

ST. PHILOMENA'S COLLEGE (AUTONOMOUS)

Affiliated to University of Mysore
Accredited by NAAC with 'B⁺⁺' Grade
Bannimantap, Mysore, Karnataka,
India-570015



DEPARTMENT OF COMPUTER SCIENCE

**The Board of Studies in COMPUTER SCIENCE DEPARTMENT which met on -
31.08.2024 has
Approved the syllabus and pattern of examination for
Semesters V and VI B.Sc for the
Academic Year 2024-25 onwards**

BOS COMMITTEE MEMBERS

Sl. No.	Name	Designation
1	Ms.Gloria Priyadarshini	Chair Person
2	Dr. Nagendra Prasad	University Nominee
3	Mr. Dharmendra	Industry Representative
4	Ms. Amulya S	Industry Representative
5	Mr. Chandraiah T	Member
6	Mr. Anil Kumar R J	Member
7	Ms Nalina Kumari	Member
8	Mr. Amos R	Member
9	Ms. Harinakshi	Member
10	Ms. Syeda Masarath	Member
11	Ms. Archana A	Member
12	Ms. Sandra Agnes J	Member
13	Ms. Manasa E	Member
14	Ms. Lydia Anjali	Member
15	Mr. Manikanta	Member
16	Ms. Shruthi	Member

Semester ____5____
Core Course Content

Course Title: Programming in Python	Course Credits: 4
Course Code: DSC-5	L-T-P per week: 4-0-0
Total Contact Hours: 52	
Formative Assessment Marks: 40	Summative Assessment Marks: 60

Pedagogy: Written Assignment/Presentation/Project / Term Papers/Seminar/Field studies, Quiz/Project/Class room exercise/Practice exercise/Educational (industry/ institutes/ NGOs) visit/ field trip/ Field work/Viva voce/Role Play/Charts/ Models/Case study/Group discussion/Crosswords/ Presentation/seminar/Review – movie / Book/Research articles/e – content preparation

Course Objectives:

To understand and learn

1. how to design and program Python applications.
2. how to use lists, tuples, and dictionaries in Python programs.
3. how to identify Python object types.
4. how to use indexing and slicing to access data in Python programs.
5. To define the structure and components of a Python program.
6. how to write loops and decision statements in Python.
7. how to write functions and pass arguments in Python.
8. how to read and write files in Python.
9. how to design object-oriented programs with Python classes.
10. how to use class inheritance in Python for reusability.
11. how to use exception handling in Python applications for error handling.

Course Outcomes (COs):

After the successful completion of the course, the student will be able to:

1. Setup python to develop simple applications
2. Understand the basic concepts in Python programming
3. Learn to write, debug and execute Python programs
4. Understand and demonstrate the use of advanced data types such as tuples, dictionaries, lists, Tuples and Sets
5. Design solutions for problems using object-oriented concepts in Python
6. Use and apply the different Python Libraries for GUI Interface, Data Analysis and Data Visualization.
7. Extend the knowledge of python programming to build successful career in software development.

COURSE CONTENT		52 Hrs
Unit 1	<p>Introduction to Features and Applications of Python; Python Versions; Python Command Line mode and Python IDEs;</p> <p>Python Basics: Identifiers; Keywords; Statements and Expressions; Variables; Operators; Precedence and Association; Data Types; Indentation; Comments; Built-in Functions- Console Input and Console Output, Type Conversions; Python Libraries; Importing Libraries with Examples.</p> <p>Python Control Flow: Types of Control Flow; Control Flow Statements- if, else, elif, while loop, break, continue statements, for loop Statement; range () and exit ()functions.</p>	10
Unit 2	<p>Exception Handling: Types of Errors; Exceptions; Exception Handling using try, except and finally.</p> <p>Python Functions: Types of Functions; Function Definition- Syntax, Function Calling, Passing Parameters/arguments, the return statement; Default Parameters; Command line Arguments; Key Word Arguments; Recursive Functions; Scope and Life time of Variables in Functions.</p> <p>Strings: Creating and Storing Strings; Accessing Sting Characters; the str() function; Operations on Strings- Concatenation, Comparison, Slicing and Joining, Traversing; Format Specifiers; Escape Sequences; Raw and Unicode Strings; Python String Methods.</p>	10
Unit 3	<p>Lists: Creating Lists; Operations on Lists; Built-in Functions on Lists; Implementation of Stacks and Queues using Lists; Nested Lists.</p> <p>Dictionaries: Creating Dictionaries; Operations on Dictionaries; Built-in Functions on Dictionaries; Dictionary Methods; Populating and Traversing Dictionaries.</p> <p>Tuples and Sets: Creating Tuples; Operations on Tuples; Built-in Functions on Tuples; Tuple Methods; Creating Sets; Operations on Sets; Built-in Functions on Sets; Set Methods.</p>	10
Unit 4	<p>File Handling: File Types; Operations on Files–Create, Open, Read, Write, Close Files; File Names and Paths; Format Operator. GU Interface: The Tkinter Module; Window and Widgets; Layout Management- pack, grid and place.</p> <p>Python SQLite: The SQLite3 module; SQLite Methods- connect, cursor, execute, close; Connect to Database; Create Table; Operations on Tables- Insert, Select, Update. Delete and Drop Records.</p>	11

Unit 5	<p>Data Analysis: NumPy- Introduction to NumPy, Array Creation using NumPy, Operations on Arrays; Pandas- Introduction to Pandas, Series and Data Frames, Creating Data Frames from Excel Sheet and .csv file, Dictionary and Tuples. Operations on Data Frames.</p> <p>Data Visualisation: Introduction to Data Visualisation; Matplotlib Library; Different Types of Charts using Pyplot- Line chart, Bar chart and Histogram and Pie chart.</p>	11
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References

1	<p>Think Python How to Think Like a Computer Scientist, Allen Downey et al., 2nd Edition, 2015, Green Tea Press. Freely available online @ https://www.greenteapress.com/thinkpython/thinkCSpy.pdf</p>
2	<p>Introduction to Python Programming, Gowri Shankar Set al.,2019,CRC Press</p>
3	<p>Python Data Analytics: Data Analysis and Science Using Pandas, matplotlib, and the Python Programming Language, Fabio Nelli, 2015, Apress®</p>
4	<p>Advance Core Python Programming, Meenu Kohli,2021,BPB Publications</p>
5	<p>Core PYTHON Applications Programming, WesleyJ. Chun,3rdEdition,2012,Prentice Hall</p>
6	<p>Automate the Boring Stuff, AlSweigart, 2015, NoStarch Press, Inc.</p>
7	<p>Data Structures and Program Design Using Python,D Malhotra etal.,2021,Mercury Learning and Information LLC</p>
8	<p>http://www.ibiblio.org/g2swap/byteofpython/read/</p>
9	<p>https://docs.python.org/3/tutorial/index.html</p>

Course Code: DSC-5 Lab	Course Title: Python programming Lab
Course Credits:02	Hours of Teaching / Week : 04
Total Contact Hours: 52	Formative Assessment Marks: 25
Exam Marks: 25	Exam Duration:03

Course Objectives:

To understand and learn

1. why Python is a useful scripting language for developers.
2. how to design and program Python applications.
3. how to use lists, tuples, and dictionaries in Python programs.
4. how to write loops and decision statements in Python.
5. how to write functions and pass arguments in Python.
6. how to build and package Python modules for reusability.
7. how to read and write files in Python.
8. how to use exception handling in Python applications for error handling.

Course Outcomes (COs):

After the successful completion of the course, the student will be able to:

1. Setup python to develop simple applications
2. Understand the basic concepts in Python Programming
3. Learn to write, debug and execute Python programs
4. Understand and demonstrate the use of advanced data types such as tuples, dictionaries, lists, Tuples and Sets
5. Design solutions for problems using object-oriented concepts in Python
6. Use and apply the different Python Libraries for GUI Interface, Data Analysis and Data Visualization.
7. Extend the knowledge of python programming to build successful career in software development.

Practical Content

Part-A

1. Check if a number belongs to the Fibonacci Sequence
2. Find the sum of n natural numbers
3. Display Multiplication Tables
4. Check if a given number is a Prime Number or not
5. Implement a sequential search
6. Create a calculator program
7. Explore string functions
8. Implement Selection Sort
9. Demonstration of operator overloading.
10. Demonstration of function overloading.

Part-B

1. Demonstrate usage of tuples
2. Demonstrate use of sets
3. Demonstrate use of List
4. Demonstrate use of Dictionaries
5. Demonstrate single inheritance
6. Demonstrate multiple inheritance
7. Implement stack
8. Demonstrate Exceptions in Python
9. Drawing Line chart and Bar chart using Matplotlib
10. Drawing Histogram and Pie chart using Matplotlib

Semester 5
Core Course Content

Course Title: Computer Networks	Course Credits: 4
Course Code: DSC-6	L-T-P per week: 4-0-0
Total Contact Hours: 52	
Formative Assessment Marks:40	Summative Assessment Marks:60

Pedagogy: Written Assignment/Presentation/Project / Term Papers/Seminar/Field studies, Quiz/Project/Class room exercise/Practice exercise/Educational (industry/ institutes/ NGOs) visit/ field trip/ Field work/Viva voce/Role Play/Charts/ Models/Case study/Group discussion/Crosswords/ Presentation/seminar/Review – movie / Book/Research articles/e – content preparation

Course objectives:

1. Build an understanding of the fundamental concepts of computer networking.
2. Familiarize the student with the basic taxonomy and terminology of the computer networking area.
3. Introduce the student to advanced networking concepts, preparing the student for entry Advanced courses in computer networking.
4. Independently understand basic computer network technology.
5. Identify the different types of network topologies and protocols.
6. Enumerate the layers of the OSI model and TCP/IP. Explain the function(s) of each layer.

Course Outcomes(COs):After the successful completion of the course, the student will be able to:

CO1	Define various data communication components in networking.
CO2	Describe networking with reference to different types of models and topologies.
CO3	Understand the need for Network and various layers of OSI and TCP/IP reference model.
CO4	Explain various Data Communications media.
CO5	Describe the physical layer functions and components
CO6	Identify the different types of network topologies and Switching methods.
CO7	Describe various Data link Layer Protocols.
CO8	Identify the different types of network devices and their functions within a network.

CO9	Analyze and Interpret various Data link Layer and Transport Layer protocols.	
CO10	Explain different application layer protocols.	
Course Contents		52 Hrs
Unit 1	Introduction: Computer Network: Definition, Goals, Structure; Broadcast and Point-To-Point Networks; Network Topology and their various Types; basics of data communication, Types of Networks, Network software, Design issues for the layers, Connection-oriented vs . Connectionless service, Applications of Computer network, Protocols and Standards, The OSI Reference Model, The TCP/IP Protocol suite, communication network and services.	10
Unit 2	Physical Layer: Functions of Physical Layer, Analog signals, Digital signals, Transmission Impairment, Data Rate Limits, and Performance. Data Transmission Media: Guided Transmission Media, Magnetic Media, Twisted Pairs, Coaxial Cable, Power Lines, Fiber Optics, Wireless Transmission, Digital Modulation and Multiplexing,. Switching: Circuit switching, Message switching & Packet switching	12
Unit 3	Data Link Layer: Functions of Data Link Layer, Data Link Control: Framing, Flow and Error Control, Error Detection and Correction, High-Level Data Link Control (HDLC) & point to Point protocol (PPP), Channel Allocation Problem, Multiple Access: Random Access (ALOHA, CSMA, CSMA/CD, CSMA/CA), Controlled Access (Reservation, Polling, Token Passing), Channelization: FDMA, TDMA, CDMA	10
Unit 4	Wired LAN: Ethernet Standards and FDDI, Wireless LAN: IEEE802.11x and Bluetooth Standards. Transport Layer: Functions of Transport Layer, Elements of Transport Protocols:Addressing, Establishing and Releasing Connection, Flow Control & Buffering, Error Control, Multiplexing & De-multiplexing, Crash Recovery, network security: firewall, hardware and software in network security. Policies, virtual private network.	10
Unit 5	User Datagram Protocol (UDP): User Datagram, UDP Operations, Uses of UDP, RPC, Principles of Reliable Data Transfer: Building a Reliable Data Transfer Protocol, Pipelined Reliable Data Transfer Protocol, Go Back-N(GBN), Selective Repeat (SR). Application layer: Functions of Application layer, Application Layer Protocols: DNS, DHCP, WWW, HTTP, HTTPs, TELNET, FTP, SMTP, POP, IIMAP, basics of IOT, 5G, and edge computing	10

Pedagogy: Lecture/ PPT/ Videos/ Animations/ Role Plays/ Think-Pair-Share/ Predict-Observe- Explain/ Demonstration/ Concept mapping/ Case Studies examples/ Tutorial/ Activity/ Flipped Classroom/ Jigsaw/ Field based Learning/ Project Based Learning/ Mini Projects/ Hobby Projects/ Forum Theatre/ Dance/ Problem Based Learning/ Game Based Learning/ Group Discussion/ Collaborative Learning/ Experiential Learning / Self Directed Learning etc.

References

Reference Books:

1	Andrew S Tanenbaum, David. J. Wetherall, —Computer Networks I, Pearson Education,5 th Edition,
2	Behrouz A. Forouzan, "Data Communications and Networking", Tata McGraw-Hill, Fourth Edition
3	Kurose and Ross, Computer Networking-A Top-Down approach, Pearson,5 edition
4	William Stallings, Data and Computer Communications, 7 th Edition, PHI.
4	http://highered.mheducation.com/sites/0072967757/index.html
7	Larry L. Peterson, Bruce S. Davie, — Computer Networks: A Systems Approach I, Morgan Kaufmann Publishers, Fifth Edition, 2011.
8	Brijendra singh, Data Communication and Computer Networks, PHI.

Course Code: DSC-6 Lab	Course Title: Computer Networking Lab
Course Credits:02	Hours of Teaching / Week : 04
Total Contact Hours: 52	Formative Assessment Marks: 25
Exam Marks: 25	Exam Duration:03

Course Objectives:

- To understand the working principle of various communication protocols.
- To analyze the various routing algorithms.
- To know the concept of data transfer between nodes

Course Outcomes:

- Understand the practical approach to network communication protocols.
- Understand network layers, structure/format and role of each network layer.
- Able to design and implement various network application such as data transmission between client and server, file transfer, real-time multimedia transmission.
- Understand the various Routing Protocols/Algorithms and Internetworking.

PartA:

1. Prepare hardware and software specification for basic computer system and Networking.
2. Study of different types of Network cables and practically implement the cross-wired cable and straight through cable using clamping tool.
3. Identifying the networking devices on a network.
4. Configure the IP address of the computer.
5. Create a basic network and share file and folders.
6. Study of basic network command and Network configuration commands.
7. Installation process of any open-source network simulation software.

PartB:

1. Implement connecting two nodes using network simulator.
2. Implement connecting three nodes considering one node as a central node using network simulator.
Implement a network to connect three nodes considering one node as a central node using network simulator

3. Implement bus topology using network simulator.
4. Implement star topology using network simulator.
5. Implement ring topology using network simulator.
6. Demonstrate the use of wireless LAN using network simulator.
7. Implement FTP using TCP bulk transfer using network simulator.
8. Implement connecting multiple routers and nodes and building a Hybrid topology network simulator.

Links for open-source simulation software:

- NS3software:<https://www.nsnam.org/releases/ns-3-30/download/>
- PacketTracerSoftware:<https://www.netacad.com/courses/packet-tracer>
- GNS3software: <https://www.gns3.com/>

Semester VI
Core Course Content

Course Title: Web Technologies	Course Credits: 4
Course Code: DSC-8	L-T-P per week: 4-0-0
Total Contact Hours: 52	
Formative Assessment Marks:40	Summative Assessment Marks:60

Pedagogy: Written Assignment/Presentation/Project / Term Papers/Seminar/Field studies, Quiz/Project/Class room exercise/Practice exercise/Educational (industry/ institutes/ NGOs) visit/ field trip/ Field work/Viva voce/Role Play/Charts/ Models/Case study/Group discussion/Crosswords/ Presentation/seminar/Review – movie / Book/Research articles/e – content preparation

Course objectives

1. To comprehend the basics of the internet and web terminologies.
2. To introduce scripting language concepts for developing client-side applications.
3. To practice server-side programming features
4. To be familiar with database applications
5. To know the usefulness of web services.

Course Outcomes (COs):

After the successful completion of the course, the student will be able to:

CO1 Understand basics of web technology

CO2 Recognize the different Client-side Technologies and tools like, HTML, CSS, JavaScript

CO3 Learn Java Servlets and JDBC

CO4 Web Technology for Mobiles and Understand web security

Contents	52 Hrs
Unit 1	
<p>Introduction and Web Design: Introduction to Internet, applications of Internet, advantages and disadvantages, WWW, Web browsers, Web protocols and Web servers, Web Design Principles and Web site structure, client-server technologies, Client-side tools and technologies, Server-side Scripting tools, URL, MIME, search engine, proxy server, HTTP protocol.</p> <p>Introductions to HTML. HTML5 Basics tags, Formatting tags in HTML, HTML5 Page layout and Navigation concepts, Semantic Elements in HTML, List, type of list tags, tables and form Tags in HTML, multimedia basics, images, frame, map tag, embedding audio and</p>	12

video clips on webpage.	
Unit 2	
Introduction to XML: XML Syntax, XML Tree, Elements, Attributes, Namespace, Parser, XSLT DOM, DTD, Schema. Introduction to CSS, CSS syntax, CSS selectors, CSS Background Cursor, CSS text fonts, CSS-List Tables, CSS Box Modeling, Display Positioning, CSS Gradients, Shadows, 2D and 3 Transform, Transitions, CSS Animations.	10
Unit 3	
Introduction to JavaScript: JavaScript Data type and Variables, JavaScript Operators, Conditional Statements, Looping Statements, JavaScript Functions, Number, Strings, Arrays, Objects in JavaScript, Window and Frame objects, Event Handling in JavaScript, Exception Handling, Form Object and DOM, JSON, Browser Object Model.	12
Unit 4	
Introduction to Servlets: Common Gateway Interface (CGI), Lifecycle of a Servlets, Servlet API, servlet interface, generic servlets, HTTP servlets, servlet request interface, request dispatcher in servlet, Cookies, Connecting to a database using JDBC.	08
Unit 5	
Web Security: Authentication Techniques, Design Flaws in Authentication, Implementation Flaws in Authentication, Securing Authentication, Path Traversal Attacks. SQL Injection, NoSQL Injection, XPath Injection, LDAP Injection, XML Injection, HTTP Injection, Mail Service Injection. Types of XSS, Exploiting XSS Vulnerabilities, Preventing XSS Attacks.	10

Pedagogy: Lecture/ PPT/ Videos/ Animations/ Role Plays/ Think-Pair-Share/ Predict-Observe- Explain/ Demonstration/ Concept mapping/ Case Studies examples/ Tutorial/ Activity/ Flipped Classroom/ Jigsaw/ Field based Learning/ Project Based Learning/ Mini Projects/ Problem Based Learning/ Game Based Learning/ Group Discussion/ Collaborative Learning/ Experiential Learning / Self Directed Learning etc.

References	
1	Web Programming, building internet applications, Chris Bates 2 nd edition, Wiley Dremtech
2	Java Server Pages–Hans Bergsten, SPD O’Reilly
3	JavaScript, D. Flanagan, O’Reilly, SPD
4	Beginning Web Programming–Jon Duckett WROX.
5	Web Applications: Concepts and Real World Design, Knuckles, Wiley-India
6	Internet and World Wide Web–How to program, Dietel and Nieto, Pearson.

Program Name	B.Sc.	Semester	VI
Course Title	Web Technologies Lab		
Course Code:	DSC 8 Lab	No. of Credits	02
Contact hours	04 Hours per week	Duration of SEA/Exam	2 hours
Formative Assessment Marks	25	Summative Assessment Marks	25

COURSE OBJECTIVES

1. To comprehend the basics of the internet and web terminologies.
2. To introduce scripting language concepts for developing client-side
3. To practice server-side programming features – PHP, JSP.
4. To be familiar with database applications
5. To know the usefulness of web services.

COURSE OUTCOMES

Upon successful completion of this course, students should be able to:

1. Design and develop web applications.
2. Understand client and server-side scripting and their applicability

Part A

1. Design web pages for your college containing college name and Logo, departments list using href, list tags.
2. Create a class time table using table tag.
3. Write a HTML code to design Student registrations form for your college Admission
4. Design Web Pages with includes Multimedia data(Image, Audio, Video, GIFs etc)
5. Create a web page using frame.
6. Write code in HTML to develop a web page having two frames that divide the webpage into two equal rows and then divide the row into equal columns fill each frame with a different background color.
7. Write CSS code to Use Inline CSS to format your ID Card.
8. Using HTML, CSS create display a text called —Hello India!! On top of an image of India- Map using an overlay.

Part B

1. Write a JavaScript Program to perform Basic Arithmetic operations
2. JavaScript Program to Check for Prime Number
3. JavaScript Program to implement JavaScript Object Concept
4. JavaScript Program to Create Array and inserting Data into Array
5. JavaScript Program to Validate an Email Address
6. JavaScript Program to find GCD
7. JavaScript Program to Display Fibonacci sequence using recursion
8. JavaScript Program to convert decimal to binary

Semester VI
Core Course Content

Course Title: Statistical Computing & R Programming	Course Credits: 4
Course Code: DSC-9	L-T-P per week: 4-0-0
Total Contact Hours: 52	
Formative Assessment Marks:40	Summative Assessment Marks:60

Pedagogy: Written Assignment/Presentation/Project / Term Papers/Seminar/Field studies, Quiz/Project/Class room exercise/Practice exercise/Educational (industry/ institutes/ NGOs) visit/ field trip/ Field work/Viva voce/Role Play/Charts/ Models/Case study/Group discussion/Crosswords/ Presentation/seminar/Review – movie / Book/Research articles/e – content preparation

Course Objectives

1. The basics of statistical computing and data analysis
2. How to use R for analytical programming
3. How to implement data structure in R
4. R loop functions and debugging tools
5. Object-oriented programming concepts in R
6. Data visualization in R
7. How to perform error handling
8. Writing custom R functions

Course Outcomes (COs):

After the successful completion of the course, the student will be able to:

1. Explore fundamentals of statistical analysis in R environment.
2. Describe key terminologies, concepts and techniques employed in Statistical Analysis.
3. Define Calculate, Implement Probability and Probability Distributions to solve a wide Variety of problems.
4. Conduct and interpret a variety of Hypothesis Tests to aid Decision Making.
5. Understand, Analyse, and Interpret Correlation Probability and Regression to analyse the Underlying relationships between different variables.

Contents		52 Hrs
Unit 1	Introduction of the language, numeric, arithmetic, assignment, and vectors, Matrices and Arrays, Non-numeric Values, Lists and Data Frames, Special Values, Classes, and Coercion, Strings in R and its functions –R Vectors, basics of R List, operations performed on R list R Arrays, R Factors, definition of Data Frames, various data frame functions	10
Unit 2	Reading and writing files, Programming, Conditions and Loops: stand- alone statement, stacking statements, coding loops, Exceptions, Timings and Visibility. R-Functions : function definition, Built in functions, user-defined function, calling a function, calling a function without an argument, calling a function with argument.	10
Unit 3	Statistics And Probability, basic data visualization, probability, common probability distributions: common probability mass functions, Bernoulli, binomial, Poisson distributions, common probability density functions, uniform, normal, student's t-distribution.	11
Unit 4	Statistical testing and modelling, sampling distributions, hypothesis testing, components of hypothesis test, testing means, testing proportions, errors and power, Analysis of variance. Simple linear regression, multiple linear regression.	10
Unit 5	Advanced graphics: plot customization, plotting regions and margins, point and click coordinate interaction, customizing traditional R plots, specialized text and label notation. Defining colors and plotting in higher dimensions, representing and using color, 3D scatter plots.	11

Pedagogy: Lecture/ PPT/ Videos/ Animations/ Role Plays/Think-Pair-Share/ Predict-Observe- Explain/ Demonstration/ Concept mapping/ Case Studies examples/ Tutorial/ Activity/ Flipped classroom / Jigsaw / Field based Learning/ Project Based Learning/ Mini Projects/ Hobby Projects/Forum Theatre/ Dance/ Problem Based Learning/ Game Based Learning/ Group Discussion/ Collaborative Learning/ Experiential Learning / Self Directed Learning etc.

References	
1	Tilman M. Davies, The book of R: A first course in programming and statistics, San Francisco, 2016.
2	Vishwas R. Pawgi, Statistical computing using R software, Nirali prakashan publisher, e1 edition, 2022.
3	https://www.youtube.com/watch?v=KlsYCECWWEht tps://www.geeksforgeeks.org/r-tutorial/ https://www.tutorialspoint.com/r/index.htm

Program Name	B.Sc.	Semester	VI
Course Title	R Programming Lab		
Course Code:	DSC 9 Lab	No. of Credits	02
Contact hours	04 Hours per week	Duration of SEA/Exam	2 hours
Formative Assessment Marks	25	Summative Assessment Marks	25

Course Objectives

1. To exercise the fundamentals of statistical analysis in R environment and application of several Statistical Techniques
2. Aims to provide exposure in terms of Statistical Analysis, Hypothesis Testing, Regression and Correlation using R programming language.
3. Aims to analyse data for the purpose of exploration using Descriptive and Inferential Statistics.
4. Aims to understand Probability and Sampling Distributions and learn the creative application of Linear Regression in multivariate context for predictive purpose.

Course Outcomes:

- Install, Code and Use R Programming Language in R Studio IDE to perform basic tasks on Vectors, Matrices and Data frames. Explore fundamentals of statistical analysis in R environment.
- Describe key terminologies, concepts and techniques employed in Statistical Analysis.
- Define Calculate, Implement Probability and Probability Distributions to solve a wide variety of problems.
- Conduct and interpret a variety of Hypothesis Tests to aid Decision Making.
- Understand, Analyze, and Interpret Correlation Probability and Regression to analyse the underlying relationships between different variables.

Practical programs

1. Write a R program for different types of data structures in R.
2. Write a R program that include variables, constants, datatypes.
3. Write a R program that include different operators, control structures, default values for arguments, returning complex objects.
4. Write a R program for quicksort implementation, binary search tree.
5. Write a R program for calculating cumulative sums, and products minima maxima and calculus.
6. Write a R program for finding stationary distribution of markanov chains.
7. Write a R program that include linear algebra operations on vectors and matrices.

8. Write a R program for any visual representation of an object with creating graphs using graphic functions: Plot (), Hist(), Linechart(), Pie(), Boxplot(), Scatterplots().
9. Write a R program for with any data set containing data frame objects, indexing and subsetting data frames, and employ manipulating and analyzing data.
10. Write a program to create an any application of Linear Regression in multivariate context for predictive purpose.

Formative Assessment - Theory		
Assessment	Assessment type	Weightage in Marks
C1 First component	Test	10
C1 Second Component	Assignment	10
C2 First Component	Classroom exercise	10
C2 Second Component	e-content	10

Blue print and pattern of examination

Time: 2½ hrs

60 marks

Part A: Answer any ten questions.

10X2=20

- 1
- 2
- 3
- 4
- 5
- 6
- 7
- 8
- 9
- 10
- 11
- 12

Part B: Answer four questions.

4X10=40

- 13
- 14
- 15
- 16
- 17
- 18

Evaluation Scheme for Lab Examination

Formative assessment		
Assessment	Assessment type	Weightage in Marks
C1 First component	Test-10 marks test for 120 minutes	10
C2 First component	Test-10 marks test for 120 minutes	10
Lab Record and attendance		05
Total		25
C3 component	Program 1	10(5 Marks writing and 5 Marks program execution)
	Program 2	10(5 Marks writing and 5 Marks program execution)
	Viva	05
Total		25