KAKARAPARTI BHAVANARAYANA COLLEGE

(AUTONOMOUS)

Kothapeta, Vijayawada – 520 001

SYLLABUS (R20)

DEPARTMENT OF

COMPUTER SCIENCE

Data Science

KAKARAPARTI BHAVANARAYANA COLLEGE (Autonomous)

Department Of Computer Science & Applications

Class:	Semester	Title of The Paper	Paper Code:	W.E.F
I BCA/B.Sc(MPCS,MECS,MSCS,MCCS, DATA SCIENCE,IOT)	**I**	**Programming with 'C'**	**R20BCA102/ R20-CSC101**	**2020-2021**

Syllabus

Total No of Hours for Teaching - Learning	Instructional Hours for Week		Duration of Semester End Examination in Hours	Max Marks		Credits
60 Hours	Theory	Practical	3 Hours	CIA	SEE	
	4	3		25	75	

Course Objectives: The objective of the course is to learn programming in 'C'.

Course Outcomes:

1. To understand the meaning and basic components of a programming language.
2. To learn about data types and operators.
3. To learn about decision making statements.
4. To Gain knowledge about functions.
5. To learn how to work with arrays.
6. To gain knowledge about strings.
7. To learn about structures.
8. To understand character arrays.
9. To understand the concept of pointers.
10. To understand the concept of files.

Unit I

Introduction to Algorithms and Programming Languages. Compiling Programs, Language Interpreters. Compiling your first program. Running your program .understanding your first program, comments, variables, Data types, and Arithmetic Expressions: working with variables. Understanding Data types and constants, working with Arithmetic Expressions. The Assignment operators. The printf function. The scanf function.

Unit II

Decision making: The if statement, if else, Nested if statements, else if. The switch statement. The conditional operator program looping: for statement. Relational operators. Nested for loops, while statement, do statement. The break statement. The continue statement.

Working with Functions: Defining a Function-Arguments and Local variables. Returning Function Results. Function calling. Declaring Return Types and Argument types. Top Down programming. Functions and Arrays. The global variables. Automatic and static variables. Recursive Functions.

Unit III

Working with Arrays: Defining an array. Initializing Arrays. Character Arrays. Multidimensional arrays-variable length Arrays.

Strings: Creating string variable, string functions.

Unit – IV

Working with structures :Defining structure . Functions and structures . Initializing structures . Array of structures structures containing structures .structures containing Arrays. Structure variants . Character strings : Array of characters. variable length character strings . Escape characters .character strings, structures and arrays - character operations.

Pointers: Defining a pointer variable. Using pointers in Expressions. Pointers and structures (Exclude Linked List). Pointers and Functions. Pointers and Arrays. Operations on pointers. Pointers and Memory address.

Unit – V

Files: file manipulating functions, file opening modes, file creating.

TEXT BOOK:

1. “Computer Fundamentals and Programming in C” by REEMA THAREJA from OXFORD UNIVERSITY PRESS

REFERENCE BOOK:

1. E Balagurusamy: ―COMPUTING FUNDAMENTALS & C PROGRAMMING‖ – Tata McGraw-Hill, Second Reprint 2008, ISBN 978-0-07-066909-3.
2. Ashok N Kamthane: Programming with ANSI and Turbo C, Pearson Edition Publ, 2002.
3. Henry Mullish & Huubert L.Cooper: The Sprit of C, Jaico Pub. House,1996.

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SECTION-A

(Instructions to the paper setter: Set minimum ONE question from each unit, max Eight from all.)

Answer any *five* of the following questions 5 x 5 = 25M

1. Explain different programming languages.
2. Explain data types in 'C'.
3. Explain different types of arrays with syntax.
4. Explain difference between while and do-while.
5. Explain I/O Functions.
6. What is recursion? Explain with example.
7. Write a program to swap of two strings.
8. Explain different types of translators.

SECTION-B

(Instructions to the paper setter: Set minimum ONE question from each unit, max Eight from all)
Answer ALL of the following questions 5x10=50M

9. A) Explain the structure of C.
   (OR)
   B) Explain different operators available in C
10. A) Explain different decision making statements.
   (OR)
   B) Write the difference between call by value and call by reference with example.
11. A) Write a program for addition of two matrices.
   (OR)
   B) Write different string functions.
12. A) Explain malloc(),calloc() with example.
   (OR)
   B) Explain the difference between structure and union with an example.
13. A) Explain different file handling functions.
   (OR)
   B) Write an example program using fwrite(),fread().

BLUE PRINT

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SECTION A (5*5=25 Marks)

- 5 Questions to be answered out of 8 Questions
- 1 Question must be given from each Unit

SECTION B (5*10=50 Marks)

- 2 Questions must be given from each Unit with an internal choice

Illustration of Model Question Paper

	Section A	Section B
UNIT I	1	2
UNIT II	2	2
UNIT III	2	2
UNIT IV	2	2
UNIT V	1	2
	8	10

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Class:	Semester:	Title of The Paper:	Paper Code:	W.E.F
I BCA/ B.Sc.(DATA SCIENCE,IOT)	**II**	**Data structures**	**R20BCA202/ R20-DSIOT201**	**2020-2021**

Syllabus

Total No of Hours for Teaching - Learning	Instructional Hours for Week		Duration of Semester End Examination in Hours	Max Marks		Credits
60 Hours	Theory	Practical	3 Hours	CIA	SEE	
	4	3		25	75	

COURSE OBJECTIVES:

1 To impart the basic concepts of data structures and algorithms

2 To understand concepts about searching and sorting techniques

3 To understand basic concepts about stacks, queues, lists, trees and graphs

4 To understanding about writing algorithms and step by step approach in solving problems with the help of fundamental data structures.

COURSE OUTCOMES:

1. Ability to analyze algorithms and algorithm correctness.
2. Ability to summarize searching and sorting techniques
3. Ability to describe stack, queue and linked list operation.
4. Ability to have knowledge of tree and graphs concepts

Unit I 14Hrs

Overview: Introduction, basic terminology, elementary data organization, data structures, data structures operations, algorithms: complexity, time-space tradeoff, algorithmic notations,

Searching: linear search and binary search.

Unit II 10Hrs

Sorting: Bubble Sort – Selection Sort – Insertion Sort, Quick Sort and merge sort.

Unit III 15Hrs

Stacks, Queues: introduction, Stacks, arrays representation of stacks, arithmetic expression: polish notation, Queue and its types.

Linked List: introduction, linked list, traversing a linked list, searching a linked list, memory allocations and garbage collection, insertion and deletion in a linked list, two-way list

UNIT IV 10Hrs

Recursion: recursion, tower of Hanoi, implementation of recursive procedure of stacks Arithmetic Notation.
Linked representation: Linked representation of stacks and queues,

Unit V 11Hrs

Trees : Tree Terminology, Tree Traversals, searching, deleting and inserting in binary search trees, heap sort, general trees.

Graphs: introduction, terminology, Traversing a graph BFS, DFS.

Prescribed Text Book:

1. Data Structures by Lipschutz- Shaum's Outline Series

Reference: Data Structures and Algorithms in Java- Robert Laford.

BLUE PRINT

Class:	Semester:	Title of The Paper:	Paper Code:	W.E.F
I BCA/ B.Sc (DATA SCIENCE,IOT)	**II**	**Data structures**	**R20BCA202/ R20-DSIOT201**	**2020-2021**

SECTION A (5*5=25 Marks)

- 5 Questions to be answered out of 8 Questions
- 1 Question must be given from each Unit

SECTION B (5*10=50 Marks)

- 2 Questions must be given from each Unit with an internal choice

Illustration of Model Question Paper

	Section A	Section B
UNIT I	1	2
UNIT II	2	2
UNIT III	2	2
UNIT IV	2	2
UNIT V	1	2
	8	10

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MODEL PAPER

SECTION-A

Answer any five of the following question 5 x 5 = 25M

1. What is Data Structure? Explain data structure operations.
2. Explain complexity, time-space trade off.
3. Explain linear search with an example.
4. Explain bubble sort with an example.
5. Explain different types of queues.
6. What is recursion? Write a program to find the factorial of given number.
7. Explain the following
   a. Root b. leaf c. Sub tree
8. Write an algorithm for BFS with example.

SECTION-B

Answer ALL of the following questions 5 x 10 = 50M

9. A) What is an array? Explain types of arrays.
   (OR)
   B) Explain selection sort on the given data
   23, 45, 12, 3, 4, 17, 34
10. A) Write a program to search an element using binary search.
    (OR)
    B) Explain Linked list operations.
11. A) What is stack? Explain stack operations.
    (OR)
    B) Define Recursion, Write an algorithm for towers of Hanoi and explain.
12. A) Explain Quick sort with example.
    (OR)
    B) Convert the given arithmetic expression into postfix expressions.
    (A + B) * C / (D - E) * F / G + H
13. A) Write a C program for traversing a BST
    (OR)
    B) Explain DFS algorithm with example.

Class: I DATA SCIENCE **Code: R20DSRP201**
PAPER2:Intro.to R programming **Semester: II (W.EF-2020-21)**

Objective

Data Science is a fast-growing interdisciplinary field, focusing on the analysis of data to extract knowledge and insight. This course will introduce students to the collection. Preparation, analysis, modelling and visualization of data, covering both conceptual and practical issues. Examples and case studies from diverse fields will be presented, and hands-on use of statistical and data manipulation software will be included.

Outcomes

i. Recognize the various discipline that contribute to a successful data science effort.
ii. Understand the processes of data science identifying the problem to be solved, data collection, preparation, modelling, evaluation and visualization.
iii. Be aware of the challenges that arise in data sciences.
iv. Develop an appreciation of the many techniques for data modelling and mining.
v. Be cognizant of ethical issues in many data science tasks.
vi. Be comfortable using commercial and open source tools such as the R language and its associated libraries for data analytics and visualization.

Unit-I

Unit-I

Introduction to the field of data science, different types of data(Data Base data, data Warehouse data, Transaction Data, Stock Exchange Data, Time Series and Bio logical data) ; data collection.

Unit-II

Experimental design; data attributes; data cleaning; data characterization and analysis.

Unit-III

Data modelling and mining techniques; model evaluation; visualization; application of data science introducing to R – R Data structures – Help functions in R

Unit-IV

Vectors-Scalars-Declarations- recycling-Common Vector operations – Using all and any Vectrorized operations-NA and NULL values – Filtering – Vectorized if- then else-Vector Equality – Vector Element names.
Creating matrices –Matrix operations-Applying Functions to Matrix Rows and Columns – Adding and deleting rows and columns.

Unit-V

Vector /Matrix Distinction –Avoiding Dimension Reduction –Higher Dimensional arrays – lists-Creating lists – General list operations – Accessing list components and values – applying

functions to lists –recursive lists. Creating Data Frames – Matrix –like operations in frames – Merging Data Frames – Applying function to Data frames.

References

1.Nina Zumel, John Mount, “Practical Data Science with R”, Manning Publications, 2014.
2.Jure Leskovec, Anand Rajaraman, Jeffrey D.Ullman, “Mining of Massive Datasets”, Cambridge University Press, 2014.
3.Mark Gardener, “Beginning R - The Statistical Programming Language”, John Wiley & Sons, Inc., 2012.
4.W. N. Venables, D. M. Smith and the R Core Team, “An Introduction to R”, 2013.
5.Tony Ojeda, Sean Patrick Murphy, Benjamin Bengfort, Abhijit Dasgupta, “Practical Data

Science Cookbook", Packt Publishing Ltd., 2014.
6. Nathan Yau, "Visualize This: The FlowingData Guide to Design, Visualization, and Statistics", Wiley, 2011.
7. Boris lublinsky, Kevin t. Smith, Alexey Yakubovich, "Professional Hadoop Solutions",

MODEL PAPER

Class: I Data Science **Semester: II**

Paper: Intro.to R programming **Code: R20**DSRP201

W.E.F 2020-21

SECTION-A

Answer any FIVE of the following **5X5=25M**

1. Explain about Time Series Data?
2. Explain about Data Warehouse?
3. Explain about data attributes
4. Explain about R Data Types?
5. What are the Features of R?
6. Explain about NA and NULL values?
7. Explain about Filtering?
8. Explain about arrays?

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SECTION-B

Answer ALL of the following **5X10=50M**

9. A) Explain the Life Cycle of Data Science?

(OR)

B) What is a Database? What are different types of Databases?

10. A) Explain about Data Cleaning?

(OR)

B) Explain about Experimental design?

11. A) Explain about R Data Structures?

(OR)

B) Explain about Data Modelling Techniques?

12. A) What is a Vector? Explain about Vector Operations?

(OR)

B) What are Matrices? Explain about Matrix Operations?

13. A) What is Lists? Explain about List operations?

(OR)

B) What are Data Frames? Explain about operations of Data Frames?