KAKARAPARTI BHAVANARAYANA COLLEGE: PG CENTRE (Autonomous)
(Sponsored by: S.K.P.V.V. Hindu High Schools Committee)
Vijayawada – 520001.

Couse:	Semester:	Title of The Course:	Course Code:	W.E.F
M.Sc. (Data Science)	I	Programming with R and Python	R23DS101	2023-24

Total No of Hours for Teaching – Learning	Instructional Hours for Week		Duration of Semester End Examination in Hours	Max Marks		Credits
	Theory	Practical		CIA	SEE	
60 Hours	4	0	3 Hours	30	70	4

Course Description and Purpose:
The course is designed to provide basic knowledge of Python. Python programming is intended for Software Engineers, system analysts, program managers and user support personnel who wish to learn the Python Programming Language and R Programming which is useful statistical operations.

Course Objectives:

- ✓ Master the fundamentals of writing Python scripts
- ✓ Learn core Python scripting elements such as variables and flow control structures
- ✓ Discover how to work with lists and sequence data
- ✓ Write Python functions to facilitate code reuse
- ✓ Use Python to read and write files
- ✓ Make their code robust by handling errors and exceptions properly
- ✓ Work with the Python standard library
- ✓ Explore Python's object, oriented feature.
- ✓ Access online resources for R and import new function packages into the R workspace.
- ✓ Import, review, manipulate and summarize data-sets in R

Course Learning Outcomes:

At the end of this course the students should be able to:

CO1: Understand computer architecture and data representations (variables, representation of numbers and character strings).
CO2: Learn basic algorithmic problem, solving techniques (decision structures, loops, functions). Modules and packages
CO3: Use and understand objects used in programming and data structures
CO4: Design, document, implement and test solutions to programming problems. Related to R includes vector matrices and arrays
CO5: Identify and repair coding errors in a program and Perform appropriate statistical tests using R Create and edit visualizations

Course Content:

UNIT -I

Introduction: History of Python, Reading Input from the Console, Variables, Assignment Statements, Operators, Control Statements in Python if Statements – Two-Way if-else Statements – Nested if and Multi-Way if-elif-else Statements – Looping Statements– Operator Precedence and Associativity.

UNIT-II

Python functions: Defining a Function – Calling a Function –Functions with/without Return Values – Positional and Keyword Arguments –Passing Arguments by Reference Values, lambda expressions, Lists, Sets in Python.

UNIT-III

Classes and objects: Introduction to Object – Oriented Programming – Basic principles of Object – Oriented Programming in Python – Classes and Objects, Inheritance and Polymorphism, Abstract Classes and Interfaces. Exception Handling ,Tuples and Dictionaries in Python.

UNIT-IV

R Programming: Data Types, Vectors, Lists, Matrices, Arrays, Data Frames, Merging Data Frames, Variables, Functions in R

UNIT-V

R - CSV Files, R - Excel File, R - Pie Charts, R - Bar Charts, R – Histograms, R - Line Graphs, R – Histograms, R – Scatterplots

Reference Books:

1 Core Python Black book Dream Tech Publishers Dr R. Nageswara Rao

2. Reema Thareja, Python Programming using Problem Solving Approach, Oxford University Press(2017)

3. Hands on Programming with R from Oreilly Publications by GarettGrolemund

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Couse:	Semester:	Title of The Course:	Course Code:	W.E.F
M.Sc. (Data Science)	I	Data Structures	R23DS102	2023-24

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
	4	0		30	70	

Course Description and Purpose:
An overview of data structure concepts, arrays, stack, queues, trees, and graphs. Discussion of various implementations of these data objects, programming styles, and run, time representations. Course also examines algorithms for sorting, searching and some graph algorithms. Algorithm analysis and efficient code design is discussed.

Course Objectives:

- Exploring basic data structures such as stacks and queues.
- Introduces a variety of data structures such as search trees, and graphs.
- Introduces sorting and pattern matching algorithms

Course Learning Outcomes:

At the end of this course the students should be able to:

CO1: Ability to select the data structures that efficiently model the information in a problem.
CO2: Ability to assess efficiency tradeoffs among different data structure implementations or combinations. Includes searching and sorting
CO3: Implement and know the application of algorithms for sorting and pattern matching. Includes linked list and stacks
CO4: Design programs using a variety of data structures, including hash tables, binary and general tree structures, search trees, , graphs, and AVL trees
CO5: Graphs and representation. Algorithms for shortest path

Course Content:

Unit-1: (12Hrs)

Introduction and Overview: Elementary Data Organization, Data Structures, Data Structure Operations, And Algorithms: Complexity, Time-Space Tradeoff.

Preliminaries: Mathematical Notations and Functions, Algorithmic Notation, Control Structures, Complexity of Algorithms. Other Asymptotic Notations, Sub algorithms, Variables, Data Types

Unit-2: (12Hrs)

Sorting: Bubble sort, Insertion Sort, Selection sort.

Arrays, Records and Pointers: Linear Arrays, Representation and Traversing Linear Arrays, Inserting and Deleting, Linear Search, Binary Search

Unit-3: (12Hrs)

Linked Lists: Representation, Traversing, Searching in Linked List, Memory Allocation: Garbage Collection, Insertion, and Deletion in Two-Way Lists.

Stacks, Queues, Recursion: Stacks, Array representation, Linked List representation, Evaluation of Arithmetic Expressions, Infix to postfix Conversion, Quick sort, Recursion, Queues, Linked representation of Queues, Deques, and Priority Queues.

Unit-4: (12Hrs)

Trees : Binary trees, Representing and traversing binary trees, Tree Traversals, Binary Search Trees, Searching, Insertion and Deletion in Binary Search Trees, AVL Search Trees, Insertion and Deletion in AVL trees

Heap: Heap Sort, Huffman's Algorithms, General Trees

Unit-5: (12Hrs)

Graphs: Terminology, Sequential representation of Graphs, Wars hall's Algorithm, Linked representation of Graphs, Operations on Graphs, Traversing a Graph. Breadth First Search, Depth First Search.

Advanced Sorting Techniques: Merge Sort and Radix Sort

Reference Books

- Seymour Lipschutz, Theory and problems of Data Structures, Mc Graw Hill(Schaums Outlines)
- John R Hubbard, Second Edition, Data Structures with Java, Mc Graw Hill(Schaums Outlines)
- Robert Lafore, Data Structures & Algorithms in Java, Second Edition, Pearson Education.

- Fundamentals of DATA STRUCTURES in C: 2nded, , Horowitz , Sahani, Anderson-freed, Universities Press
- Data Structures, a Pseudocode Approach, Richard F Gilberg, Behrouz A Forouzan, Cengage.

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Couse:	Semester:	Title of The Course:	Course Code:	W.E.F
M.Sc. (Data Science)	I	Probability and Statistics	R23DS103	2023-24

Total No of Hours for Teaching – Learning	Instructional Hours for Week		Duration of Semester End Examination in Hours	Max Marks		Credits
	Theory	Practical		CIA	SEE	
60 Hours	4	0	3 Hours	30	70	4

Course Description and Purpose:

To develop the understanding of the mathematical and logical basis to many modern techniques in computer science technology like machine learning, programming language design, and concurrency.

Course Objectives:

Understand the mathematical fundamentals that is prerequisites for variety of courses like Data mining, Network protocols, analysis of Web traffic, Computer security, Software engineering, Computer architecture, operating systems, distributed systems bioinformatics, Machine learning.

Study various sampling and classification problems.

Course Learning Outcomes:

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

CO1: Apply the basic rules and theorems of probability theory such as Baye's Theorem, determine probabilities that help to solve engineering problems and to determine the expectation and variance of a random variable from its distribution.

CO52: Able to perform and analyze of sampling, means, proportions, variances and estimates the maximum likelihood based on population parameters.

CO3: Learn how to formulate and test hypotheses about sample means, variances and proportions and to draw conclusions based on the results of statistical tests.

CO4: Design various ciphers using number theory.

CO: Design Simple Regression and Correlation

Course Content:

UNIT-I

Some probability laws: Axioms of Probability, Conditional Probability, Independence of the Multiplication Rule, Bayes' theorem

UNIT-II

Discrete Distributions: Random Variables, Discrete Probability Densities, Expectation and distribution parameters, Binomial distribution, Poisson distribution and its applications

UNIT-III

Inferences on the mean and the Variance of a distribution: Hypothesis Testing, significance testing, Hypothesis and significance test on the mean, Hypothesis tests on the Variance

Inferences on proportions: Estimating proportions, testing hypothesis on a proportion, Comparing two proportions: estimation, comparing two proportions: hypothesis testing**.**

UNIT-IV

Comparing two means and two variances: point estimation: Independent samples, Comparing variances: the F-distribution, Comparing means, variances equal

Analysis of Variance: One-way classification fixed effects model, comparing variances, pair wise comparisons, randomized complete block design

UNIT-V

Simple linear regression and correlation: Model and parameter estimation, inferences about slope, Inferences about intercept, Co-efficient of determination

Multiple linear regression models: Least square procedures for model fitting, a matrix approach to least squares, interval estimation

Reference Books

1. Susan Milton and Jesse C. Arno ld, Introduction to Probability and Statistics, Fourth edition.

2.William Mendenhall, Robert J Beaver, Barbara M Beaver, Introduction to Probability and Statistics,Twelth edition, Thomson.

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Couse:	Semester:	Title of The Course:	Course Code:	W.E.F
M.Sc. (Data Science)	I	DATA BASE MANAGEMENT SYSTEMS	R23DS104	2023-24

Total No of Hours for Teaching – Learning	Instructional Hours for Week		Duration of Semester End Examination in Hours	Max Marks		Credits
	Theory	Practical		CIA	SEE	
60 Hours	4	0	3 Hours	30	70	4

Course Description and Purpose:

Covers the classical internal database management systems which include insert, delete and update commands in sql and learn to know how to maintain the database .

Course Objectives:

- To understand need of DBMS, models and functions of DBMS.
- To make the students learn the architecture of DBMS.
- To expose the students learn the advantages of normalization.
- To make the students understand the RAID strategies.
- To make the students understand the need for transaction processing,
- Indexing techniques for physical implementation of databases.

Course Outcomes:

At the end of this course, the students will be able to

CO1: The student would be able to understand Database Architecture, Client Server architecture.
CO2: The student develops an ability to write Queries in Database languages and design database Using SQL like curd operations
CO3: The student would be able to apply the concepts of relational algebra, calculus on Databases.
CO4: The student would be able to normalize the relations while designing a data base. Using normal forms
CO5: Understand the issues in transaction processing and implement them to maintain data reliability and integrity.

Unit1: (12 Hrs)

Databases and Database Users: Introduction, Characteristics of the Database Approach, Actors on the Scene, Workers behind the scene, Advantages of the using the DBMS Approach.

Database System Concepts and Architecture:

Data Models, Schemas and Instances, Three Schema architecture and Data Independence,

ER Model: Entity Types, Entity Sets, Attributes and Keys, Relationship types, Relationship sets, roles and structural Constraints Weak Entity types, Relationship Types of Degree Higher than Two, EER Diagram. Generalization, Specialization. Company Database EER Diagram.

Unit 2: (12 Hrs)

Relational Model Concepts, Relational Model Constraints and Relational Database Schemas, Update Operations, Transactions and Dealing with Constraint Violations.

The Relational Algebra and Relational Calculus: Unary Relational Operations: SELECT and PROJECT, Relational Algebra Operations from set Theory, Binary Relational Operations: JOIN and DIVISION, Additional Relational Operations, , Specifying Constraints in SQL, Basic Queries in SQL, More Complex SQL Queries, INSERT,DELETE and UPDATE statements in SQL, Triggers and Views.

Unit 3: (12 Hrs)

Functional Dependencies and Normalization for Relational Databases:

Informal Design Guidelines for Relation Schemas, Functional dependencies, Normal Forms Based in Primary Keys, General Definitions of Second and Third Normal Forms, Boyce-Codd Normal Form.

Relational Database Design Algorithms and Further Dependencies: Properties of Relational Decompositions, Algorithms for Relational Database Schema Design, Multivalued Dependencies and Fourth Normal Form, Join Dependencies and Fifth Normal Form,

Unit -4: (12 Hrs)

Disk Storage, Basic File Structures and Hashing:

Introduction, Secondary Storage Devices, Operations on Files, Hashing Techniques, Other Primary File Organizations, RAID Technology.

Indexing Structures for Files: Types of Single-Level Ordered Indexes, Multilevel Indexes, Dynamic Multilevel Indexes Using B Trees, Other Types of Indexes.

Unit -5 (12 Hrs.)

Introduction to Transaction Processing Concepts and Theory:

Introduction to Transaction Processing, Transaction and System Concepts, Desirable Properties of Transactions,

Concurrency Control Techniques: Two Phase Locking Techniques for Concurrency Control, Concurrency Control Based on Timestamp Ordering, Multiple Granularity Locking.

Reference Books:

- Fundamentals of Database Systems by RamezElmasri, ShamkantB. Navathe, from Fifth Edition, Pearson Education (2007).
- DataBase Systems Design Implementation and Management by Peter Rob,Carlos Coronel from Eight Editon Thomson(2008).
- An Intorduction to Data Base Systems by C.J.Date, A.KannanS.Swamynanatha from VII Edition Pearson Education (2006).

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Couse:	Semester:	Title of The Course:	Course Code:	W.E.F
M.Sc. (Data Science)	I	Operating Systems	R23DS105	2023-24

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	3
	3	1		30	70	

Course Description and Purpose:

Covers the classical internal algorithms and structures of operating systems, including CPU scheduling, memory management, and device management. Considers the unifying concept of the operating system as a collection of cooperating sequential processes. Covers topics including file systems, virtual memory, disk request scheduling, concurrent processes, deadlocks, security, and integrity.

Course Objectives:

- To understand the services provided by and the design of an operating system.
- To understand the structure and organization of the file system.
- To understand what a process is and how processes are synchronized and scheduled.
- To understand different approaches to memory management.
- Students should be able to use system calls for managing processes, memory and the file system.
- Students should understand the data structures and algorithms used to implement an OS.

Course Learning Outcomes:

At the end of this course students will able to understand

CO1: Understand fundamental operating system abstractions such as processes, threads, files, semaphores, IPC abstractions, shared memory regions, etc.,
CO2: Analyze important algorithms eg. Process scheduling and memory management algorithms.
CO3: Categorize the operating system's resource management techniques, dead lock management techniques, memory management techniques
CO4: Understand the File System Structure
CO5: Understanding the Distributed Operating Systems

Course Content:

UNIT- I

Introduction to Operating System Concept: Types of Operating Systems, Operating Systems Concepts, Operating System Operations. Operating Systems Structures- Operating System Services, User Operating- System Interface, Introduction to System calls, Types of System Calls. Processes Management: Process Management: Process concept, Process State Diagram, Process control block, Process Scheduling, Inter process Communication, Threads- Threading Issues, Scheduling- Basic Concepts, Scheduling Criteria, Scheduling Algorithms.

UNIT- II

Process Synchronization: The Critical-Section Problem, Peterson's Solution, Synchronization Hardware, Semaphores, Classic Problems of Synchronization, Monitors. Principles of deadlock: System Model, Deadlock characterization, Deadlock handling, Deadlock Prevention, Detection and Avoidance, Recovery Starvation, Critical Regions form Deadlock.

UNIT –III

Memory Management: Swapping, Contiguous Memory Allocation, Paging, structure of the Page Table, Segmentation. Virtual Memory Management- Demand Paging, Page-Replacement Algorithms.

UNIT- IV

File-System Interface: File Concept, Access Methods, Directory structure, File-System mounting, Files Sharing, Protection. File-System implementation- File-System Structure, Allocation Methods, Free-Space Management, Disk Structure, Disk Scheduling.

UNIT –V

Distributed Operating Systems- Types of network based Operating systems, Network Structure, Network Topology, Communication Structure, Communication Protocols, Robustness, Design Issues .A review of Mobile Operating Systems, Features of Android Operating Systems.

Reference Books

- Abraham Silberschatz,& Peter Baer Galvin, Gagne, Operating System Concepts, Ninth Edition, Wiley, 2015
- William Stallings, Operating Systems-Internals and Design Principles, Fifth Edition, Pearson Education, 2007
- Achyut S Godbole, Operating Systems, Second Edition, TMH, 2007 Flynn/McHoes, Operating Systems, Cengage Learning, 2008.
- Deitel & Deitel, Operating System, Third Edition, Pearson Education, 2008

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Couse:	Semester:	Title of The Course:	Course Code:	W.E.F
M.Sc. (Data Science)	I	Python and R Programming Lab	R23DS106	2023-24

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	3
	0	6		30	70	

List of Programs

1. Write a python program to demonstrate Operators?
2. Write a python program to demonstrate Conditional statements?
3. Write a python program to demonstrate Functions with passing arguments by reference?
4. Write a python program to demonstrate lambda Expressions?
5. Write a python program to demonstrate Object oriented Programming?
6. Write a python program to demonstrate Inheritance?
7. Write a python program to demonstrate Polymorphism?
8. Write a python program to demonstrate abstract Classes?
9. Write a python program to demonstrate Interfaces?
10. Write a python program to demonstrate Exception Handling?
11. Write a python program to demonstrate Lists?
12. Write a python program to demonstrate Dictionary Methods?
13. Write a python program to demonstrate Sets concept?
14. Write a python program to demonstrate Tuples?
15. Write a R Program for Lists, Vector, Matrix and Array

16. Write a R Program for Lists, Vector, Matrix and Array

17. Write a R Program to import CSV Files

18. Write a R Program to import Excel Files

19. Write a R Program to plot Pie Charts, Bar Charts, Box plots, Line graphs and Scatter plots.

Note: Faculty need not to confine for above list they can add more programs based on students' Performance.

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Couse:	Semester:	Title of The Course:	Course Code:	W.E.F
M.Sc. (Data Science)	I	Data Structures Lab	R23DS107	2023-24

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	3
	0	6		30	70	

List of Programs

1. Write a program to implement Stack operations using Arrays
2. Write a program to implement Queue operations using Arrays
3. Write a program to implement linked list operations using Arrays
4. Write a Program to implement tree traversal techniques
5. Write a program to convert infix expression to postfix expression
6. Write a program to evaluate postfix expression
7. Write a program to implement Binary search.
8. Write a program to implement Selection sort
9. Write a program to implement Insertion sort
10. Write a program to implement Quick sort
11. Write a program to implement Merge Sort.
12. Write a program to implement Radix Sort.

13. Write a program to implement insertion and deletion in AVL Tree

14. Write a program to implement insertion and deletion in Binary Search Tree.

15. Write a program to implement BFS.

16. Write a program to implement BFS.

17. Write a program to implement Priority Queue.

Note: Faculty need not to confine for above list they can add more programs based on students' Performance.

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Couse:	Semester:	Title of The Course:	Course Code:	W.E.F
M.Sc. (Data Science)	I	Programming with R and Python	R23DS101	2023-24

MODEL QUESTION PAPER (w.e.f: 2023-24)

Time: Three Hours **Max Marks: 70M**

Section -A

Answer any 5 Questions **5*4=20M**

1. What is Multi-Way if-elif-else statement? **(CO1)**
2. Explain about Lambda Functions **(CO1)**
3. Explain about Sets in Python **(CO2)**
4. Explain about Tuples **(CO2)**
5. Explain about Exception Handling **(CO3)**
6. Explain about Data Types **(CO3)**
7. Explain about R - Pie Charts **(CO4)**
8. Explain about Arrays **(CO5)**

SECTION-B

Answer the following Questions. **10*5=50M**

1. A) Explain about Control Statements in Python. **(CO1)**

OR

B) Discuss about Looping Statements in Python. **(CO1)**

UNIT - II

2 A) Discuss about functions in Python **(CO2)**

OR

B) Explain about Lists in Python. **(CO2)**

UNIT - III

3 A) Discuss about Inheritance in Python. **(CO3)**

OR

B) Explain about abstract classes in Python. **(CO3)**

UNIT - IV

4 A) Explain about Vectors and Matrices in R**(CO4)**

OR

B) Explain about Data Frames and merging data frames in R. **(CO4)**

UNIT - V

5 A). Explain about CSV Files in R. **(CO5)**

OR

B) Discuss about histograms and Scatter plots in R. **(CO5)**

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Couse:	Semester:	Title of The Course:	Course Code:	W.E.F
M.Sc. (Data Science)	I	Data Structures	R23DS102	2023-24

MODEL QUESTION PAPER (w.e.f: 2023-24)

Time: Three Hours **Max Marks: 70M**

Section -A

Answer any 5 Questions **5*4=20M**

1. What is Time-Space Tradeoff? **(CO1)**
2. Explain about Insertion Sort **(CO1)**
3. Explain about Linear Search **(CO2)**
4. Explain about Garbage Collection **(CO2)**
5. Explain about Exception Handling **(CO3)**
6. Explain about Priority Queues **(CO3)**
7. Explain about Huffman's Algorithms **(CO4)**
8. Explain about Sequential representation of Graphs **(CO5)**

SECTION-B

Answer the following Questions. **10*5=50M**

UNIT - I

1. A) Explain about elementary data organization and Complexity. **(CO1)**

OR

B) Discuss about various asymptotic notations and Data Types. **(CO1)**

UNIT - II

2 A) Discuss about Selection Sort**(CO2)**

OR

B) Explain about Binary search. **(CO2)**

UNIT - III

3 A) Discuss about Quick sort with example. **(CO3)**

OR

B) Explain about DeQue with example. **(CO3)**

UNIT - IV

4 A) Explain about Binary search tree operations **(CO4)**

OR

B).Explain insertion and deletion operation in AVL Tree. **(CO4)**

UNIT - V

5 A). Explain about Graph Traversals. **(CO5)**

OR

B) Discuss about Radix sort with example. **(CO5)**

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Couse:	Semester:	Title of The Course:	Course Code:	W.E.F
M.Sc. (Data Science)	I	Probability and Statistics	R23DS103	2023-24

MODEL QUESTION PAPER (w.e.f: 2023-24)

Time: Three Hours **Max Marks: 70M**

Section -A

Answer any 5 Questions **5*4=20M**

1. What is Conditional Probability? **(CO1)**
2. Explain about Random Variables **(CO1)**
3. Explain about Discrete Probability Densities **(CO2)**
4. Explain about significance test on the mean **(CO2)**
5. Explain about comparing two proportions **(CO3)**
6. Explain about randomized complete block design **(CO3)**
7. Explain about Co-efficient of determination **(CO4)**
8. Explain about interval estimation **(CO5)**

SECTION-B

Answer the following Questions. **10*5=50M**

UNIT – I

1. A) Explain Conditional Probability and Bayes Theorem. **(CO1)**

(OR)

B) Explain about Bayes Theorem **(CO1)**

UNIT – II

2. A) Explain about Expectation and distribution parameters? **(CO2)**

(OR)

B) Explain about Binomial distribution, Poisson distribution **(CO2)**

UNIT – III

3. A) Explain about Hypothesis and significance test on the mean **(CO3)**

(OR)

B) Explain about testing hypothesis on a proportion **(CO3)**

UNIT – IV

4. A) Explain about Comparing variances and Comparing means **(CO4)**

(OR)

B) Explain about One-way classification fixed effects model**. (CO4)**

UNIT – V

5. A) Explain about model and parameter estimation. **(CO5)**

(OR)

B) Explain about least square procedures for model fitting **(CO5)**

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Couse:	Semester:	Title of The Course:	Course Code:	W.E.F
M.Sc. (Data Science)	I	DATA BASE MANAGEMENT SYSTEMS	R23DS104	2023-24

MODEL QUESTION PAPER (w.e.f: 2023-24)

Time: Three Hours **Max Marks: 70M**

Section -A

Answer any 5 Questions **5*4=20M**

1. Explain Advantages of the using the DBMS Approach? **(CO1)**
2. Explain about Schemas and Instances **(CO1)**
3. Explain about Weak Entity types **(CO2)**
4. Explain about Relational Algebra Operations **(CO2)**
5. Explain about Complex SQL Queries **(CO3)**
6. Explain about Functional dependencies **(CO3)**
7. Explain about Algorithms for Relational Database Schema Design **(CO4)**
8. Explain about Operations on Files **(CO5)**

SECTION-B

Answer the following Questions. **10*5=50M**

UNIT - I

1. a) Explain Three Schema Architecture with neat diagram and Data Independence. **(CO1)**

OR

b) Explain Entity, types of Attributes and Keys relationship with an ER-diagram**(CO1)**

UNIT - II

2. a) Explain about Relational Model Constraints and Relational Database Schemas. **(CO2)**

OR

b) INSERT, DELETE and UPDATE statements in SQL **(CO2)**

UNIT - III

3 a) What is Normalization? Explain 1NF and 2NF. **(CO3)**

OR

b) Define and BCNF. How BCNF in difference from3NF? **(CO3)**

UNIT - IV

4. a) Explain about RAID technology. **(CO4)**

OR

b) Dynamic Multilevel Indexes Using B Trees **(CO4)**

UNIT - V

5. a) Write the Desirable Properties of Transactions. **(CO5)**

OR

b) What is Concurrency Control? Explain Two Phase Locking Techniques. **(CO5)**

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Couse:	Semester:	Title of The Course:	Course Code:	W.E.F
M.Sc. (Data Science)	I	Operating Systems	R23DS105	2023-24

MODEL QUESTION PAPER (w.e.f: 2023-24)

Time: Three Hours **Max Marks: 70M**

Section -A

Answer any 5 Questions **5*4=20M**

1. Explain System calls **(CO1)**
2. Explain about Inter process Communication **(CO1)**
3. Explain about Critical Regions form Deadlock. **(CO2)**
4. Explain about Demand Paging **(CO2)**
5. Explain about Disk Structure **(CO3)**
6. Explain about Allocation Methods **(CO3)**
7. Explain about Communication Protocols **(CO4)**
8. Explain about Network Topology **(CO5)**

SECTION-B

Answer the following Questions. **10*5=50M**

UNIT - I

1. a) Explain about Operating System Structure and Services (CO1)

(Or)

a) Explain about Process Control block and process scheduling(CO1)

UNIT - II

2. a) Explain about Critical-Section Problem and Peterson's Solution ? (CO2)

(Or)

b) Explain about Dead Lock Prevention, Detection and Avoidance.(CO2)

UNIT - III

3. a) Explain about Paging and structure of the Page Table(CO3)

(Or)

b) Explain about Page-Replacement Algorithms(CO3)

UNIT - IV

4.a) Explain about File-System mounting and Files Sharing?(CO4)

(Or)

b) Describe the concept of Disk Structure and Disk Scheduling.(C04)

UNIT - V

5. a) Explain about Features of Android Operating Systems(CO5)

(Or)

c) Explain about Types of network based Operating systems?(CO5)