

SRI SARADA COLLEGE FOR WOMEN (AUTONOMOUS),

Reaccredited with 'B++' Grade by NAAC

Affiliated to Periyar University

Fairlands, SALEM- 636 016.



OUTCOME BASED SYLLABUS

PG & RESEARCH DEPARTMENT OF COMPUTER SCIENCE

M.Sc. DATA SCIENCE

(Self-Financing)

(For the students admitted in 2024-2025 onwards)

PROGRAMME OUTCOMES

PO1	Problem Solving Skill Apply knowledge of Management theories and Human Resource practices to solve business problems through Research in Global Context
PO2	Decision Making Skill Foster analytical and critical thinking abilities for data-based decision-making.
PO3	Individual and Team Leadership Skill Capability to lead themselves and the team to achieve organizational goals.
PO4	Employability Skill Inculcate contemporary business practices to enhance employability skills in the competitive environment.
PO5	Entrepreneurial Skill Equip with skills and competencies to become an entrepreneur

SRI SARADA COLLEGE FOR WOMEN (AUTONOMOUS), SALEM-16

PG & RESEARCH DEPARTMENT OF COMPUTER SCIENCE

M.Sc. DATA SCIENCE

PROGRAMME STRUCTURE UNDER CBCS

(For the students admitted in 2024-2025)

Total Credits: 92 + Extra Credits (Maximum 16)

SEMESTER – I				
Course	Course Title	Code	Hrs./Week	Credits
Core Course- I	Fundamentals of Data Science	24PDSCC1	6	5
Core Course - II	Mathematics for Data Science	24PDSCC2	7	5
Core Course- III	Statistics-1	24PDSCC3	7	4
Elective – I	Internet of Things / Research Methodology for Computer Science	24PDSSEC1A / 24PDSSEC1B	5	3
Elective -II	Web Programming/Java Programming	24PDSSEC2A/ 24PDSSEC2B	5(3L+2P)	3
Total			30	20
Extra Skills	<ul style="list-style-type: none">* <i>Articulation and Idea Fixation</i>* <i>Physical Fitness Practice</i>* <i>Productive Preparation for UGC NET/SET/JRF - I (24PDSSC1)</i> <i>(Self-Study - 1 Extra Credit)</i>* <i>Extra credits are given for extra skills and courses qualified in MOOC/NPTEL</i>			

Programme Title	:	M.Sc. Data Science	
Course Title	:	CORE COURSE-I: FUNDAMENTALS OF DATA SCIENCE	
Course Code	:	24PDSCC1	Hours/Week:6
Semester	:	I	Credit:5

COURSE OBJECTIVES:

To introduce the concepts and fundamentals of data science and its life cycle

COURSE OUTCOME:

On Completion of the Course the students will be able to

CO1: Understand the types of data and analytics, data science process, and its life cycle.

CO2: Apply math in data science

CO3: Analyze the various data intensive operations and tools

CO4: Evaluate the tools and methods for analyzing the data

CO5: Investigate the recent potential applications and development of data science with real time case studies

SYLLABUS

Unit – I: **Hours: 16**
Introduction of Data Science: Data Science - Data Science Venn diagram - Basic Terminology – Data Science Case Studies- Types of Data – Levels of data- Types of Data Analytics - Descriptive Analytics - Diagnostic Analytics- Predictive Analytics- Prescriptive Analytics- Five Steps of Data Science.

Unit – II: **Hours:20**
Mathematical Preliminaries - Basic Maths – Mathematics as discipline – Basic Symbols and terminology –Linear algebra - Basic Probability – Definitions- Probability – Bayesian vs frequentist – Compound events – Conditional probability – Rules of probability.

Unit – III: **Hours: 18**
Data Mining and Data Warehousing - Introduction to Data Warehousing – Design consideration of Data Warehouse - Data Loading Process – Case Study – Data Mining – Data Mining techniques – Tools and platforms – Case study.

Unit - IV: **Hours: 18**
Visualizing Data - Exploratory Data Analysis – Developing the visual aesthetic – Chart types – Great Visualizations – Reading graphs – Interactive visualizations.

Unit - V:**Hours: 18**

Data Science – Recent Trends - Applications of Data Science, recent trends in various data collection and analysis techniques, various visualization techniques, application development methods of used in data science.

BOOKS FOR STUDY:

1. Ozdemir, Sinan. Principles of Data Science. Packt Publishing Ltd, 2016. (Unit 1- Chapter 1,2,3 Unit 2 – Chapters 4, 5)
2. Maheshwari, Anil.” Data analytics made accessible”. Seattle: Amazon Digital Services, 2nd edition (2023). (Unit 3 – Chapters 3, 4)
3. Skiena, Steven S. The Data Science Design Manual. Springer, 2017. (Unit 4- Chapter 6)

BOOKS FOR REFERENCE:

1. Hadrien Jean. Education, C. (2023). Data Science. Certybox Education.
2. Pierson, Lillian. Data Science for dummies. John Wiley & Sons, 2021.
3. Grus, Joel. Data Science from Scratch: First principles with python. O'Reilly Media, 2019.
4. Blum, Avrim, John Hopcroft, and Ravindran Kannan. Foundations of Data Science. Cambridge University Press, 2020.

WEB RESOURCES :

1. <https://www.analyticsvidhya.com/>
2. <https://www.simplilearn.com>
3. <https://www.ibm.com/in-en/topics/data-science>
4. <https://www.mygreatlearning.com/blog/what-is-data-science/>

Mapping of COs with POs:

CO/ PO	PO1	PO2	PO3	PO4	PO5
CO1	3	2	2	3	3
CO2	3	2	2	3	3
CO3	3	2	3	3	3
CO4	3	2	3	3	3
CO5	3	2	2	3	3
Weightage of course contributed to each PO	15	10	12	15	15

Programme Title : M.Sc. Data Science
Course Title : CORE COURSE -II: MATHEMATICS FOR DATA SCIENCE
Course Code : 24PDSCC2 **Hours/Week:7**
Semester : I **Credit:5**

COURSE OBJECTIVES:

To build the mathematical background necessary to understand and implement in data science practical/research work.

COURSE OUTCOME:

On Completion of the Course the students will be able to

CO1: Demonstrate understanding of basic mathematical concepts in data science, relating to linear algebra

CO2: Describe properties of linear systems using vectors, perform and matrix operations.

CO3: Describe and compute orthogonality and determinants

CO4: Solve linear differential equations

CO5: Understand and apply the concept of Linear transformations

SYLLABUS

UNIT-I

Hours: 15

Vectors and Matrices - Vectors and Linear Combinations-Lengths and Angles from Dot Products-Matrices and Their Column Spaces-Matrix Multiplication AB and CR -Solving Linear Equations $Ax = b$ -Elimination and Back Substitution-Elimination Matrices and Inverse Matrices-Matrix Computations and $A = LU$ -Permutations and Transposes.

UNIT-II:

Hours: 22

The Four Fundamental Subspaces - Vector Spaces and Subspaces-Computing the Nullspace by Elimination: $A = CR$ - The Complete Solution to $Ax = b$ - Independence, Basis, and Dimension-Dimensions of the FourSubspaces-Introduction to Partial Differential Equations.

UNIT-III:

Hours: 22

Orthogonality - Orthogonality of Vectors and Subspaces-Projections onto Lines and Subspaces-Least Squares Approximations-Orthonormal Bases and Gram-Schmidt-The Pseudoinverse of a Matrix Determinants – 3 by 3 Determinants and Cofactors-Computing and Using Determinants-Areas and Volumes by Determinants.

UNIT-IV :**Hours: 23**

Eigenvalues and Eigenvectors-Introduction to Eigenvalues : $Ax = \lambda x$ - Diagonalizing a Matrix-Symmetric Positive Definite Matrices-Complex Numbers and Vectors and Matrices-Solving Linear Differential Equations

UNIT-V:**Hours: 23**

The Singular Value Decomposition (SVD)-Singular Values and Singular Vectors-Image Processing by Linear Algebra-Principal Component Analysis (PCA by the SVD) - Linear Transformations-The Idea of a Linear Transformation-The Matrix of a Linear Transformation-The Search for a Good Basis.

BOOK FOR STUDY

1.Gilbert Strang, Introduction to Linear Algebra, Wellesley - Cambridge Press, Sixth Edition, 2023.

BOOKS FOR REFERENCE

1. David Lay, Steven Lay, Judi McDonald, Linear Algebra and Its Applications 5th Edition, Pearsons.
2. Sheldon Axler, Linear Algebra Done Right (Undergraduate Texts in Mathematics) 3rd Edition, Springer, 2015 Edition
3. Jim Hefferon, Linear Algebra, Fourth edition
4. Jeff M Philips, Mathematical Foundations for Data Analysis

WEB RESOURCE :

- <https://joshua.smcvt.edu/linearalgebra/>

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CO3	3	2	3	3	3
CO4	3	3	2	3	3
CO5	3	3	2	3	3
Weightage of course contributed to each PO	15	13	11	15	15

Programme Title	: M.Sc. Data Science	
Course Title	: CORE COURSE -III: STATISTICS-1	
Course Code	: 24PDSCC3	Hours/Week:7
Semester	: I	Credit:4

COURSE OBJECTIVES:

To develop knowledge and understand fundamental concepts in probability and statistics.

COURSE OUTCOME:

On Completion of the Course the students will be able to

CO1: Organize, manage and present data.

CO2: Understand, describe, and calculate the measures of data and correlation.

CO3: Recognize and understand various probability distribution functions, calculate and interpret expected results

CO4: Apply the methods of estimating a parameter.

CO5: Understand the concept of probability and apply for simple events.

SYLLABUS**UNIT-I****Hours: 15**

Introduction to Statistics-Introduction-Data Collection and Descriptive Statistics-Inferential Statistics and Probability Models-Populations and Samples-A Brief History of Statistics-Organization and Presentation of Data-Origin and development of Statistics, Scope, limitation and misuse of statistics. Types of data: primary, secondary, quantitative and qualitative data. Types of Measurements: nominal, ordinal, discrete and continuous data. Presentation of data by tables: construction of frequency distributions for discrete and continuous data, graphical representation of a frequency distribution by histogram and frequency polygon, cumulative frequency distributions.

UNIT-II:**Hours:22**

Descriptive statistics-Introduction-Describing Data Sets-Frequency Tables and Graphs-Relative Frequency Tables and Graphs-Grouped Data, Histograms, Ogives, and Stem and Leaf Plots-Summarizing Data Sets-Sample Mean, Sample Median, and Sample Mode-Sample Variance and Sample Standard Deviation-Sample Percentiles and Box Plots-Chebyshev's Inequality-Normal Data Sets-Paired Data Sets and the Sample Correlation

Coefficient- Correlation-Scatter plot, Karl Pearson coefficient of correlation, Spearman's rank correlation coefficient, multiple and partial correlations (for 3 variates only).

UNIT-III:**Hours:22**

Random variables and expectation-Random Variables-Types of Random Variables-Jointly Distributed Random Variables-Independent Random Variables-Conditional Distributions-Expectation-Properties of the Expected Value- Expected Value of Sums of Random Variables-Variance- Covariance and Variance of Sums of Random Variables-Moment Generating Functions-Chebyshev's Inequality and the Weak Law of Large Numbers-Special random variables-The Bernoulli and Binomial Random Variables-Computing the Binomial Distribution Function-The Poisson Random Variable- Computing the Poisson Distribution Function-The Hypergeometric Random Variable-The Uniform Random Variable- Normal Random Variables-Exponential Random Variables-The Poisson Process-The Gamma Distribution-Distributions Arising from the Normal-The Chi-Square Distribution-The t-Distribution-The F Distribution-The Logistics Distribution.

UNIT-IV:**Hours:23**

Distributions of sampling statistics-Introduction-The Sample Mean-The Central Limit Theorem- Approximate Distribution of the Sample Mean, How Large a Sample Is Needed?-The Sample Variance-Sampling Distributions from a Normal Population-Distribution of the Sample Mean, Joint Distribution of X and S-Sampling from a Finite Population-Parameter estimation-Introduction-Maximum Likelihood Estimators-Interval Estimates- Confidence Interval for a Normal Mean When the Variance is Unknown-Confidence Intervals for the Variance of a Normal Distribution - Estimating the Difference in Means of Two Normal Populations-Approximate Confidence Interval for the Mean of a Bernoulli Random Variable-Confidence Interval of the Mean of the Exponential Distribution-The Bayes Estimator.

UNIT-V :**Hours:23**

Basics and Elements of Probability-Random experiment, sample point and sample space, event, algebra of events. Definition of Probability: classical, empirical and axiomatic approaches to probability, properties of probability .Theorems on probability, conditional probability and independent events, Laws of total probability, Baye's theorem and its applications-Introduction-Sample Space and Events-Venn Diagrams and the Algebra of Events-Axioms of Probability-Sample Spaces Having Equally Likely Outcomes.

BOOKS FOR STUDY

1. Sheldon M. Ross, Introduction to Probability and Statistics for Engineers And Scientists, Elsevier Academic Press, UK, Fifth Edition, 2023
2. Rohatgi V.K and Saleh E, An Introduction to Probability and Statistics, 3rd edition, John Wiley & Sons Inc., New Jersey, 2015.
3. Gupta S.C and Kapoor V.K, Fundamentals of Mathematical Statistics, 11th edition, Sultan Chand & Sons, New Delhi, 2014

BOOK FOR REFERENCE

1. Jim Frost, Introduction to Statistics: An Intuitive Guide for Analyzing Data and Unlocking Discoveries

WEB RESOURCES :

1. <https://onlinestatbook.com/2/>
2. <https://www.simplilearn.com/tutorials/statistics-tutorial>
3. <https://towardsdatascience.com/fundamentals-of-statistics-for-data-scientists-and-data-analysts-69d93a05aae7>

Mapping of COs with POs:

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CO1	3	3	2	3	3
CO2	2	3	3	3	3
CO3	2	3	3	3	3
CO4	3	3	3	3	3
CO5	3	3	2	3	3
Weightage of course contributed to each PO	13	15	13	15	15

Programme Title	:	M.Sc. Data Science	
Course Title	:	ELECTIVE I: INTERNET OF THINGS	
Course Code	:	24PDS DSEC1A	Hours/Week:5
Semester	:	I	Credit:3

COURSE OBJECTIVE:

- To understand the concepts, data, framework, standards, protocols, reliability, security and privacy involved in IoT

COURSE OUTCOME:

On Completion of the Course the students will be able to

CO1: Describe the concepts of IoT

CO2: Know the essentials IoT data and framework

CO3: Learn IoT protocols

CO4: Design a basic IoT system

CO5: Examine the reliability, security and privacy of an IoT system

SYLLABUS

UNIT-I

Hours : 12

IoT Ecosystem Concepts and Architectures - Introduction – IoT definition and evolution – IoT Architectures – OpenIoT Architecture for IoT/Cloud Convergence - Resource Management – IoT Data Management and Analytics - Communication Protocols – Internet of Things applications-Scheduling Process and IoT Services Lifecycle - IoT enabling technologies – IoT levels and Deployments templates – Introduction to M2M - Difference between IoT and M2M – SDN and NFV for IoT.

UNIT-II

Hours : 12

IoT Data and Framework Essentials - Introduction - Programming framework for IoT– The foundation of Stream processing in IoT- Continuous Logic processing system – Challenges and Future directions – Anomaly detection – Problem statement and definitions – Efficient incremental local modelling – IoT Governance.

UNIT-III

Hours: 20

RF Protocols RFID, NFC:IEEE 802.15.4 - ZigBee - ZWAVE, THREAD - Bluetooth Low Energy (BLE) - IPv6 for Low Power and Lossy Networks (6LoWPAN) - Routing Protocol for Low power and lossy networks (RPL) - CoAP- XMPP - Web Socket- AMQP – MQTT –

WebRTC - PuSH Architectural Considerations in Smart Object Networking - TinyTO Protocol. 3.2 Introduction to IoT based applications – Scenarios – Architecture overview – Sensors – The gateway – Data Transmission – Internet of Vehicles (IoV) – IoV Characteristics, technologies and its application.

UNIT-IV :

Hours: 16

Developing Internet of Things - Introduction – IoT Design Methodology – Case study on IoT system for Weather monitoring – IoT Device - IoT physical devices and endpoints - Exemplary Device: Raspberry Pi - Linux on Raspberry Pi - Raspberry Pi interfaces – Programming Raspberry Pi and with python – Other IoT devices.

UNIT-V:

Hours: 15

IoT Reliability, Security and Privacy - Introduction - Concepts - IoT Security Overview – Security Frameworks for IoT – Privacy in IoT networks – IoT characteristics and reliability issues - Addressing reliability.

BOOKS FOR STUDY:

- 1 Arshdeep Bahga, Vijay Madiseti, “Internet of Things, A Hands -on Approach”, 1st Edition 2015, University Press, ISBN: 978-81-7371- 954-7
2. Buyya, Rajkumar, and Amir Vahid Dastjerdi, eds. Internet of Things: Principles and paradigms. Elsevier, 2016.
3. Hersent, Olivier, David Boswarthick, and Omar Elloumi. The internet of things: Key applications and protocols. John Wiley & Sons, 2011.

BOOKS FOR REFERENCE:

1. Bernd Scholz-Reiter, Florian Michahelles, “Architecting the Internet of Things”, ISBN 978- 3- 642-19156-5 e-ISBN 978-3-642-19157-2, Springer
2. Jan Holler, VlasiosTsiatsis, Catherine Mulligan, Stefan Avesand, Stamatis Karnouskos, David Boyle, “From Machine-to-Machine to the Internet of Things: Introduction to a New Age of Intelligence”, 1st Edition, Academic Press, 2014.
3. Peter Waher, “Learning Internet of Things”, PACKT publishing, BIRMINGHAM – MUMBAI.

WEB RESOURCES:

- 1 <https://thingsee.com/blog/quality-hardware-list-for-your-iot-projects>
- 2 <https://tools.ietf.org/html/rfc7452>. <http://dret.net/lectures/iot-spring15/protocols>
- 3 <http://iot.intersog.com/blog/overview-of-iot-development-standards-andframeworks>.

Mapping of COs with POs:

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CO1	3	3	1	2	2
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CO3	3	3	1	2	2
CO4	3	3	3	2	2
CO5	3	3	1	2	2
Weightage of course contribute to each PO	15	15	7	10	10

Programme Title : M.Sc. Data Science
**Course Title : ELECTIVE I: RESEARCH METHODOLOGY FOR
COMPUTER SCIENCE**
Course Code : 24PDS DSEC1B Hours/Week:5
Semester : I Credit:3

COURSE OBJECTIVE:

- To develop an understanding of the research methods relevant to effectively address a research problem

COURSE OUTCOME:

On Completion of the Course the students will be able to

CO1: Develop an understanding of Research methods

CO2: Formulate a Research problem

CO3: Collect and Analyse data

CO4: Effectively write a research paper

CO5: Present the Paper more professionally.

SYLLABUS

UNIT-I: Hours:12

Introduction to Research-Meaning, Objectives and Characteristics of research - Research Methods Vs. Methodology - Types of research- Research process - Criteria of good research - Research Project-Shaping a Research Project-Research Planning-Students and Advisors – Checklist.

UNIT-II: Hours:12

Literature Review -Reading and Reviewing - Hypotheses, Questions, and Evidence.

UNIT-III: Hours:20

Experiments for Computing-Experimentation-Statistical Principles - Writing a Paper-Organization-Good Style-Style Specifics-Punctuation-Mathematics-Algorithms- Graphs, Figures, and Tables -Other Professional Writing.

UNIT-IV: Hours:16

Presentation -Editing- Presentations-Slides-Posters-Ethic

UNIT-V:**Hours:15**

Report writing-Report writing using LATEX for a research problem

BOOKS FOR STUDY:

1. Kothari C. R. Research Methodology Methods and Techniques. 2nd ed. New Delhi: New Age, 2004.
2. Justin Zobel. Writing for Computer Science.3rd ed. Springer-Verlag,2014

BOOKS FOR REFERENCE:

1. Ranjit Kumar. Research Methodology -a step-by-step guide for beginners. 3rd ed. SAGE Publications India Pvt Ltd, 2011.
2. Panneerselvam R. Research Methodology. 2nd ed. New Delhi: Prentice Hall, 2014.

WEB RESOURCES:

1. <https://www2.le.ac.uk/offices/red/rd/research-methods-and-methodologies>
2. <http://www.socscidiss.bham.ac.uk/methodologies.html>

Mapping of COs with POs:

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CO1	3	3	3	2	1
CO2	3	3	3	2	1
CO3	3	3	3	2	1
CO4	3	3	3	2	1
CO5	3	3	3	2	1
Weightage of course contribute to each PO	15	15	15	10	5

Programme Title	:	M.Sc. Data Science	
Course Title	:	ELECTIVE II: WEB PROGRAMMING	
Course Code	:	24PDSSEC2A	Hours/Week:5
Semester	:	I	Credit:3

COURSE OBJECTIVE:

- To introduce students about web application and state management.

COURSE OUTCOME:

On Completion of the Course the students will be able to

CO1: Comprehend .NET Framework and Windows Application

CO2: Know about presentation controls and namespaces

CO3: Connect with backend using ADO.NET

CO4: Get the knowledge about web application and state management

CO5: Gain knowledge on connecting XML, LINQ and AJAX

SYLLABUS

UNIT-I:

Hours :13

Overview of .NET Framework-CLR-CTS- Metadata and Assemblies-.NET Framework Class Library – BCL- Windows Forms – ASP.NET and ASP.NET AJAX-ADO.NET – Tools in the .NET Framework- New Features of .NET Framework: Portable Class Libraries - Introducing Windows Application-Introduction – Creating Windows Forms- Customizing a Form - Collecting User Input in windows Forms and Events-Buttons-Text Boxes- Check Boxes- Radio Buttons –Combo Boxes –Date and TimePicker – Calendar-List Boxes –Checked List Box –List View – Tree View.

UNIT-II:

Hours : 15

Presentation and Informational Controls in Windows Forms and Events-Labeling- Labeling- Link Label- Status Bar- Picture Box-Image List-Progress Bar-Tool Tip –MDI and Menus Creation - Data Types in C# -Type Conversions – Boxing and Unboxing - Namespace - Introduction – Adding a reference to the Namespace – Accessing a predefined Namespace through the using Directive - Introducing to ADO.net- Understanding ADO.NET- Creating Connection Strings –Creating a Connection to a Database- Creating a Command Object- Working with DataAdapters –Using DataReader work with Database.

UNIT-III:

Hours : 17

ASP.NET-Life cycle- Specifying a Location for a Web Application -Single-File Page Model - Code- Behind Page Model- Adding controls to web form - Web Server Controls-The Control Class - The WebControl Class - The Button Control - The TextBox Control -The Label Control - The HyperLink Control -The LinkButton Control -The Placeholder Control - The HiddenField Control - The CheckBox Control -The RadioButton Control -The ListBox Control -The DropDownList Control -The Image Control -The ImageButton Control - The Table Control - Menus - Validation Server Controls - Master Page - Web.Config.

UNIT-IV:

Hours : 15

State Management-Understanding the session object Sessions and the Event Model, Configuring, In-Process Session State, Out-of-Process Session state Application Object, Query strings, Cookies, ViewState, Global.asax- XML and .NET-Basics of XML, Create XML Document - Reading XML with XmlReader – Reading XML with XmlDocument - Working with XmlNode - Animations-Understanding WPF's Animation services – The Role of the Animation class types-The To, From and by properties – The Role of the Timeline Base Class – Authoring and Animation in C# Code – Controlling the pace of an animation – Reversing and Looping an Animation – The Role of StoryBoards.

UNIT-V:

Hours : 15

LINQ-Introducing LINQ Queries- Standard Query Operators- Introducing LINQ to Dataset, SQL and XML- The LinqDataSource Control. Data Binding – Grid View, Details view, Forms view - ASP. NET AJAX-Understanding the need for AJAX, Building a simple ASP.NET page without AJAX, Building a simple ASP.NET page with AJAX.

BOOKS FOR STUDY:

1. C# 2012 Programming Covers .NET 4.5 Black Book. Dreamtech press, Kogent Learning Solutions, 2013.
2. Liberty, Jesse, and Dan Hurwitz. Programming. NET Windows Applications. " O'Reilly Media, Inc.", 2004.
3. Troelsen, Andrew, and Philip Japikse, C# 6.0 and the .NET 4.6 Framework. Apress, 2015.

BOOKS FOR REFERENCE:

1. Albahan Joseph, and Ben Albahari. *C# 5.0 in a NutShell: The Definitive Reference*. “Orielly Media Inc”, 2012.
2. Anne Boehm . Joel. Murach’s *C# 2015*. United States of America: Murach's,2016.
Delamater. Mary. Anne Boehm. *ASP.NET 4.5 Web Programming with C# 2012*. United States of America: Murach's, 2013.
3. John Sharp. *Microsoft Visual C# Step by Step*. United States of America: Pearson Edition,2018.
4. Price, Jason, and Mike Gunderlov. *Mastering Visual C#.Net*. John Wiley & Sons, 2006

WEB RESOURCES:

1. <http://www.w3schools.com/aspnet/aspnet.asp>
2. <http://csharp.net-tutorials.com/xml/introduction/>
3. <http://ajax.net-tutorials.com/basics/introduction/>
4. <http://www.c-sharpcorner.com/>

Mapping of COs with POs:

CO/PO	PO1	PO2	PO3	PO4	PO5
CO1	3	3	3	2	1
CO2	3	3	3	2	1
CO3	3	3	3	2	1
CO4	3	3	3	2	1
CO5	3	3	3	2	1
Weightage of course contribute to each PO	15	15	15	10	5

Programme Title : M.Sc. Data Science
Course Title : ELECTIVE II: JAVA PROGRAMMING
Course Code : 24PDS DSEC2B **Hours/Week:5**
Semester : I **Credit:3**

COURSE OBJECTIVE:

- To enable the students to understand and appreciate the need for Object Oriented Programming.

COURSE OUTCOME:

On Completion of the Course the students will be able to

- CO1** Understand the concepts of object-oriented programming
- CO2** Use Java programming language at a basic level and construct simple software applications
- CO3** Understand classes, objects and implementing inheritance
- CO4** Analyze and understand the functionality of Inheritance, Interface and develop simple applications
- CO5** To develop software applications and services using Java code

SYLLABUS

UNIT-I:

Hours:15

Introduction to Java-Overview – Features - Fundamental OOPS concepts – JDK – JRE – JVM -Structure of a Java program - Data types – Variables – Arrays – Operators –Keywords - Naming Conventions - Control statements, Type conversion and Casting - Scanner - String - equals(), equalsIgnoreCase(), length().

UNIT-II:

Hours:13

Classes and Objects-Class – Objects – Methods - Method Overloading - Constructors – Constructor Overloading - this keyword - usage of static with data and methods – Garbage Collection - Access Control - Inheritance-Concept – extends keyword - Single and Multilevel Inheritance – Composition – super keyword - Method Overriding - Abstract Classes - Dynamic Method Dispatch – Usage of final with data, methods and classes – Packages and Interfaces

-Concepts - package and import keywords - Defining, Creating and Accessing a Package – Interfaces - Multiple Inheritance in Java, Extending and Initialising fields in Interfaces.

UNIT-III:

Hours:17

Exception Handling-Exception handling- Types of Exceptions- try, catch, throw, throws and finally keywords - User defined Exceptions - JDBC-Database Connectivity- Types of JDBC drivers- Executing statements- Prepared statements- Callable statements - Mapping SQL types to Java- ResultSet Metadata.

UNIT-IV :

Hours:15

Multithreading-Introduction - Life Cycle of a Thread, Thread class and Runnable Interface, Thread Priorities, Synchronisation. GUI Programming with JavaFX-JavaFX Basic Concepts – Packages - Stage and Scene Classes - Nodes and Scene Graphs – Layouts - The Application Class and the Lifecycle Methods - Launching a JavaFX Application - JavaFX Application Skeleton - Compiling and Running -Application Thread - JavaFX Controls- Label – Button – Image – RadioButton – CheckBox – ListView- ComboBox- TextField ScrollPane.

UNIT-V:

Hours:15

Event-Event Handling – Input Event, Action Event and Window Event - Java Library- java.util – List, ArrayList.

BOOK FOR STUDY:

1. Schildt, Herbert. Java: The Complete Reference. McGraw-Hill Education Group, 2014.

BOOKS FOR REFERENCE:

1. Eckel, Bruce. Thinking in Java. 4th ed. Pearson Education, 2006.
2. Liang, Y. Daniel. Intro to Java Programming, Brief Version. Pearson Higher Ed, 2015.
3. Holmes, J. Barry, Joyce, T. Daniel. Object-oriented Programming with Java. Jones & Bartlett Learning. 2001

WEB RESOURCES:

1. <http://docs.oracle.com/javase/tutorial/java/index.html/>
2. <http://www.java2s.com/Tutorial/Java/CatalogJava.htm/>
3. <https://www.edureka.co/blog/object-oriented-programming/>

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