II YEAR: THIRD SEMESTER

Course Code	Course Name	Category	L	T	P	S	Credits	Hours	Marks		
									CIA	External	Total
24USTC31	Distribution Theory	Core Course-5	3	2	1	0	5	6	25	75	100

Learning Objectives	
LO1	To understand the fundamental concept of probability distribution, including its types, properties, and how it is used to model random variables
LO2	To apply the essential properties of discrete distribution
LO3	To evaluate normal distribution and its characteristics, such as symmetry, mean, and the empirical rule
LO4	To explore the uniform and exponential distribution
LO5	To evaluate the concept of Gamma distribution & Beta distribution including its properties.

Unit	Content	Hours
1	Introduction to Probability distribution-Bernoulli distribution-Binomial distribution – moments-moment generating function-characteristic function-Additive properties of Binomial Distribution -cumulants -Simple Problems. Poisson distribution – moments-moment generating function-characteristic function- Additive properties of Poisson distribution –cumulants-Simple Problems	18
2	Negative binomial distribution – moment generating function-Cumulants. Geometric distribution – lack of memory-moments-moment generating function - Hyper geometric distribution – mean and variance of the Hyper geometric distribution– Multinomial distribution –mean and variance.	18
3	Normal Distribution – chief characteristics of the normal distribution-median-mode –Moments-moment generating function-Cumulants -points of inflexion,Area property -Importance of Normal Distribution. Simple Problems.	18
4	Exponential distribution – moment generating function- characteristic function, memory less property –Rectangular Or Uniform Distribution-Moments- Moment Generating function- Characteristics function-Simple Problems	18
5	Gamma distribution – moment generating function and cumulants and central moments-Additive property of Gamma distribution (reproductive property) – Beta distribution – First kind and second kind – constants.	18
Total		90

Theory-80% Problem-20%

CO	Course Outcomes **The student will be able to**
CO1	Apply the fundamental concept of probability distributions, identify and differentiate between various types Probability distribution.
CO2	Analyze the nature of various probability distributions, including geometric and hyper geometric distributions, to solve real-world problems.
CO3	Derive the properties of Normal distribution in continuous probability distribution
CO4	Apply Exponential & Uniform distribution and its characteristics
CO5	Analyze the Gamma and Beta distributions including their properties
Textbooks:	
1	Gupta S.C.and Kapoor V.K(2015):Fundamentals of Mathematical Statistics, Sultan Chand & Sons.
2	A.M.Goon,M.K.Gupta &B.Dasgupta(1980):An outline of Statistical theory,Vol.I,6th revised, World Press.
Reference Books:	
1	Hogg.R.V.and Craig.A.T.(1978):Introduction to Mathematical Statistics, 6th Mc Graw Hill Publishing Co.Inc.NewYork
2	Hogg.R.V.and Craig.A.T.(1978):*I* Introduction to Mathematical Statistics 7th Mc Graw Hill Publishing Co.Inc.NewYork.
3	Rohatgi,V.K.(1984):An Introduction to Probability Theory and Mathematical Statistics,2nd Edition
Web resources:	
1	https://www.geeksforgeeks.org/discrete-probability-distribution
2	https://www.knime.com/blog/continuous-probability-distribution
3	https://www.scribbr.com/statistics/probability-distributions

Mapping with Programme Outcomes and Programme Specific Outcomes

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PSO1	PSO2	PSO3
CO1	3	3	3	2	3	3	2	3	3	3	3
CO2	3	3	3	2	2	2	2	2	3	2	2
CO3	3	3	3	2	3	3	2	3	3	3	3
CO4	3	3	3	2	3	2	2	2	3	3	2
CO5	3	3	3	2	3	2	2	2	3	3	3
Total	15	15	15	10	14	12	10	12	15	14	13
Average	3	3	3	2	2.8	2.4	2	2.4	3	2.8	2.6

3 – Strong, 2- Medium, 1- Low

II YEAR: THIRD SEMESTER

Course Code	Course Name	Category	L	T	P	S	Credits	Hours	Marks		
									CIA	External	Total
24USTC32P	Statistical Practical-IV	Core Practical-6	0	0	4	0	2	4	25	75	100

Learning Objectives	
LO1	To understand and apply Probability distribution and its concept.
LO2	To fit the various distribution model in discrete distribution.
LO3	To gain practical knowledge of Normal distribution.
LO4	To understand practical knowledge in exponential and beta distribution
LO5	To apply Gamma and Beta distribution and its concepts.

	Content	Hours
	1. Binomial distribution 2. Fitting a Binomial distribution 3. Poisson Distribution 4. Fitting a Poisson Distribution 5. Normal distribution 6. Fitting a Normal distribution 7. Exponential distribution 8. Uniform distribution 9. Gamma Distribution 10. Beta distribution of First kind & Second kind	60
Total		60
Problems-100%		

CO	Course Outcomes The student will be able to
CO1	Understand and analyze discrete probability distributions, and to compute the mean and variance to make informed decisions based on probabilistic models.
CO2	Apply continuous probability distributions, and to calculate their mean and variance in order to analyze and interpret real-world data and make informed decisions.
CO3	Create the practical applications of the χ^2 (chi-square) statistic in real-life problems, such as testing hypotheses, analyzing categorical data, and evaluating the goodness of fit in various fields like market research, medicine, and social sciences.
CO4	Apply the concepts of Uniform and Exponential distributions to model real-life phenomena
CO5	Analyze the nature and applications of distributions such as the Gamma and Beta distributions, understanding their characteristics, and applying them to model various real-life situations
Textbooks:	
1	Gupta S.C.and Kapoor V.K(2015):Fundamentals of Mathematical Statistics, Sultan Chand & Sons.
2	A.M.Goon,M.K.Gupta &B.Dasgupta(1980):An outline of Statistical theory,Vol.I,6th revised,WorldPress.
Reference Books:	
1	Hogg.R.V.and Craig.A.T.(1978):Introduction to Mathematical Statistics, 6th Mc Graw Hill Publishing Co.Inc. NewYork.
2	Hogg.R.V.and Craig.A.T.(1978):*I* Introduction to Mathematical Statistics 7th Mc Graw Hill Publishing Co.Inc.NewYork.
3	Rohatgi,V.K.(1984):An Introduction to Probability Theory and Mathematical Statistics,2nd Edition

Mapping with Programme Outcomes and Programme Specific Outcomes

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PSO1	PSO2	PSO3
CO1	3	3	3	2	3	3	2	3	3	3	3
CO2	3	3	3	2	2	2	2	2	3	2	2
CO3	3	3	3	2	3	3	2	3	3	3	3
CO4	3	3	3	2	3	2	2	2	3	3	2
CO5	3	3	3	2	3	2	2	2	3	3	3
Total	15	15	15	10	14	12	10	12	15	14	13
Average	3	3	3	2	2.8	2.4	2	2.4	3	2.8	2.6

3 – Strong, 2- Medium, 1- Low

II YEAR: THIRD SEMESTER

Course Code	Course Name	Category	L	T	P	S	Credits	Hours	Marks		
									CIA	External	Total
24UMAA35	Numerical Methods	Elective Course -4	2	1	1	0	4	4	25	75	100

Learning Objectives	
LO1	To develop Solution of Numerical Algebraic and Transcendental Equations.
LO2	To introduce the study of Simultaneous Linear Algebraic Equations and Finite differences.
LO3	To acquire the knowledge on central difference interpolation formula for Equal intervals.
LO4	To analyze applications on Newton's divided difference formula and Lagrange's interpolation Formula
LO5	To evaluate derivatives using Newton's forward and backward differences formulae and numerical integration.

Unit	Content	Hours
1	**The Solution of Numerical Algebraic and Transcendental Equations** Iteration Method, Regular Falsi Method, Newton–Raphson Method. **Chapter 1: Sections 1.2 to 1.4**	12
2	**Solution of Simultaneous Linear Algebraic Equations** Gauss – Elimination Method, Gauss–Jordan Method, Gauss –Jacobi Method. **Finite Differences:** Operators**, Interpolation for Equal intervals:** Newton's Forward Interpolation Formula and Newton's Backward Interpolation Formula. **Chapter: Sections 2.1 to 2.2,2.5,** **Chapter 3: Sections 3.1** **Chapter 4: Sections 4.1,4.2,4.3**	12
3	**Central Difference Interpolation Formula for Equal Intervals** Gauss Forward Interpolation Formula, Gauss Backward Interpolation Formula, Sterling's Formula. **Chapter5: Sections 5.1 to5.5**	12
4	**Interpolation with Unequal Intervals** Divided Differences, Newton's Divided Differences Interpolation Formula, Lagrange's Interpolation Formula and Inverse Lagrange's Interpolation. **Chapter6:Sections 6.1,6.2,6.5& 6.7**	12
5	**Numerical Differentiation** Numerical Differentiation based on Newton's Forward and Backward Interpolation Formula. **Numerical Integration:** General Quadrature formula for equidistant ordinates, Trapezoidal Rule, Simpson's 1/3rd Rule, Simpson's 3/8th Rule. **Chapter 7: Sections 7.1 to 7.3,7.7 to 7.9,7.13 to 7.14**	12
	Total	**60**

Theory-80% Problem-20%

CO	Course Outcomes The student will be able to
CO1	Compute derivatives on Numerical Algebraic and Transcendental Equations
CO2	Find Solutions of Simultaneous Linear Algebraic Equations and Interpolation.
CO3	Understand the need of interpolation
CO4	Work on numerical methods to approximate derivatives by applying Newton's forward and backward differences formulae.
CO5	Get Knowledge of advanced numerical differentiation and numerical integration techniques
Textbooks:	
1	P.Kandasamy and K.Thilagavathy, Calculus of Finite differences & Numerical Analysis, S. Chand & Company Ltd., New Delhi, 2003.
Reference Books:	
1	H.C.Saxena, Finite differences and Numerical analysisS.Chand&Co.,Delhi,1991.
2	M.K.Venkataraman, Numerical methods for Science and Engineering National Publishing Company,Chennai,1992.
3	T.K.Manicavachagom Pillay and Narayanan, Numerical Analysis, Viswanathan (Printers /Publishers) Pvt.Ltd, 1994.
4	Dr.B.S.W.Goel, Numerical Analysis, Chand off set Printer, Chennai
5	B.D.Gupta, Numerical Analysis, Konark Pub.Ltd,Delhi,2001.
Web resources:	
1	https://ocw.mit.edu/courses/22-15-essential-numerical-methods-fall-2014/pages/syllabus//
2	https://ocw.mit.edu/courses/18-330-introduction-to-numerical-analysis-spring-2004//

Mapping with Programme Outcomes and Programme Specific Outcomes

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PSO1	PSO2	PSO3
CO1	3	3	3	3	3	3	3	3	3	3	3
CO2	3	3	3	3	3	3	3	3	3	3	3
CO3	3	3	3	3	3	3	3	3	3	3	3
CO4	3	3	3	3	2	3	2	3	3	3	3
CO5	3	2	2	2	3	2	3	3	3	3	3
Total	15	14	14	14	14	14	14	15	15	15	15
Average	3.0	2.8	2.8	2.8	2.8	2.8	2.8	3.0	3.0	3.0	3.0

3–Strong, 2-Medium, 1-Low

II YEAR: THIRD SEMESTER

Course Code	Course Name	Category	L	T	P	S	Credits	Hours	Marks		
									CIA	External	Total
24UMAA35P	Practical - Numerical Methods	Elective Practical 5	0	0	2	0	2	2	25	75	100

Learning Objectives

LO1	To learn Newton–Raphson Method, Gauss Elimination Methods and Gauss–Jacobi Method.
LO2	To work on Newton's Forward Interpolation Formula and Backward Interpolation Formula
LO3	To analyze Lagrange's Interpolation, Newtons Forward Formula for Derivatives.
LO4	To understand Trapezoidal Rule.
LO5	To understand Simpson's 1/3rd Ruleand Simpson's 3/8th Rule.

	Content	Hours
	1. Newton–Raphson Method. 2. Gauss Elimination Methods. 3. Gauss–Jacobi Method. 4. Newton's Forward Interpolation Formula. 5. Newton's Backward Interpolation Formula. 6. Lagrange's Interpolation. 7. Newtons ForwardF ormula for Derivatives. 8. Trapezoidal Rule. 9. Simpson's1/3rdRule. 10. Simpson's3/8thRule.	30
	Total	30
	Problem 100%	

CO	Course Outcomes The student will be able to
CO1	Find the roots of Newton–Raphson Method, Gauss Elimination and Gauss–Jacobi Method
CO2	Interpolate methods and understand methods.
CO3	Calculate Lagrange's Interpolation, Newtons Forward Formula for Derivatives.
CO4	Understand the method and applying to approximate area and evaluating its accuracy.
CO5	Work on problems in Simpson's1/3rdRuleand3/8thRule.
Textbooks:	
1	P.Kandasamy and K.Thilagavathy, Calculus of Finite differences & Numerical Analysis, S.Chand&Company Ltd., New Delhi, 2003
Reference Books:	
1	H.C. Saxena, Finite differences and Numerical analysis S. Chand & Co., Delhi, 1991.
2	M.K. Venkataraman, Numerical methods for Science and Engineering National Publishing Company,Chennai, 1992
3	T.K. Manicavachagom Pillay and Narayanan, Numerical Analysis, Viswanathan (Printers /Publishers) Pvt. Ltd, 1994.
4	Dr. B.S.W. Goel, Numerical Analysis, Chand offset Printer, Chennai
5	B.D .Gupta ,Numerical Analysis, Konark Pub.Ltd, Delhi, 2001.
Website and e-learning source	
1	https://ocw.mit.edu/courses/22-15-essential-numerical-methods-fall-2014/pages/syllabus/
2	https://ocw.mit.edu/courses/18-330-introduction-to-numerical-analysis-spring-2004/

Mapping with Programme Outcomes and Programme Specific Outcomes

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PSO1	PSO2	PSO3
CO1	3	3	3	3	3	3	3	3	3	3	3
CO2	3	3	3	3	3	3	3	3	3	3	3
CO3	3	3	3	3	3	3	3	3	3	3	3
CO4	3	3	3	3	2	3	2	3	3	3	3
CO5	3	2	2	2	3	2	3	3	3	3	3
Total	15	14	14	14	14	14	14	15	15	15	15
Average	3.0	2.8	2.8	2.8	2.8	2.8	2.8	3.0	3.0	3.0	3.0

3 – Strong, 2- Medium, 1- Low

II YEAR: THIRD SEMESTER

Course Code	Course Name	Category	L	T	P	S	Credits	Hours	Marks		
									CIA	External	Total
24UCSA32	Programming in C	Elective Course - 4	2	1	1	0	4	4	25	75	100

Learning Objectives	
LO1	To understand Programming basics and the fundamentals of C.
LO2	To apply Data types in C, Mathematical and logical operations, Using control statement and loops
LO3	To analyze Arranging data in arrays with algorithm
LO4	To explore Learning the functions parameters Implementing
LO5	To apply Pointers and file operations

Unit	Content	Hours
1	Introduction to Programming: Introduction to computers, Computer characteristics, Hardware vs software, Steps to develop a program, Software development life cycle, Structured programming, Types of programming languages, Introduction to c, Developing a c program, Console input and output functions, Error diagnostics, Debugging techniques	12
2	Operators and Expressions: Identifiers and keywords, Data types, Constants, Variables, Declarations, Expressions, Statements, Arithmetic operators, Unary operators, Relational and logical operators, Assignment operators, Conditional operator Branching, if- else statement, which statement, go to statement, Looping, while statement, do- while statement, for statement, Nested control structures, break statement, continue statement.	12
3	Arrays and Strings: Defining an array, Processing an array, Multidimensional arrays, Searching algorithm, Linear search, Sorting algorithm, Bubble sort algorithm, Strings, Defining a string, Initialization of strings, Reading and writing a string, Processing the strings.	12
4	Functions: Functions, Overview, Defining a function, Accessing a function, Function prototypes, Passing arguments to a function, Passing arrays to functions, Recursion. Pointers and Structures: Fundamentals, Pointer declarations, Passing pointers to functions, Structure & Union	12
5	File system : Types of file, working with files, File Handling, file operation, Sequential and Random Access Files. Standard I/O Functions: fscanf(), fprintf(), fgets(), fputs(), Command Line Arguments.	12
Total		60

Theory 80% Problem 20%

CO	Course Outcomes **The student will be able to**
CO1	Understand basic Structure of the C-Programming, declaration and usage of variable
CO2	Develop conditional and iterative statements to write C programs
CO3	Implement arrays and strings in your C program.
CO4	Apply code reusability with functions
CO5	Programs that use Pointers to access arrays, strings and functions.
Textbooks:	
1	Byron Gottfried, "Schaum's Outline of Programming with C", 3rd edition, 2016, McGraw Hill Education (India), ISBN: 9780070145900
2	Let Us C: Authentic guide to C programming language - 19th Edition – 15 December 2022 by Yashavant Kanetkar
3	A Textbook of Basics of C Programming – 2020 - Vikash Kumar Gupta, ISBN: 978-93-87394-89-6
4	Programming in C KTU [EST 102] Paperback – 26 April 2022 by Vijitha RobinsonKailas SreeChandran
Reference Books:	
1	C Programming Books for Beginners and Advanced By jasdeepbhatia| December 26, 2023
2	C Programming Language, 2nd Edition by Brian W. Kernighan, Dennis Ritchie Released 1988
3	Programming in C ,Stephen G. Kochan, Third Edition
Web resources:	
1	www.w3schools.com/
2	www.javatpoint.com/

Mapping with Programme Outcomes and Programme Specific Outcomes

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PSO1	PSO2	PSO3
CO1	3	2	3	3	3	3	3	3	3	2	2
CO2	3	3	3	3	2	3	3	2	2	3	3
CO3	3	2	3	3	3	3	3	3	3	2	2
CO4	3	3	3	3	2	3	3	2	2	3	3
CO5	3	2	3	3	3	3	3	3	3	2	2
Total	15	12	15	15	13	15	15	13	13	12	12
Average	3	2.4	3	3	2.6	3	3	2.6	2.6	2.4	2.4

3–Strong, 2-Medium, 1-Low

II YEAR: THIRD SEMESTER

Course Code	Course Name	Category	L	T	P	S	Credits	Hours	Marks		
									CIA	External	Total
24UCSA32P	Practical-Programming in C	Elective Practical-5	0	0	2	0	2	2	25	75	100

Learning Objectives	
LO1	To introduce students to the basic knowledge of programming fundamentals of C language
LO2	To impart writing skill of C programming to the students and solving problems.
LO3	To impart the concepts like looping, array, functions, pointers, file, structure
LO4	To impart the concepts like looping, array, functions, pointers, file, structure
LO5	To impart the concepts like looping, array, functions, pointers, file, structure

	Content	Hours
	1. Write a Program to calculate and display the volume of a CUBE having its height (h=10cm), width (w=12cm) and depth (8cm). 2. Write a program to take input of name, roll no and marks obtained by a student in 4 subjects of 100 marks each and display the name, roll no with percentage score secured. 3. Write a Program to perform the arithmetic expression using switch statement. 4. Write a program to generate all prime numbers up to nth number. 5. Program to print product of two matrices. 6. Program to concatenate two strings without using library functions. 7. Program to find factorial of a given number using function. 8. Find Square Root, numerical differentiation, numerical integration using functions and recursion. 9. Program to print the elements of array using pointers. 10. Implementation of Text Processing using Strings	30
	Total	**30**
	Problem 100%	

CO	Course Outcomes **The student will be able to**
CO1	Understand the logic for a given problem. Write the algorithm of a given problem.
CO2	Recognize and understand the syntax and construction of C programming code.
CO3	Learn the methods of iteration or looping and branching
CO4	Make use of different data-structures like arrays, pointers, structures and files
CO5	Write programs to printout put on the screen as well as in the files.
Textbooks:	
1	Byron Gottfried, "Schaum's Outline of Programming with C",3rd edition, 2016, Mc Graw Hill Education (India), ISBN:9780070145900
2	Let Us C:Authentic guide to C programming language-19th Edition–15 December 2022 by Yashavant Kanetkar
3	A Textbook of Basics of C Programming – 2020 -Vikash Kumar Gupta, ISBN: 978-93-87394-89-6
4	Programming in CKTU [EST102] Paperback–26 April 2022 by Vijitha Robinson(Kailas Sree Chandran
5	ByronGottfried,"Schaum's Outline of Programming with C",3rd edition,2016,Mc Graw Hill Education (India), ISBN:9780070145900
Reference Books:	
1	C Programming Books for Beginners and Advanced By jasdeepbhatia | December26,2023
2	C Programming Language, 2nd Edition by Brian W. Kernighan, Dennis Ritchie Released March 1988
3	Programming in C, Stephen G.Kochan, Third Edition
Web resources:	
1	https://www.w3schools.com/
2	https://www.tpointtech.com/

Mapping with Programme Outcomes and Programme Specific Outcomes

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PSO1	PSO2	PSO3
CO1	3	2	3	3	3	3	3	3	3	2	2
CO2	3	3	3	3	2	3	3	2	2	3	3
CO3	3	2	3	3	3	3	3	3	3	2	2
CO4	3	3	3	3	2	3	3	2	2	3	3
CO5	3	2	3	3	3	3	3	3	3	2	2
Total	15	12	15	15	13	15	15	13	13	12	12
Average	3	2.4	3	3	2.6	3	3	2.6	2.6	2.4	2.4

3 – Strong, 2- Medium, 1- Low

II YEAR: THIRD SEMESTER

Course Code	Course Name	Category	L	T	P	S	Credits	Hours	Marks		
									CIA	External	Total
24USTS31	R Programming		1	0	1	0	2	2	25	75	100

Learning Objectives	
LO1	To learn the fundamental concepts of 'R' using R Gui and R Studio
LO2	To understand the special data structures of R language Character Vector, Array, Matrix and List
LO3	To provide knowledge for various control structures
LO4	To provide knowledge in Data types and packages
LO5	To understand about graphical analysis pie and bar charts

Unit	Content	Hours
1	Introduction: History of R- Benefits of Using R – Working with code Editor: RGui and R Studio - Starting your First R Session - Sourcing a script - Navigating the workspace- Vectors: Creating vectors- combing vectors repeating vector - Getting values in and out of vectors- working with logical vectors	6
2	Using character vector for text data - Manipulating text - Factoring in Factors - Naming matrix rows and columns - Calculating with matrices- Creating an array- Creating a list Creating a list - Extracting elements from lists - Changing elements in lists	6
3	Control Structures: Conditional control structures: if statement - if..else statement - switch statement - Loops: for, while and repeat loops - break and next statement. Functions: The Function Keyword - Arguments - Return Values- Computing basic statistics: mean, median, mode, correlation and covariance.	6
4	Getting data into and out of R: Working with other data types - Getting your data out of R - Working with Files and Folders. Packages: Finding packages, installing packages, loading packages, updating package and unloading packages.	6
5	Introduction to Graphical Analysis: Box-Whiskers plots - Scatter plots - Pairs plots - Line charts - Pie charts - Bar charts: single category bar chats and multiple category bar charts.	6
	Total	**30**

	Theory-100%

Course Outcomes	
CO	**The student will be able to**
CO1	Understand the basics of R programming
CO2	Work with vectors and matrices
CO3	Acquire the knowledge of various control structures
CO4	Parse data files using built-in functions
CO5	Apply the various statistical functions and produce high quality graphics
Text books:	
1	Andrie Devries And Jorismeys , "R Programming For Dummies", Wiley Publications, Isbn:978-81-265-5201-6. (Unit 1 : chapter-2,3,4) (Unit 4: chapter 12,14) (Unit 2 chapter 5,6,7)
2	Tilman M .Davis “The Book of R”, No Starch Press, 2016 (Unit 3: chapter 10,11,3)
3	Paul Teetor, "R Cook Book",O'relly Publications, First Edition, 2011, Isbn: 978-0-596-80915-7 (Unit 5: Chapter 10)
4	Alex Nordeen, Learn R Programming In 24 Hours: Complete Guide For Beginners, Guru99, 2020.
5	Dr.Mark Gardener, "Beginning R- The Statistical Programming Language", Wiley Publications, Isbn: 978-81-265-4120-1.
Reference Books:	
1	Joseph Adler, "R In Nutshell A Desktop Quick Reference",Isbn:978-0-596- 80170-0
2	Roger D. Peng, "R Programming For Data Science", Leanopub, 2015
3	Matloff, Norman, And Matloff, Norman S, The Art Of R Programming: A Tour Of Statistical Software Design, No Starch Press, 2011
4	Lovelace, Robin, And Gillespie, Colin. Efficient R Programming: A Practical Guide to Smarter Programming, O'reilly Media, 2016.
5	Jeeva Jose, Beginner's Guide For Data Analysis Using R Programming., Khanna Publishing House,2019
Web Resources:	
1	https://www.tutorialspoint.com/r/index.htm
2	https://www.youtube.com/watch?v=_V8eKsto3Ug
3	https://www.youtube.com/watch?v=SYYUBytX1ng

Mapping with Programme Outcomes and Programme Specific Outcomes

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PSO1	PSO2	PSO3
CO1	3	3	3	3	3	3	2	3	3	3	3
CO2	3	3	2	2	2	3	3	3	3	3	3
CO3	3	3	3	3	3	3	2	3	2	2	1
CO4	3	2	3	3	3	2	3	3	2	2	2
CO5	3	3	3	2	3	3	3	3	3	3	3
Total	15	14	14	13	14	14	13	15	13	13	12
Average	3	2.8	2.8	2.6	2.8	2.8	2.6	3	2.6	2.6	2.4

3 – Strong, 2- Medium, 1- Low