1982) Handbook of Business Letters, Revised Edn. Prentice Hall Inc.
24. French, Astrid (1993) Interpersonal Skills. Sterling Publishers, New delhi.
- 25.Fritzsche, David J (2005) Business Ethics: A Global and Managerial Perspective McGraw Hil

**Syllabus of courses of FY BSc(Data Science & Analytics) Programme
(With effect from the Academic Year 2023-2024)**

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

5.B. Value Enhancement Course

5.B.a. Computer Application (3 Credits)

Semester I

5. Ability Enhancement Course, Value Enhancement Course, Indian Knowledge System	
5.B. Value Enhancement Course	
5.B.a. Computer Application	
Course Objectives and Course Outcomes	
Course Objectives	
CObj 1	To impart knowledge in concepts and components of Data Communications and Networking
CObj 2	To understand the basic concepts of data communication, layered model, protocols and inter- working between computer networks and switching components in telecommunication systems
CObj 3	To understand use of Internet in business and Ms Office
Course Outcomes	
COut 1	Learners will able to understand basic concept of Data Communications
COut 2	Learners will able to understand basic concept of Networks and Infrastructure
COut 3	Learners will able to understand basic concept of Networks and Protocols.
COut 4	Learners will able to apply various network application such as data transmission between clientand server, file transfer, real-time multimedia transmission.
COut 5	Learners will apply different internet in business sectors
COut 6	Learners will able to understand concepts of MS Word
COut 7	Learners will able to create power slides for power point presentation using techniques of MS power point
COut 8	Can work with I.T Firm

Module at Glance

Computer Application		
Sr.No	Modules/Units	No. of Lectures
1	Data Communication, Networking	15
2	Internet	10
3	MS Word and Power point	20

Sr. No.	Modules	No. of Lectures
1	Data Communication and Networking	15
	Data Communication Component Data representation Distributed processing Network Basics and Infrastructure Network Models LAN, MAN, WAN Network Hardware: Hubs, Bridges, Switches, and Routers Network Structures – Server Based, Client server, Peer to Peer Topologies – Star, Bus, Ring. Network Protocols – TCP /IP, OSI Model	
2	Internet	10
	Definition, Types of connections, Services on net- WWW, Email-BlogsIP addresses, Domain names, URLs, Hyperlinks, Web Browsers Cyber Crime, Hacking, Sniffing, Spoofing	
3	MS Word	20
	Learning Word Creating /Saving of Document Editing and Formatting Document Designing a title page Preparing Index Use of SmartArt Cross Reference, Bookmark and Hyperlink.Mail MergeFeature. MS Power point Creating a presentation with minimum 20 slides with a script. Presenting in different views,Inserting Pictures, Videos, Creating animation effects on them Slide Transitions, Timed PresentationsRehearsal of presentation	
Total No. of Lectures:		45

Question Paper Pattern (Academic Year: 2023-2024)**Computer Application****Internal Examination and Semester End Examination – 100 Marks****SEMESTER I****A] Internal Examination – 40 Marks**

Method of evaluation	Total marks
Class Test -I	20
Class Test -II	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)	Mark s(To Be Attempted)
Q-1	Answer the following questions (Any 4)		
	A. Theory/Concept-based question	5	20
	B. Theory/Concept-based question	5	
	C. Theory/Concept-based question	5	
	D. Theory/Concept-based question	5	
	E. Theory/Concept-based question	5	
Q-2	Answer the following questions (Any 4)		
	A. Theory/Concept-based question	5	20
	B. Theory/Concept-based question	5	
	C. Theory/Concept-based question	5	
	D. Theory/Concept-based question	5	
	E. Theory/Concept-based question	5	
Q-3	Answer the following questions (Any 4)		
	A. Theory/Concept-based question	5	20
	B. Theory/Concept-based question	5	
	C. Theory/Concept-based question	5	
	D. Theory/Concept-based question	5	
	E. Theory/Concept-based question	5	
	Total		60

Books and Reference		
Sr. No.	Title	Author/s
1.	Data Communication and Networking	Behrouz A Forouzan
2.	Introduction to Computers	Peter Norton

**Syllabus of courses of FY BSc(Data Science & Analytics) Programme
(With effect from the Academic Year 2023-2024)
Ability Enhancement Courses, Value Enhancement Course, Indian Knowledge System
5.C Indian Knowledge System (IKS)
5.C.a. Indian traditional approach in conservation and sustainability (2 Credits)
Semester I**

5. Ability Enhancement Courses, Value Enhancement Course, Indian Knowledge System	
5.C Indian Knowledge System (IKS)	
5.C.a. Indian traditional approach in conservation and sustainability	
Course Objectives and Course Outcomes	
Course Objectives	
CObj 1	The course will enable the learner to understand the scientific and moral value of traditional ancient Indian knowledge.
CObj 2	The course is expected to convert the ancient wisdom to the applied aspects of the modern scientific paradigm.
CObj 3	The course is expected to create interest and excitement in the learner to explore more on the specific area of knowledge.
CObj 4	The course is expected to empower the learner to inspire others in learning our own traditional practices of sustainability.
CObj 5	The course is expected to develop the interest in the learner to do further research in the specific area of knowledge.
Course Outcomes	
COut 1	The learners shall be able to acknowledge the contribution of traditional Indian wisdom in various commercial fields.
COut2	The learner should be able to draw connections between the trade & commercial activities along with their influence on the environment and the efforts to address the same.
COut 3	The learners shall be able to identify traditional eco-friendly options for current modes of transportation.
COut 4	The learner should be able to understand the ancient practices of resource conservation and to have a holistic approach towards sustainable development in modern times.
COut 5	The learners should be able to analyze the current practices of land management with respect to ancient Indian practices for the conservation of the same.
COut6	The syllabus shall enable the learners to correlate the conventional practices of water conservation with special reference to ancient wisdom in the same regards.
COut 7	The learners shall be able to suggest measures for forest conservation through various ancient Indian solutions.
COut 8	The learners should be able to evaluate the Indian contribution in various contemporary fields of social sciences and technologies
COut 9	The learners should be able to describe the case studies to illustrate the significant contribution of Indian scholars in various conventional fields of social sciences.
COut 10	The learners should be able to examine the future perspectives and possibilities of various aspects of the Indian Knowledge System to enrich the society

Modules at a Glance

Indian traditional approach in conservation and sustainability		
Sr. No.	Modules	No. of Lectures
1	Conventional trade & commerce and environment	15
2	Resource conservation and sustainability	15
3	Significant Indian contributions to the world	Internal component/assessment
Total No. of Lectures:		30

Sr. No.	Modules
1	Conventional trade & commerce and environment
	<p>A. Introduction and overview of Indian Knowledge System. Indian disciplinary knowledge system in different fields like, architecture, science & technology, nature, astronomy, agriculture, health & medicine, Defense (case study of Rani Abbakka Chowta who defeated Portuguese)</p> <p>B. Traditional commercial activities & trade practices with reference to environmental conservation: Agricultural trade, Silk, Cotton, Spices, Metallurgy, Textile industry, etc.</p> <p>C. Transportation and its modes: Grand Trunk road, Boat & ship-building, Energy efficiency in the transport sector: a current scenario, Eco mobility. Impact of transport on climate, impact of climate on transport.</p>
2	Resource conservation and sustainability
	<p>A. Land Management & Conservation: Ancient & traditional agricultural activities, Conservation strategies, Harappan civilization-town planning, etc.</p> <p>B. Water Management & Conservation: Harappan civilization, ancient practices of irrigation, Tanks, Lakes, Stepwells, Traditional rain-water harvesting, Community involvement.</p> <p>C. Forest & Wildlife Conservation: Sacred forests, sacred groves, sacred hills, Social forestry, Agroforestry, Animal worshiping, Worshiping natural forces. Women and conservation- Ecofeminism.</p>

3	Significant Indian contributions to the world (Internal component/assessment)
	<p>A. Contribution in the field of agriculture: Food crops, Cotton, Animal husbandry, etc.</p> <p>B. Contribution in the field of science and technology: Invention of zero, etc.</p> <p>C. Contributions in the field of health and medicine: Ayurveda, Meditation, Yoga, etc.</p> <p>D. Case studies on Indian Knowledge System on any particular/ specific area of knowledge: Ayurveda, Agriculture, Astronomy, Architecture, Economics, Mathematics, Philosophy, Yoga, Medicine, Nature, Politics, Weaponry, Military science, Literature, Poetics or any other area of knowledge. Indian Knowledge System- Future perspectives: Challenges and Opportunities.</p>

Indian Knowledge System

Question Paper Pattern (Academic Year: 2023-2024)

Internal Examination & Semester End Examination – 50 Marks

A] Internals-20 Marks

INTERNAL ASSESSMENT: 20 MARKS

MODULE-III is given for internal assessment. Students will be writing assignments on the selected topics.

B] Semester End Examination (SEE)- 30 Marks

Maximum Marks 30

Duration: 1 Hour

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

Question No.	Particulars (Nature of Questions)	Marks (Given)
Q-1	Attempt any one of the following: A. Theory/Concept-based question. B. Theory/Concept-based question.	10
Q-2	Attempt any one of the following: A. Theory/Concept-based question. B. Theory/Concept-based question.	10
Q-3	Attempt any two of the following. A. Short note B. Short note C. Short note D. Short note	10
	Total	30

**Syllabus of courses of FY BSc(Data Science & Analytics) Programme
(With effect from the Academic Year 2023-2024)**

1.Major

1.A. Data Science & Analytics -II

1.A. a Data Base Management (3 Credits)

Semester II

1.Major	
1.A. Data Science & Analytics -II	
1.A.a Data Base Management	
Course Objectives and Course Outcomes	
Course Objectives	
CObj 1	To understand Organizing, structuring and storing data
CObj 2	Understand Database as Relational model
CObj 3	To understand SQL to retrieve data and concept of redundancy
CObj 4	To understand creation, manipulation and querying of data in databases
Course Outcomes	
COut 1	Learners will able to understand the basic concepts and the applications of database systems
COut 2	Learners will able to apply data models in business sectors.
COut 3	Learners understand to create Entity relationship model for databases.
COut 4	Learners understand concepts of Advanced data models
COut 5	Learners understand concepts of Normalization of Database Tables
COut 6	Learners understand basic SQL
COut 7	Learners able to construct queries in SQL
COut 8	Learners understand advanced SQL

Modules at a Glance

Data Base Management		
Sr.No	Modules	No. of Lectures
1	Introduction To DBMS	15
2	Advanced Data Model	15
3	Structured Query Language (SQL)	15
Total		45

Sr. No.	Modules	No. of Lectures
1	Introduction & DBMS Architecture:	15
	<p>Why Databases? Data versus Information, Introducing the Database, Role and Advantages of the DBMS, Types of Databases, Why Database Design Is Important, Evolution of File System Data Processing, Problems with File System DataProcessing, Database Systems</p> <p>Data Models – Data Modeling and Data Models, The Importance of Data Models, Data Model Basic Building Blocks, Business Rules, The Evolution of Data Models, Degrees of Data Abstraction</p> <p>Entity Relationship Model: Entities, attributes, Relationships, Connectivity and Cardinality, Existence Dependence, Relationship Strength, Weak Entities, Relationship Participation, Relationship Degree, Recursive Relationships, Associative (Composite) Entities, Developing an ER Diagram, Database Design Challenges: Conflicting Goals.</p>	
2	Advanced-Data Modeling:	15
	<p>The Extended Entity-Relationship Model, Entity Clustering, Entity Integrity: Selecting Primary Keys, Design Cases: Learning Flexible Database Design</p> <p>Normalization of Database Tables: Database Tables and Normalization, The Need for Normalization, The Normalization Process, Improving the Design, Surrogate Key Considerations, Higher-Level Normal Forms, Normalization and Database Design, Denormalization, Data-Modeling Checklist</p>	
3	Structured Query Language (SQL):	15
	<p>Introduction to SQL, Basic SELECT Queries, SELECT Statement Options, FROM Clause Options, ORDER BY Clause Options, WHERE Clause Options, Aggregate Processing, Subqueries, SQL Functions, Relational Set Operators, Crafting SELECT Queries</p> <p>Advanced SQL: Data Definition Commands, Creating Table Structures, Altering Table Structures, Data Manipulation Commands, Virtual Tables: Creating a View, Sequences, Procedural SQL, Embedded SQL</p>	
Total No. of Lectures:		45

Practical Work (20 Marks)

List of Practical: (Can be done in Oracle / SQL Server / MySQL)	
1.	For given scenario Draw E-R diagram and convert entities and relationships to a table.
2.	Write SQL query for given problem statement:
a.	Viewing all databases
b.	Creating a Database
c.	Viewing all Tables in a Database
3.	Perform the following Operations:
a.	Creating Tables (With and Without Constraints)
b.	Inserting/Updating/Deleting Records in a Table
c.	Saving (Commit) and Undoing (rollback)
4.	Perform the following Operations:
a.	Altering a Table
b.	Dropping/Truncating/Renaming Tables
c.	Backing up / Restoring a Database
5.	Perform following:
a.	Simple Queries with Where Operators
b.	Whereas with Keywords and Logical Operators
c.	Simple Queries with Aggregate functions
d.	Queries with Aggregate functions (group by and having clause)
6.	Perform Queries involving:
a.	Date Functions
b.	String Functions
c.	Math Functions
7.	Retrieving Data from Multiple Table:
a.	Joining Tables (Inner Joins, Outer-Joins)
b.	Aliases for Table Names
8.	Views:
a.	Creating Views
b.	Dropping Views
c.	Selecting from view

Question Paper Pattern (Academic Year: 2023-2024)
Data Base Management
Semester End Examination and Practical Examination – 100 Marks

SEMESTER II

A] Semester End Examination (SEE)- 60 Marks

Maximum Marks 60

Duration: 2 Hours

Note: 1.All questions are compulsory

1.All questions carry equal marks

Question No.	Particulars (Nature of Questions)	Marks (Given)	Marks (To Be Attempted)
Q-1	Answer the following questions (Any 4)		
	A. Theory/Concept-based question	5	20
	B. Theory/Concept-based question	5	
	C. Theory/Concept-based question	5	
	D. Theory/Concept-based question	5	
	E. Theory/Concept-based question	5	
Q-2	Answer the following questions (Any 4)		
	A. Theory/Concept-based question	5	20
	B. Theory/Concept-based question	5	
	C. Theory/Concept-based question	5	
	D. Theory/Concept-based question	5	
	E. Theory/Concept-based question	5	
Q-3	Answer the following questions (Any 4)		
	A. Theory/Concept-based question	5	20
	B. Theory/Concept-based question	5	
	C. Theory/Concept-based question	5	
	D. Theory/Concept-based question	5	
	E. Theory/Concept-based question	5	
	Total		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.	Fundamentals of Database Systems	Elmasri Ramez and Navathe Shamkant B,	Pearson Education	6th Edition,	2010.
2.	Database System Concepts	Silberschatz, Korth, Sudarshan,	McGraw Hill,	5 Edition,	2006.
3.	Database Management Systems,	Ramakrishnam, Gehrke,	McGraw-Hill,		2007
4.	Murach's MySQL	Joel Murach,	Murach,		2012

**Syllabus of courses of FY BSc(Data Science & Analytics) Programme
(With effect from the Academic Year 2023-2024)**

1.Major

1.A. Data Science & Analytics -II

1.A. b. Probability and Distribution (3 Credits)

Semester II

1.Major	
1.A. Data Science & Analytics -II	
1.A. b. Probability and Distribution	
Course Objectives and Course Outcomes	
Course Objectives	
CObj 1	To familiarize with concepts of probability and learn implementation of different types of probabilities
CObj 2	To know the concept and implementation of discrete distributions including Bernoulli, Binomial
CObj 3	To get acquainted with theory and practical implementation of concepts of continuous distributions
Course Outcomes	
COut 1	Learners will able to understand of the fundamental concepts of probability
COut 2	Learners will able to understand concepts of sample spaces, events, and probability axioms
COut 3	Learners will able to apply the laws of probability to solve problems and calculate probabilities in different scenarios
COut 4	Learners will able to evaluate work with common discrete probability distributions
COut 5	Learners will able to understand the characteristics and applications of each distribution
COut 6	Learners should be able to use discrete probability distributions to make inferences about populations, estimate parameters
COut 7	Learners will able to analyse and compute probabilities using continuous distributions
COut 8	Learners will able to work with common continuous probability distributions and apply various technology for probability calculations

Modules at a Glance

Probability and Distribution		
Sr.No	Modules	No. of Lectures
1	Introduction To Probability	15
2	Non Parametric Distribution	15
3	Discrete and Continuous Parametric Distribution	15
Total		45

Sr. No.	Modules	No. of Lectures
1	Introduction to probability	15
	Probability, events, types of events, additional, multiplication theorem, conditional theorem	
2	Non - parametric	15
	Definition, Wilcoxon sign rank test, Mann whitney test Parametric - Definition, independent sample t-test, paired t-test, chi-square test	
3	Discrete Parametric Distribution:	15
	Introduction, Bernoulli Distribution, Binomial Distribution, Poisson Distribution, MGF, CGF Continuous Parametric Distribution: Introduction, Uniform Distribution, Normal Distribution, , The Exponential Distribution, MGF, CGF	
Total No. of Lectures:		45

Practical Work (20 Marks)

Practicals to be done using Excel	
1	Create a program to compute conditional probability
2	Create a program to understand the application of Bayes theorem
3	Fitting of binomial distribution
4	Fitting of Poisson distribution
5	Find out MGF and CGF for the binomial distribution
6	Create a program to understand the normal distribution
7	Application for computing probabilities for exponential distribution

Question Paper Pattern (Academic Year: 2023-2024)**Probability and Distribution****Semester End Examination and Practical Examination – 100 Marks****SEMESTER II****A] Semester End Examination (SEE)- 60 Marks****Maximum Marks****60**

Duration

: 2 Hours

Note: 1.All questions are compulsory

1.All questions carry equal marks

Question No.	Particulars (Nature of Questions)	Marks (Given)	Marks (To Be Attempted)
Q-1	Attempt any four of the following. A. Numerical / Case study-based question B. Numerical / Case study-based question C. Numerical / Case study-based question D. Numerical / Case study-based question E. Numerical / Case study-based question	25	20
Q-2	Attempt any four of the following. A. Numerical / Case study-based question B. Numerical / Case study-based question C. Numerical / Case study-based question D. Numerical / Case study-based question E. Numerical / Case study-based question	25	20
Q-3	Attempt any four of the following. A. Numerical / Case study-based question B. Numerical / Case study-based question C. Numerical / Case study-based question D. Numerical / Case study-based question E. Numerical / Case study-based question	25	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.	Fundamentals of Mathematical statistics	S. C, Gupta and V. K. Kapoor	S. Chand and Sons	Tenth	2002
2.	Applied Statistics and Probability for Engineers	Douglas C. Montgomery and George C. Runger	Wiley	Sixth	2014
3.	Probability, Statistics, and Stochastic Processes	Peter Olofsson and Mikael Andersson	Wiley	Second	2012

**Syllabus of courses of FY BSc(Data Science & Analytics) Programme
(With effect from the Academic Year 2023-2024)**

2. Minor

2A.a. Calculus Course I (3 Credits)

Semester II

2.Minor	
2A.a. Calculus	
Course Objectives and Course Outcomes	
Course Objectives	
CObj 1	To give the insight of calculus starting with continuity and derivatives.
CObj 2	To gain proficiency in integration.
CObj 3	To apply derivatives and integration to various domains
CObj 4	To use polar coordinates for different conics and understand multiple integrals.
CObj 5	To understand partial differentiation and differential equations.
Course Outcomes	
COut 1	Learners able to understand concepts of Continuity and Derivatives
COut 2	Learners able to apply the knowledge of derivatives and integration to different domains and obtain the results
COut 3	Learners understand concept of Integrals
COut 4	Learners understand concept of Multiple Integrals
COut 5	Learners will able to apply the knowledge of integrals, multiple integrals and polar coordinates to solve real life problems with ease.
COut 6	Learners will able to understand applications of differentiation

Modules at a Glance

Calculus		
Sr.No	Modules	No. of Lectures
1	Continuity and Derivatives:	15
2	Integrals	15
3	Applications of differentiation	15
Total		45

Sr. No.	Modules	No. of Lectures
1	Continuity and Derivatives:	15
	Limits at Infinity; Horizontal Asymptotes, Derivatives and Rates of Change, The Derivative as a Function. Differentiation rules: Derivatives of Polynomials and Exponential Functions, The Product and Quotient Rules, The Chain Rule, Implicit Differentiation, Derivatives of Logarithmic Functions, Rates of Change in the Natural and Social Sciences, Exponential Growth and Decay, Linear Approximations and Differentials. Partial Derivatives: Functions of Several Variables, Limits and Continuity, Partial Derivatives, Tangent Planes and Linear Approximations, The Chain Rule, Maximum and Minimum Values, Lagrange Multipliers.	
2	Integrals:	15
	Areas and distances, The Definite Integral, The Fundamental Theorem of Calculus, Indefinite Integrals, The Substitution Rule, Integration by Parts, Trigonometric Integrals, Trigonometric Substitution, Approximate Integration, Improper Integrals. Multiple Integrals: Double Integrals over Rectangles, Iterated Integrals, Double Integrals over General Regions, Applications of Double Integrals, Triple Integrals Differential Equations: Modelling with Differential Equations, Direction Fields and Euler's Method, Separable Equations	

3	Applications of differentiation:	15
	<p>Maximum and Minimum Values, Mean Value Theorem, Derivatives and Shape of a Graph, Indeterminate Forms, and L'Hospital's Rule, Newton's Method.</p> <p>Applications of Integration: Areas between Curves, Volumes, Work, Average Value of a Function, Arc Length, Area of a Surface of Revolution, Applications to Physics and Engineering, Applications to Economics and Biology, Probability.</p> <p>Parametric Equations and Polar Coordinates: Curves Defined by Parametric Equations, Calculus with Parametric Curves, Polar Coordinates, Areas and Lengths in Polar Coordinates</p>	
Total No. of Lectures:		45

Question Paper Pattern (Academic Year: 2023-2024)

Calculus

Internal Examination and Semester End Examination – 100 Marks SEMESTER II

A] Internal Examination – 40 Marks

Method of evaluation	Total marks
Class Test -I	20
Class Test -II	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

QuestionNo.	Particulars (Nature of Questions)	Marks (Given)	Marks (To Be Attempted)
Q-1	Attempt any four of the following. A. Numerical / Case study-based question B. Numerical / Case study-based question C. Numerical / Case study-based question D. Numerical / Case study-based question E. Numerical / Case study-based question	25	20
Q-2	Attempt any four of the following. A. Numerical / Case study-based question B. Numerical / Case study-based question C. Numerical / Case study-based question D. Numerical / Case study-based question E. Numerical / Case study-based question	25	20
Q-3	Attempt any four of the following. A. Numerical / Case study-based question B. Numerical / Case study-based question C. Numerical / Case study-based question D. Numerical / Case study-based question E. Numerical / Case study-based question	25	20
Total		75	60

Books and References:					
Sr. No.	Title	Author/s	Publisher	Edition	Year
1.	Calculus–Early Transcendentals	James Stewart	Thomson	6 th	2008
2.	Calculus and Analytical Geometry	George B. Thomas Jr., Ross L. Finney Maurice D. Weir	Addision Wesley Publishing Company	--	1998
3.	Schaum’s 3000 Solved Problems in Calculus	Elliot Mendelson	Tata McGraw Hill	--	1988
4.	The Advanced Calculus Problem Solver	Staff of Research & Education Association	Research & Education Association	---	2007
5.	Calculus Made easy	Silvanus P. Thompson, Martin Gardner	PALGRAVE		1998

**Syllabus of courses of FY BSc (Data Science & Analytics)
 Programme(With effect from the Academic Year 2023-2024)
 3. General Elective (GE) / Open Elective (OE)
 3.A.a. Data Structures and Algorithms Using Python (3 credits)
 Semester II**

3.General Elective(GE) / Open Elective (OE)	
3.A.a. Data Structures and Algorithms Using Python	
Course Objectives and Course Outcomes	
Course Objectives	
CObj 1	To learn the essential Python data structures.
CObj 2	To learn the significant Python implementation of popular data structures
CObj 3	To learn about various data structure algorithms and design paradigms
CObj 4	To acquire knowledge of how to create complex data structures.
CObj 5	To acquire basic understanding of complex data structures such as trees and graphs and their applications
Course Outcomes	
COut 1	Learners will able to understand concepts of data structures using python language
COut 2	Learner is able to evaluate appropriate data structure in Python for specified problems and algorithms
COut 3	Learner is able to apply Linked list and Stack data structure in various domains
COut 4	Learner is able to apply Tree and Queue data structures and use their operation.
COut 5	Learner has ability to apply of Hashing techniques, Symbol Table and Graph Algorithms appropriately.
COut 6	Learner understand to handle sorting, searching and pattern matching on various datastructures

Modules at a Glance

Data Structures and Algorithms Using Python		
Sr.No	Modules	No. of Lectures
1	Python Data Types and Structures:	15
2	Stacks	15
3	Graphs and Other Algorithms:	15
Total		45

Sr. No.	Modules	No. of Lectures
1	Python Data Types and Structures:	15
	<p>Modules for data structures and algorithms: Collections, Deques, Chain Map objects Counter, Counter objects, Ordered dictionaries, Learning about named tuples Arrays</p> <p>Principles of Algorithm Design: An introduction to algorithms, Algorithm design paradigms Recursion and backtracking, Backtracking, Divide and conquer - long multiplication The recursive approach Runtime analysis Asymptotic analysis Big O notation, Composing complexity classes Omega notation, Thetanotation.</p> <p>Lists and Pointer Structures: Arrays-Pointer structures Singly linked lists-Singly linked list class, The append operation, A faster append operation, Getting the size of the list, Improving list traversal, Deleting nodes, List search, Clearing a list Doubly linked lists-A doubly linked list node Doubly linked list class Append operation</p> <p>The delete operation List search Circular lists-Appending elements, Deleting an element in a circular list, and Iterating through a circular list.</p>	
2	Stacks:	15
	<p>Stack implementation, Push operation, Pop operation, Peek operation, Bracket-matching application</p> <p>Queues:- List-based queues, Stack-based queues Node-based queues, Application of queues Media player queues</p> <p>Trees: Terminology, Tree nodes, Tree traversal, Depth-first traversal-order traversal and infix notation, Pre-order traversal and prefix notation, Post-order traversal and postfix notation, Breadth-first traversal, Binary trees-Binary search trees, Binary search tree implementation, Binary search tree operations, Finding the minimum and maximum nodes Inserting nodes Deleting nodes, Searching the tree, Benefits of a binary search tree, Balancing trees, Expression trees,</p> <p>Parsing a reverse Polish expression, Heaps, Ternary search trees</p>	

3	Graphs and Other Algorithms:	15
	<p>Graphs-Directed and undirected graphs, Weighted graphs, Graph representations, Adjacency lists, Adjacency matrices, Graph Traversals-Breadth-first traversal, Depth-first search.</p> <p>Sorting: Sorting algorithms- Bubble sort algorithms, Insertion sort algorithms, Selection sort algorithms, Quick sort algorithms</p>	
Total No. of Lectures:		45

Practical Work (20 Marks)

List of Practical: (Any 5 practicals to be submitted in the Journal)	
1	General Python Programs
a	Write a Python Program to demonstrate the use of various Python DataTypes and Structures
b	Write Python Programs to implement array and operations of arrays.
2	List
a	Write Python Program to create singly linked list and various operations on it.
b	Write Python Program to create doubly linked list and various operations on it.
c	Write Python Program to create circular linked list and various operations on it.
3	Stacks and Queues
a.	Write Python Program to implement stack and demonstrate push, pop and peek operations.
b.	Write Python Program to implement stack for Bracket-matching application
c.	Write Python Program to implement list based queues and demonstrate various operations on it.
d.	Write Python Program to implement stack based queues and demonstrate various operations on it.
4.	Trees
a.	Write Python Program to implement tree data structure and demonstrate depth- first traversal
b.	Write Python Program to implement tree data structure and demonstrate breadth first traversal
c.	Write Python Program to implement binary search tree to find the minimum node.
d.	Write Python Program to implement binary search tree to find the minimum node.
5.	Graphs
a.	Write a Python program to store and display Graph data structure using adjacency matrix
b.	Write a Python Program to implement Graph traversal (BFS/DFS) based on above practical.

Question Paper Pattern (Academic Year: 2023-2024)**Calculus****Semester End Examination and Practical Examination – 100 Marks****SEMESTER II****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)
Q-1	Answer the following questions (Any 4)		
	A. Theory/Concept-based question	5	20
	B. Theory/Concept-based question	5	
	C. Theory/Concept-based question	5	
	D. Theory/Concept-based question	5	
	E. Theory/Concept-based question	5	
Q-2	Answer the following questions (Any 4)		
	A. Theory/Concept-based question	5	20
	B. Theory/Concept-based question	5	
	C. Theory/Concept-based question	5	
	D. Theory/Concept-based question	5	
	E. Theory/Concept-based question	5	
Q-3	Answer the following questions (Any 4)		
	A. Theory/Concept-based question	5	20
	B. Theory/Concept-based question	5	
	C. Theory/Concept-based question	5	
	D. Theory/Concept-based question	5	
	E. Theory/Concept-based question	5	
	Total		60

B] Practical Examination - 40 Marks

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

Books and references				
Sr. No.	Title	Author/s	Publisher	Year
1.	Hands-On Data Structures and Algorithms with Python	Basant Agarwal, Benjamin Baka	Packt Publishing	2018
2.	Data Structure and algorithm Using Python	Rance D. Necaie	Wiley India Edition	2016
3.	Data Structure and Algorithm in Python	Michael T. Goodrich, RobertomTamassia	Wiley India Edition	2016
4.	Data Structure and AlgorithmicThinking with Python	Narasimha Karumanchi	Careermonk Publications	2015

**Syllabus of courses of FY BSc (Data Science & Analytics) Programme
(With effect from the Academic Year 2023-2024)**

4.Vocational & Skill Enhancement Course (VSCE)

4.A. Skill Enhancement Course

4.A.a. Introduction to Data Science (2 Credits)

Semester II

4.Vocational & Skill Enhancement Course (VSCE)	
4.A. Skill Enhancement Course	
4.A.a. Introduction to Data Science	
Course Objectives and Course Outcomes	
Course Objectives	
CObj 1	Develop in depth understanding of the key technologies in data science and business analytics: data
CObj 2	Practice problem analysis and decision-making.
CObj 3	Gain practical, hands-on experience with statistics programming languages and big data tools through coursework and applied research experiences..
Course Outcomes	
COut 1	Learners will able to understand Data Science technology with a stack
COut 2	Learners will able to apply concepts of Data Science in Business
COut 3	Learners will be able to understand the Layered framework
COut 4	Learners will able to understand management Layers
COut 5	Learners will able to apply the data science process in training the trainer
COut 6	The learner will able to understand the concepts of the Super step
COut 7	Learners will able to analyse data using the super step process of data science

Modules at a Glance

Data Science		
Sr.No	Modules/ Units	No. of Lectures
1	Data Science Technology Stack	10
2	Three Management Layers	10
3	Super steps	10
Total		30

Sr. No.	Modules	No. of Lectures
1	Data Science Technology Stack	10
	Rapid Information Factory Ecosystem, Data Science Storage Tools, Data Lake, Data Vault, Data Warehouse Bus Matrix, Data Science Processing Tools, Spark, Mesos, Akka, Cassandra, Kafka, Elastic Search, R, Scala, Python, MQTT Layered Framework: Definition of Data Science Framework, Cross Industry Standard Process for Data Mining (CRISP-DM) Homogeneous Ontology for Recursive Uniform Schema, The Top Layers of a Layered Framework, Layered Framework for High-Level Data Science and Engineering Business Layer: Business Layer, Engineering a Practical Business Layer Utility Layer: Basic Utility Design, Engineering a Practical Utility Layer	
2	Three Management Layers	10
	Operational Management Layer, Processing-Stream Definition and Management, Audit, Balance, and control Layer, Balance, Control, Yoke Solution, Cause and-effect Analysis System, Functional Layer, Data Science Process Retrieve Super step: Data Lakes, Data Swamps, Training the trainer Model, Understanding the Business Dynamics of the Data Lake Actionable Business Knowledge from Data Lakes, Engineering a Practical Retrieve Super step, Connecting to Other Data Sources.	
3	Super steps	10
	Process Super step: Data Vault, Time-Person-Object Location-Event Data Vault, Data Science Process, Data Science Transform Super step: Transform Super step, building a Data Warehouse, Transforming with Data Science, Hypothesis Testing, Overfitting and Underfitting, Precision-Recall, Cross-Validation Test. Assess Super step: Assess Super step, Errors, Analysis of Data, Practical Actions, Engineering a Practical Assess Super step	
Total No. of Lectures:		30

Question Paper Pattern (Academic Year: 2023-2024)**Data Science****Internal Examination and Semester End Examination – 100 Marks****SEMESTER II****A] Internal Examination – 40 Marks**

Method of evaluation	Total marks
Case study analysis	20
TOTAL	20

B] Semester End Examination (SEE)-30 Marks**Maximum Marks 30**

Duration: 1 Hours

Note: 1. All questions are compulsory

2. All questions carry equal

marks

Question No.	Particulars (Nature of Questions)	Marks (Given)
Q-1	Attempt any one of the following: A. Theory/ Concept- based question B. Theory/ Concept- based question	10
Q-2	Attempt any one of the following: A. Theory/ Concept- based question B. Theory/ Concept- based question	10
Q-3	Attempt any two of the following. A. Short note B. Short note C. Short note D. Short note	10
	Total	30

References:

1. Practical Data Science Andreas François Vermeulen APress 2018
2. Principles of Data Science Sinan Ozdemir PACKT 2016
3. Data Science from Scratch Joel Grus O'Reilly 2015

**Syllabus of courses of FY BSc(Data Science & Analytics) Programme
(With effect from the Academic Year 2023-2024)
4.Vocational & Skill Enhancement Course (VSCE)
4.B.Vocational Skill Course (VSC)
4.B.a Introduction to Intellectual Property Rights (2 Credits)
Semester II**

4.Vocational & Skill Enhancement Course (VSCE)	
4.B. Vocational Skill Course (VSC)	
4.B.a Introduction to Intellectual Property Rights	
Course Objectives and Course Outcomes	
Course Objectives	
CObj 1	To recognize the importance of IP and to educate the pupils on basic concepts of Intellectual Property Rights
CObj 2	To make the students understand the statutory provisions of different types of IPRs in simple forms.
CObj 3	To learn the procedure of obtaining a Patent, Copyright, Geographical Indication, Trademark, Industrial Design and Trade Secret
Course Outcomes	
COout 1	Distinguish and explain various forms of IPRs
COout 2	Identify criteria to fit one's own intellectual work in a particular form of IPRs.
COout 3	Apply statutory provisions to protect particular forms of IPRs.
COout 4	Be familiar with intellectual property protection mechanisms
COout 5	Explain why something is or is not entitled to intellectual property protection
COout 6	Discover the new developments in IPR
COout 7	Learners shall be able to look for IPR protection primarily before the conventional mode of protection like scientific publication

Modules at a Glance

Introduction to Intellectual Property Rights		
Sr. No.	Modules	No. of Lectures
1	Introduction to Intellectual Property Rights	10
2	Types of Intellectual Property Rights	10
3	Application and Emerging Trends	10
Total		30

Sr. No.	Modules	No. of Lectures
1	Introduction to Intellectual Property Rights	10
	Meaning of Intellectual Property and Property Rights: Basic concepts of Intellectual Property; Nature, Scope and Significance of Intellectual Property	
2	Types of Intellectual Property Rights	10
	Patent, Copyright, Geographical Indication, Trademark, Industrial Design and Trade Secret	
3	Application and Emerging Trends	10
	Technology and Legal developments in Intellectual Property; Advantages and Disadvantages of IPR; Recent changes in IPR laws; Registration procedure	
Total No. of Lectures:		30

Question Paper Pattern (Academic Year: 2023-2024)**Introduction to Intellectual Property Rights****Internal Examination and Semester End Examination – 50 Marks****SEMESTER II****A] Internal Examination – 20 Marks**

Method of evaluation	Total marks
Case study analysis	20
TOTAL	20

B] Semester End Examination (SEE)-30 Marks**Maximum Marks 30**

Duration : 1 Hours

Note: 1.All questions are compulsory

2.All questions carry equal marks

Question No.	Particulars	Marks per Question	Total marks	
Q.1	Answer the following questions (Any 2)		15	
	A	Practical / Case study-based question		5
	B	Practical / Case study-based question		5
	C	Practical / Case study-based question		5
Q.3	Answer the following questions (Any 2)		15	
	A	Practical / Case study-based question		5
	B	Practical / Case study-based question		5
	C	Practical / Case study-based question		5
TOTAL			30	

Reference books:

- “Law Relating to Intellectual Property Rights” by V K Ahuja
- “Law Relating To Intellectual Property Rights” by R Radhakrishnan and S Balasubramanian
- “Law Relating to Intellectual Property, 2011 (Reprint)” by B L Wadehra

**Syllabus of courses of FY BSc (Data Science & Analytics) Programme
(With effect from the Academic Year 2023-2024)
5.Ability Enhancement Courses (AEC) /Indian Knowledge Systems (IKS)
5.A. Ability Enhancement Course (AEC)
5.A.a. Language & Literature -II (3 Credits)
Semester II**

5. Ability Enhancement Courses, Value Enhancement Course, Indian Knowledge System	
5.A Ability Enhancement Course (AEC)	
5.A.a Language & Literature - II	
Course Objectives and Course Outcomes	
Course Objectives	
CObj 1	To understand the effective use of power point presentation, relevance, and importance of conducting meetings
CObj 2	To teach the formats of letter writing
CObj 3	To enable the learners to adapt to the requirements of the industry.
Course Outcomes	
COut 1	The learners learn to use statistical tools in powerpoint presentations, and write letters of enquiry and letters of complaint.
COut 2	Learners can prepare flyers and leaflets to help the learners demonstrate their creativity
COut 3	The learners are able to write different types of reports.
COut 4	The learners can analyse all forms of group communication and are able to appropriately use them.
COut 5	Learners understand the importance of following the steps to conduct the meetings.
COut 6	Learners are able to apply the steps taught for effective communication.
COut 7	The learners understand the role and the scope of work of a chairman.
COut 8	Data is analysed and the learner is able to present the same in the form of a report.
COut 9	Learners are able to create effective presentations
COut 10	Learner is able to evaluate and seek redress under RTI

Module at Glance

Language & Literature II		
Sr.No	Module	No .of Lectures
1	Presentation Skills & Group Communication	15
2	Business Correspondence	15
3	Language and Writing Skills	15
Total		45

Sr. No.	Modules	No. of Lectures
1	Presentation Skills	15
	Presentations: (to be tested in tutorials only) 4 Principles of Effective Presentation Effective use of PPT Effective use of statistical tools How to make a Power-Point Presentation Interviews: Group Discussion Preparing for an Interview, Types of Interviews – Selection, Appraisal, Grievance, Exit Meetings: Need and Importance of Meetings, Conduct of Meeting and Group Dynamics Role of the Chairperson, Role of the Participants, Drafting of Notice, Agenda and Resolutions Conference: Meaning and Importance of Conference Organizing a Public Relations: Meaning, Functions of PR Department, External and Internal Measures of PR	
2	Business Correspondence	15
	Trade Letters: Purchase Order, Credit and Status Enquiry, Collection Explain in detail along with the specimens. Only following to be taught in detail:- Letters of Inquiry, Letters of Complaints, Claims, , Sales Letters, promotional leaflets and fliers Consumer Grievance Letters, Letters under Right to Information(RTI) Act	
3	Language and Writing Skills	15
	Reports: Parts, Types, Feasibility Reports, Investigative Reports Summarization: Identification of main and supporting/sub points Presenting these in a cohesive manner	
Total No. of Lectures:		45

Question Paper Pattern (Academic Year: 2023-2024)
Language & Literature II
Internal Examination and Semester End Examination – 100 Marks
Semester II

A] Internal Examination – 40 Marks

Method of evaluation	Marks
Activity in Language lab	20
Translation of newspaper article	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	Marks per Question	Total marks	
Q.1	Answer the following questions (Any 4)		20	
	A	Theory/concept-based question		5
	B	Theory/concept-based question		5
	C	Theory/concept-based question		5
	D	Theory/concept-based question		5
	E	Theory/concept-based question		5
Q.2	Answer the following questions (Any 4)		20	
	A	Theory/concept-based question		5
	B	Theory/concept-based question		5
	C	Theory/concept-based question		5
	D	Theory/concept-based question		5
	E	Theory/concept-based question		5
Q.3	Answer the following questions (Any 4)		20	
	A	Theory/concept-based question		5
	B	Theory/concept-based question		5
	C	Theory/concept-based question		5
	D	Theory/concept-based question		5
	E	Theory/concept-based question		5
TOTAL			60	

Reference Books

1. Agarwal, AnjuD(1989) A Practical Handbook for Consumers, IBH.
2. Alien, R.K.(1970) Organisational Management through Communication. Podar :
NurturingIntellectCreating Personalities
3. Ashley,A(1992) A Handbook Of Commercial Correspondence, Oxford University Press.
4. Aswathapa, K (1991)Organisational Behaviour, Himalayan Publication, Mumbai.
5. Atreya N and Guha (1994) Effective Credit Management, MMC School of Management, Mumbai.
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9. Banerjee, Bani P (2005) Foundation of Ethics in Mangement Excel Books
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11. Basu,C.R.(1998) Business Organisation and Management, T.M.H.New Delhi.
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Practices,HarperCollins College Publishers, New York.
13. Bhargava and Bhargava(1971) Company Notices, Meetings and Regulations
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NewYork,Taxman Publication.
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23. Frailley, L.E. (1982) Handbook of Business Letters, Revised Edn. Prentice Hall Inc.
24. French, Astrid (1993) Interpersonal Skills. Sterling Publishers, New delhi.
25. 27 Fritzsche, David J (2005) Business Ethics: A Global and Managerial Perspective McGraw Hil

**Syllabus of courses of FY BSc(Data Science & Analytics) Programme
(With effect from the Academic Year 2023-2024)
5.Ability Enhancement Courses (AEC) /Indian Knowledge Systems (IKS)
5.B.Value Enhancement Course
5.B.a. Cyber Security (3 Credits)
Semester II**

5.Ability Enhancement Courses (AEC) /Indian Knowledge Systems (IKS)	
5.B.Value Enhancement Course	
5.B.a. Cyber Security	
Course Objectives and Course Outcomes	
Course Objectives	
CObj 1	Ensure secure storage,
CObj 2	Control access and prevent unauthorized processing.
CObj 3	Transfer, or deletion of data
Course Outcomes	
COut 1	Learners will able to understand Cyber security to secure data
COut 2	Learners will be able to understand IT Act 2000 to prevent data from unauthorized users
COut 3	Learners will able to transfer and delete data
COut 4	Learners will able to understand Contracts in the Infotech World
COut 5	Learners will able to apply Indian Evidence Act of 1872 to secure Information technology data
COut 6	Learners will be able to understand Copyright protection in Cyber world
COut 7	Learners will able to understand battling Cyber Squatters
COut 8	Learners will able to apply Copyright protection act in to secure the data.
COut 9	Learners will able to apply Indian Evidence Act of 1872 to secure Information technology data

Modules at a Glance

Cyber Security		
Sr. No.	Modules/	No. of Lectures
1	Power of Arrest Without Warrant Under the IT Act, 2000	15
2	Contracts in the Infotech World:	15
3	Battling Cyber Squatters and Copyright Protection in the Cyber World	15
Total		45

Sr. No.	Modules	No. of Lectures
1	Power of Arrest Without Warrant Under the IT Act, 2000: A	15
	Critique, Crimes of this Millennium, Section 80 of the IT Act, 2000 – A Weapon or a Farce? Forgetting the Line Between Cognizable and Non-Cognizable Offences, Necessity of Arrest without Warrant from Any Place, Public or Otherwise, Check and Balances Against Arbitrary Arrests, Arrest for “About to Commit” an Offence Under the IT Act: A Tribute to Draco, Arrest, But NO Punishment! Cyber Crime and Criminal Justice: Penalties, Adjudication and Appeals Under the IT Act, 2000: Concept of “Cyber Crime” and the IT Act, 2000, Hacking, Teenage Web Vandals, Cyber Fraud and Cyber Cheating, Virus on the Internet, Defamation, Harassment and Email Abuse, Cyber Pornography, Other IT Act Offences, Monetary Penalties, Adjudication and Appeals Under IT Act, 2000, Network Service Providers, Jurisdiction and Cyber Crime, Nature of Cyber Criminality, Strategies to Tackle Cyber Crime and Trends, Criminal Justice in India and Implications on cyber crime	
2	Contracts in the Infotech World:	15
	Contracts in the Infotech World, Click-Wrap and Shrink-Wrap Contract: Status under the Indian Contract Act, 1872, Contract Formation Under the Indian Contract Act, 1872, Contract Formation on the Internet, Terms and Conditions of Contracts. Jurisdiction in the Cyber World: Questioning the Jurisdiction and Validity of the Present Law of Jurisdiction, Civil Law of Jurisdiction in India, Cause of Action, Jurisdiction and the Information Technology Act, 2000, Foreign Judgements in India, Place of Cause of Action in Contractual and IPR Disputes, Exclusion Clauses in Contracts, Abuse of Exclusion Clauses, Objection of Lack of Jurisdiction, Misuse of the Law of Jurisdiction, Legal Principles on Jurisdiction in the United State of America, Jurisdiction Disputes w.r.t. the Internet in the United State of America.	

	The Indian Evidence Act of 1872 v. Information Technology Act, 2000: Status of Electronic Records as Evidence, Proof and Management of Electronic Records; Relevancy, Admissibility and Probative Value of E-Evidence, Proving Digital Signatures, Proof of Electronic Agreements, Proving Electronic Messages, Other Amendments in the Indian Evidence Act by the IT Act, Amendments to the Bankers Books Evidence Act, 1891 and Reserve Bank of India 12 Act, 1934.	
3	Battling Cyber Squatters and Copyright Protection in the Cyber World:	15
	<p>Concept of Domain Name and Reply to Cyber Squatters, Meta-Tagging, Legislative and Other Innovative Moves Against Cyber Squatting, The Battle Between Freedom and Control on the Internet, Works in Which Copyright Subsists and meaning of Copyright, Copyright Ownership and Assignment, License of Copyright, Copyright Terms and Respect for Foreign Works, Copyright Infringement, Remedies and Offences, Copyright Protection of Content on the Internet; Copyright Notice, Disclaimer and Acknowledgement, Downloading for Viewing Content on the Internet, Hyper- Linking and Framing, Liability of ISPs for Copyright Violation in the Cyber World: Legal Developments in the US, Napster and its Cousins: A Revolution on the Internet but a Crisis for Copyright Owners, Computer Software Piracy.</p> <p>Protection of Cyber Consumers in India: Are Cyber Consumers Covered Under the Consumer Protection Act? Goods and Services, Consumer Complaints, Defects in Goods and Deficiency in Services, Restrictive and Unfair Trade Practices, Instances of Unfair Trade Practices, Reliefs Under CPA, Beware Consumers, Consumer Fora's, Jurisdiction and Implications on Consumers in India, Applicability of CPA to Manufacturers, Distributors, Retailers and Service Providers Based in Foreign Lands Whose Goods are Sold or Services Provided to a Consumer in India. Amendments in Indian IT Act 2000</p>	
	Total no of lectures	45

Question Paper Pattern (Academic Year: 2023-2024)
Cyber Security
Internal Examination and Semester End Examination – 100 Marks
Semester II

A] Internal Examination – 40 Marks

Method of evaluation	Total marks
Class Test -I	20
Class Test -II	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	Marks per Question	Total marks	
Q.1	Answer the following questions (Any 4)		20	
	A	Theory/concept-based question		5
	B	Theory/concept-based question		5
	C	Theory/concept-based question		5
	D	Theory/concept-based question		5
Q.2	Answer the following questions (Any 4)		20	
	A	Theory/concept-based question		5
	B	Theory/concept-based question		5
	C	Theory/concept-based question		5
	D	Theory/concept-based question		5
Q.3	Answer the following questions (Any 4)		20	
	A	Theory/concept-based question		5
	B	Theory/concept-based question		5
	C	Theory/concept-based question		5
	D	Theory/concept-based question		5
	Total No of Marks		60	

Reference Books :

Sr. No.	Title	Author/s	Publisher	Year
1.	Cyber LawSimplified	Vivek Sood	TMH Education	2001
2.	Cybersecurity Law	Jeff Kosseff	Wiley	2017