E.G.S. PILLAY ENGINEERING COLLEGE (AUTONOMOUS)

Approved by AICTE, New Delhi

(Affiliated to Anna University, Chennai | Re-accredited by NAAC with 'A++' Grade)

Accredited by NBA (B.Tech-IT, B.E-CSE and ECE)(Tier-1)

NAGAPATTINAM – 611002

B.TECH - INFORMATION TECHNOLOGY R – 2023

SECOND YEAR - THIRD SUM

CURRICULUM AND SYLLABUS FOR THIRD SEMESTER

Course Code	Course Name	Category	L	T	P	C
2301MA306	Queuing and Network Model	BSC	3	1	0	4
2302IT301	Data Structures and Algorithms	PCC	3	0	0	3
2302IT302	Computer Organization and Architecture	PCC	3	0	0	3
2302IT303	Problem solving using Python	PCC	2	0	4	4
2302IT304	Database Management Systems	PCC	3	0	0	3
2301HSX01	Universal Human Values and Ethics	HSMC	2	0	0	2
2302IT351	Data Structures and Algorithms Laboratory	PCC	0	0	2	1
2302IT352	Database Management Systems Laboratory	PCC	0	0	2	1
2304GE301	Professional Development Course -I	EEC	0	0	2	1
2301LS301	Life skill-III	MC	0	0	0	0
Total			**15**	**2**	**12**	**22**

2301MA306	QUEUING MODEL AND NETWORK MODEL	L	T	P	C
		3	1	0	4

PREREQUISITE:

1. Engineering Mathematics-I
2. Engineering Mathematics-II
3. Basics of Queuing and Network concepts.

COURSE OBJECTIVES:

1. To understand the basics of Linear programming and formulation of LPP.
2. To analyze the concept of Transportation and Assignment models.
3. To understand the basic concept of real time problems in simulation.
4. To emphasis the concept of network model and Techniques.
5. To emphasis on more advance topics that are particularly useful in modeling, Such as queuing theory.

COURSE OUTCOMES:

On the successful completion of the course, students will be able to

CO1:	Develop models and algorithms to analyze queueing systems
CO2:	Understand the given problem as transportation and assignment problem
CO3:	Analyze the real time problems in simulation
CO4:	To analyze the network construction and project evaluation
CO5:	Develop models and algorithms to analyze queueing systems Analyze the real time problems in simulation

COs Vs POs MAPPING:

COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1	3	2	1	-	-	-	-	-	-	-	-	-
CO2	3	2	1	-	-	-	-	-	-	-	-	-
CO3	3	2	1	-	-	-	-	-	-	-	-	-
CO4	3	2	1	-	-	-	-	-	-	-	-	-
CO5	3	2	1	-	-	-	-	-	-	-	-	-

COs Vs PSOs MAPPING:

COs	PSO1	PSO2	PSO3
CO1	1	-	-
CO2	1	-	-
CO3	1	-	-
CO4	1	-	-
CO5	1	-	-

COURSE CONTENTS:

MODULE I **LINEAR PROGRAMMING** **9 Hours**

Formulation – Graphical solution – Simplex method – Two phase method-Artificial variable method

MODULE II **TRANSPORTATIONANDASSIGNMENTMODELS** **9 Hours**

Mathematical formulation of transportation problem- Methods for finding initial basic feasible solution – optimum solution - degeneracy – Mathematical formulation of assignment models – Hungarian Algorithm –Variants of the Assignment problem

MODULE III **SIMULATION** **9 Hours**

Discrete Event Simulation – Monte – Carlo Simulation – Stochastic Simulation – Applications to real time problems.

MODULE IV	**NETWORKMODEL**	**9 Hours**
Network Construction–Critical Path Method–Project Evaluation and Review Technique–Resource analysis in Network Scheduling.		
MODULE V	**QUEUEINGMODELS**	**9 Hours**
Characteristics of Queuing Models –Markovian Queues–$(M/M/1):(FIFO/\infty/\infty)$, $(M/M/1):(FIFO/N/\infty)$, $(M/M/C):(FIFO/\infty/\infty)$, $(M/M/C):(FIFO/N/\infty)$ models– Little's formulae.		
		TOTAL: 45 HOURS

REFERENCES:

1. *Grewal.B.S.,"HigherEngineeringMathematics",42ndEdition,KhannaPublishers,Delhi,2012*
2. *Gross. Dand Harris C.M, "Fundamentals of Queuing Theory", Wiley Student Edition,2004.*
3. *Robertazzi, "Computer Networks and Systems: Queuing Theory and performance Evaluation", Springer, 3rd Edition, 2006*
4. *TahaH.A."OperationsResearch",Pearsoneducation,Asia,8th Edition,2007*
5. *KalavathyS,OperationsResearch,SecondEdition,VikasPublishingHouse,2004.*
6. *D.S. Hira and P.K. Gupta, Operations Research, (Revised Edition), Published by S. Chand & Company Ltd, 2014*
7. *Winston, W.L., "Operations Research", Thomson – Brooks/Cole, Fourth Edition, Belmont, 2003.*

2302IT301	DATA STRUCTURES AND ALGORITHMS	L	T	P	C
		3	0	0	3

PREREQUISITE:

Programming in C and C++

COURSE OBJECTIVES:

	1. Learn the fundamental concepts of Data Structures and Algorithm.
	2. To apply the concepts of various linear data structures.
	3. To apply the concepts of various nonlinear data structures.
	4. Become familiar with the different algorithm design techniques.

COURSE OUTCOMES:

On the successful completion of the course, students will be able to

CO1:	Understand the concepts of Data Structures and Algorithm.
CO2:	Understand and apply the various concepts of Linear data Structures
CO3:	Understand and apply the various concepts of Non-Linear data Structures.
CO4:	Apply Divide and Conquer and Dynamic programming method to solve different problems.
CO5:	Apply Greedy technique and Backtracking method to solve different problems.

COs Vs POs MAPPING:

COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1	3	3	2	2	2	-	-	-	-	-	-	-
CO2	3	3	2	2	2	-	-	-	-	-	-	-
CO3	3	3	3	2	2	-	-	-	-	-	-	-
CO4	3	3	2	2	2	-	-	-	-	-	-	-
CO5	3	3	3	2	2	-	-	-	-	-	-	-

COs Vs PSOs MAPPING:

COs	PSO1	PSO2	PSO3
CO1	3	2	2
CO2	3	2	1
CO3	3	2	2
CO4	3	2	1
CO5	3	2	2

COURSE CONTENTS:

MODULE I	INTRODUCTION	9 Hours

Data Structures Basics – Data Structures and Types – ADT – Notion of an Algorithm – Fundamentals of Algorithmic Problem Solving – Fundamentals of the Analysis of Algorithm Efficiency – Asymptotic Notations – Mathematical analysis for Recursive and Non-recursive algorithms

MODULE II	LINEAR DATA STRUCTURES	9 Hours

Array: Types, Implementations – List: Types, Applications – Stack: Operations, Array and Linked list implementation, Applications – Evaluation of Arithmetic Expressions – Queues: Operations, Array and Linked list implementation.

MODULE III	NON-LINEAR DATA STRUCTURES	9 Hours

Tree: Tree Terminologies, Binary Tree Representation, Tree Traversals, Binary Search Trees, Binary Heap, Hashing, AVL Tree – Graph: Representation of Graphs, Topological Sort, Depth First Search and Breadth First Search.

MODULE IV	DIVIDE-AND-CONQUER AND DYNAMIC PROGRAMMING	9 Hours

Divide and conquer methodology – Sorting Technique: Merge sort, Quick sort – Searching Technique: Linear search, Binary search – Computing a Binomial Coefficient – Floyd Warshall Algorithm – Optimal Binary Search Trees – Travelling Salesman Problem – Tower of Hanoi Problem.

MODULE V	**GREEDY TECHNIQUE AND BACKTRACKING**	**9 Hours**
Greedy Technique: Minimum Spanning Tree: Prim's Algorithm, Kruskal's Algorithm – Shortest path algorithm: Dijkstra's Algorithm – Huffman Trees code – Knapsack Problem – Backtracking: N-Queen Problem, Graph Coloring Problem.		
		TOTAL: 45 HOURS

REFERENCES:

1.Thomas H. Cormen, Charles E. Leiserson, Ronald Rivest, Clifford Stein, Introduction to Algorithms", Fourth Edition, McGraw Hill/ MIT Press, 2022

2.Mark Allen Weiss, "Data Structures and Algorithm Analysis in C++", Pearson Education, 2014

3. Reema Thareja, "Data Structures Using C", Oxford University Press, 2011

4. Aho, Hopcroft and Ullman, "Data Structures and Algorithms", Pearson Education,2012

5. Michael T Goodrich, Roberto Tamassia, David Mount, "Data Structures and Algorithms in C++", 8th Edition, Wiley Publishers, 2014.

6. Langsam, Augenstein and Tanenbaum, Data Structures Using C and C++, 2nd Edition, Pearson Education, 2015.

7. nptel.ac.in/

2302IT302	COMPUTER ORGANIZATION AND ARCHITECTURE	L	T	P	C
		3	0	0	3

PREREQUISITE:

Basics of Computer Structure

COURSE OBJECTIVES:

	1. To make students understand the basic structure and operation of digital computer.
	2. To study the concepts of pipelining.
	3. To expose the students to the concept of parallelism
	4.To familiarize the students with hierarchical memory system including cache memories and virtual memory.

COURSE OUTCOMES:

After completion of the course, Student will be able to

CO1:	Understand the concepts of structure of computers and machine instructions
CO2:	Explain the concepts of processing Modules
CO3:	Design and analyze pipelined control Modules
CO4:	Evaluate performance of memory systems
CO5:	Understand disk storage and apply RAID concepts in real time problems

COs Vs POs MAPPING:

COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1	3	2	1	-	-	-	-	-	-	-	-	-
CO2	3	2	1	-	-	-	-	-	-	-	-	-
CO3	3	3	3	2	1	-	-	-	-	-	-	-
CO4	3	2	2	1	1	-	-	-	-	-	-	-
CO5	3	2	2	1	1	-	-	-	-	-	-	-

COs Vs PSOs MAPPING:

COs	PSO1	PSO2	PSO3
CO1	2	2	1
CO2	2	2	1
CO3	3	2	1
CO4	3	2	2
CO5	2	2	1

COURSE CONTENTS:

MODULE I **STRUCTURE OF COMPUTERS & MACHINE INSTRUCTION** **9 Hours**

Introduction, Technologies for building Processors and Memory, Performance, The Power Wall, Operations of the Computer Hardware, Operands of the Computer Hardware, Signed and Unsigned numbers, Representing Instructions in the Computer, Logical Operations, Instructions for Making Decisions, Supporting Procedures in Computer Hardware, Communicating with People.

MODULE II **PROCESSING MODULE** **9 Hours**

MIPS Addressing for 32-Bit Immediate and Addresses, Parallelism and Instructions: Synchronization, Translating and Starting a Program, Addition and Subtraction, Multiplication, Division, Floating Point, Parallelism and Computer Arithmetic: Sub word Parallelism, Real Stuff: Streaming SIMD Extensions and Advanced Vector Extensions in x86.

MODULE III **PIPELINING** **9 Hours**

Logic Design Conventions, Building a Datapath, A Simple Implementation Scheme, An overview of Pipelining, Pipelined Datapath and Control, Data Hazards: Forwarding versus Stalling, Control Hazards, Exceptions, Parallelism via Instructions, Real Stuff: The ARM Cortex – A8 and Intel Core i7 Pipelines, Going Faster: Instruction –Level Parallelism and Matrix Multiply. An Introduction to Digital Design Using

a Hardware Design Language to Describe and Model a Pipeline.		
MODULE IV	**MEMORY**	**9 Hours**
Memory Technologies, the Basics of Caches, Measuring and Improving Cache Performance, dependable memory hierarchy, Virtual Machines, Virtual Memory, A Common Framework for Memory Hierarchy, Using a Finite- State Machine to Control a Simple Cache, Parallelism and Memory Hierarchy: Redundant Arrays of Inexpensive Disks, Advanced Material: Implementing Cache Controllers, Real Stuff: The ARM Cortex-A8 and Intel Core i7 Memory Hierarchies, Going Faster: Cache Blocking and Matrix Multiply.		
MODULE V	**DISK STORAGE**	**9 Hours**
Disk Storage and Dependability-RAID levels-hardware multi-threading-clusters- message passing multiprocessors-Multiprocessors network topologies.		
		TOTAL: 45 HOURS

REFERENCES:

1.David A. Patterson and John L. Hennessey, "Computer organization and design, The Hardware/Software interface", Morgan Kauffman / Elsevier, Fifth edition, 2014.

2.Carl Hamacher, Zvonko Vranesic and Safwat Zaky, "Computer Organization", 5th Edition, Tata McGraw Hill, 2013.

3.William Stallings, ―Computer Organization and Architecture – Designing for Performance‖, Sixth Edition, Pearson Education, 2013.

4.V.P. Heuring, H.F. Jordan, ―Computer Systems Design and Architecture‖, Second Edition, Pearson Education, 2015.

5.Behrooz Parhami, ―Computer Architecture‖, Oxford University Press, 2012.

6.http://nptel.ac.in

2302IT303	PROBLEM SOLVING USING PYTHON	L	T	P	C
		2	0	4	4

PREREQUISITE:

Programming Languages

COURSE OBJECTIVES:

	1.To know the basics of problem solving
	2.To read and write simple Python programs.
	3.To develop Python programs with conditions, loops and data structures.
	4.To define Python functions and call them.
	5.To do input/output with files in Python.

COURSE OUTCOMES:

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

CO1:	Execute Python code in variety of environments
CO2:	Use the correct Python control flow construct
CO3:	Design Data structures and functions using python
CO4:	Implement File, Modules and Packages concepts using Python
CO5:	Create their own classes and use existing python classes

COs Vs POs MAPPING:

COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1	3	3	2	2	2	-	-	-	-	-	1	-
CO2	3	3	2	2	2	-	-	-	-	-	1	-
CO3	3	3	2	2	2	-	-	-	-	-	1	-
CO4	3	3	2	2	2	-	-	-	-	-	1	-
CO5	3	3	3	2	2	-	-	-	-	-	1	-

COs Vs PSOs MAPPING:

COs	PSO1	PSO2	PSO3
CO1	3	2	1
CO2	3	2	1
CO3	3	2	1
CO4	3	2	1
CO5	3	2	1

COURSE CONTENTS:

MODULE I	PROBLEM SOLVING AND PYTHON INTRODUCTION	9 Hours

Problem solving techniques: Program development life-cycle – Algorithms – building blocks of algorithms -Flowchart– Pseudo Code-Illustrative problems. Introduction to Python, Python Interpreter and its working, Syntax and Semantics

MODULE II	PYTHON BASICS	9 Hours

Data Types, operators, loops, Assignments and Expressions, Control Flow Statements.

MODULE III	DATA STRUCTURES AND FUNCTIONS	9 Hours

Lists-Tuples-Dictionaries-Functions and lambda expressions-Iterations and Comprehensions.

MODULE IV	FILES,MODULES AND Packages	9 Hours

Files and exception: text files, reading and writing files, format operator; command line arguments, errors and exceptions, handling exceptions, modules, packages

MODULE V	CLASSES OBJECTS And REGULAR EXPRESSIONS	9 Hours

Overview of OOPs terminology-class-inheritance-overloading-Regular Expressions

TOTAL: 45 HOURS

REFERENCES:

1.Martin. C. Brown, "PYTHON: The Complete Reference", McGraw Hill,2001.

2.Naomi R. Ceder , The Quick Python Book, Second Edition,2010

3.Guido van Rossum and Fred L. Drake Jr, —An Introduction to Python – Revised and updated for

4.Python 3.2, Network Theory Ltd., 2011.

5.John V Guttag, —Introduction to Computation and Programming Using Python'', Revised and

6.expanded Edition, MIT Press , 2013

7.Robert Sedgewick, Kevin Wayne, Robert Dondero, —Introduction to Programming in Python: An

8.Inter-disciplinary Approach, Pearson India Education Services Pvt. Ltd., 2016.

9.Allen B. Downey ,"Think Python: How to Think Like a Computer Scientist'', 2nd edition,

10.Updatedfor Python 3,Shroff/O'Reilly Publishers, 2016 (http://greenteapress.com/wp/thinkpython/)

11.http://nptel.ac.in/

2302IT304	DATABASE MANAGEMENT SYSTEMS	L	T	P	C
		3	0	0	3

PREREQUISITE:

Programming and Problem Solving, Data Structures and Algorithms

COURSE OBJECTIVES:

	1. To understand the fundamentals of data models and conceptualize and depict a database system using ER diagram
	2. To make a study of SQL and relational database design
	3. To know about data storage techniques a query processing.
	4. To impart knowledge in transaction processing, concurrency control techniques and recovery procedures.
	5. To familiarize the students with the different types of databases.

COURSE OUTCOMES:

After completion of the course, Student will be able to

CO1:	Classify the modern and futuristic database applications based on size and complexity
CO2:	Map ER model to Relational model to perform database design effectively
CO3:	Apply queries using normalization criteria and optimize the queries
CO4:	Compare and contrast various indexing strategies in different database systems
CO5:	Appraise how advanced databases differ from traditional databases
CO6:	Design XML schema, able to write XML queries for information retrieval

COs Vs POs MAPPING:

COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1	3	2	-	-	-	-	-	-	-	-	-	2
CO2	3	2	1	2	-	-	-	-	-	-	-	2
CO3	3	2	2	1	2	-	-	-	-	-	-	2
CO4	3	2	2	1	-	-	-	-	-	-	-	2
CO5	3	2	2	1	2	-	-	-	-	-	-	2
CO6	3	2	2	1	2	-	-	-	-	-	-	2

COs Vs PSOs MAPPING:

COs	PSO1	PSO2	PSO3
CO1	3	2	1
CO2	3	3	1
CO3	3	3	2
CO4	3	2	1
CO5	3	3	2
CO6	3	3	2

COURSE CONTENTS:

MODULE I	INTRODUCTION	9 Hours

Introduction to database - Data Base Architecture - Data Independence - Functional Dependencies –- Relational Algebra-Entity relationship model - mapping cardinalities-keys, E-R diagrams.

MODULE II	QUERY LANGUAGE & OPTIMIZATION	9 Hours

Relational Calculus – Tuple Relational Calculus – Domain Relational Calculus - SQL — DDL- DML-DCL-TCL-Embedded SQL-Static Vs Dynamic SQL - Views – Constraints – Query processing and optimization- - Normal Forms – 1NF to 5NF-Domain Key Normal Form

MODULE III	TRANSACTION PROCESSING	9 Hours

Transaction Processing – Properties of Transactions –Serializability - Concurrency Control-Locking Mechanisms – Time Stamp ordering –Two phase Commit Protocol-Deadlock-Recovery systems-Log-based

recovery.		
MODULE IV	**FILES AND INDEXING**	**9 Hours**
O3verview of Physical Storage Media-RAID -File Organization-File operations – Hashing Techniques – Indexing -Single level and Multi-level Indexes-B+ tree Index Files-B tree Index Files.		
MODULE V	**ADVANCED TOPICS**	**9 Hours**
Data warehousing, heterogeneous component systems-Data mining and knowledge discovery-OODBMS-Object Relational Databases –XML Data Base - Cloud based systems – NOSQL introduction -Hbase data model -Database Tuning -Case Study for Design and Manage the Database for any Project.		
		TOTAL: 45 HOURS

REFERENCES:

1.Abraham Silberschatz, Henry F.Korth and S.Sundarshan "Database System Concepts", Sixth Edition, McGraw Hill, 2017.

2. Ramez Elmasri and Shamkant B. Navathe, "Fundamentals of Database Systems",Fifth Edition, Pearson Education, 2013.

3.Thomas M. Connolly and Carolyn E. Begg, ―Database Systems - A Practical Approach to Design, Implementation, and Management‖, fifth edition, Pearson Education, 2011

4.C.J.Date, A.Kannan and S.Swamynathan, ―An Introduction to Database Systems‖, Eighth Edition, Pearson Education, 2012.

5.Raghu Ramakrishnan, ―Database Management Systems‖, Fourth Edition, McGraw-Hill College Publications, 2015.

6.Frank. P. Coyle, "XML, Web Services And The Data Revolution", Pearson Education, 2012

7.http://nptel.ac.in/

8.http://coursera.org/

2302IT351	DATA STRUCTURES AND ALGORITHMS LAB	L	T	P	C
		0	0	2	1

PREREQUISITE:

Programming in C and C++

	1. Learn the fundamental concepts of Data Structures and Algorithm.
	2. To apply the concepts of various linear data structures.
	3. To apply the concepts of various nonlinear data structures.
	4. Become familiar with the different algorithm design techniques.

COURSE OBJECTIVES:

	1. 1. Learn the fundamental concepts of Data Structures and Algorithm.
	2. 2. To apply the concepts of various linear data structures.
	3. 3. To apply the concepts of various nonlinear data structures.
	4. 4. Become familiar with the different algorithm design techniques.

COURSE OUTCOMES:

After completion of the course, Student will be able to

CO1:	Understand the concepts of Data Structures and Algorithm.
CO2:	Understand and apply the various concepts of Linear data Structures
CO3:	Understand and apply the various concepts of Non-Linear data Structures.
CO4:	Apply Divide and Conquer and Dynamic programming method to solve different problems.
CO5:	Apply Greedy technique and Backtracking method to solve different problems.

COs Vs POs MAPPING:

COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1	3	3	2	2	2	-	-	-	-	-	-	-
CO2	3	3	2	2	2	-	-	-	-	-	-	-
CO3	3	3	3	2	2	-	-	-	-	-	-	-
CO4	3	3	2	2	2	-	-	-	-	-	-	-
CO5	3	3	3	2	2	-	-	-	-	-	-	-

COs Vs PSOs MAPPING:

COs	PSO1	PSO2	PSO3
CO1	3	2	2
CO2	3	2	1
CO3	3	2	2
CO4	3	2	1
CO5	3	2	2

LIST OF EXPERIMENTS:

1. DDL and DML commands
2. Transaction control commands and aggregate functions
3. Joins and Nested Queries
4. Constraints and Views

High level programming language extensions (Control structures, Procedures and Functions).

5. Cursors and Triggers
6. Embedded SQL
7. Procedures, Functions and Report

9. Database Design and implementation with any one front end tool (Mini Project)

Sample list of Projects

1. Hospital management
2. Railway ticket reservation
3. Student Mark list processing
4. Employee pay roll processing

5. Inventory control

TOTAL: 30 HOURS

REFERENCES:

1. *Thomas H. Cormen, Charles E. Leiserson, Ronald Rivest, Clifford Stein, Introduction to Algorithms", Fourth Edition, McGraw Hill/ MIT Press, 2022*
2. *Mark Allen Weiss, "Data Structures and Algorithm Analysis in C++", Pearson Education, 2014*
3. *ReemaThareja, "Data Structures Using C", Oxford University Press, 2011*
4. *Aho, Hopcroft and Ullman, "Data Structures and Algorithms", Pearson Education,2012*
5. *Michael T Goodrich, Roberto Tamassia, David Mount, "Data Structures and Algorithms in C++", 8th Edition, Wiley Publishers, 2014.*
6. *Langsam, Augenstein and Tanenbaum, Data Structures Using C and C++, 2nd Edition, Pearson Education, 2015.*
7. *nptel.ac.in/*

2302IT352	DATABASE MANAGEMENT SYSTEMS LAB	L	T	P	C
		0	0	2	1

PREREQUISITE:

Programming and Problem Solving, Data Structures and Algorithms

COURSE OBJECTIVES:

1. To understand the fundamentals of data models and conceptualize and depict a database system using ER diagram
2. To make a study of SQL and relational database design
3. To know about data storage techniques a query processing.
4. To impart knowledge in transaction processing, concurrency control techniques and recovery procedures.
5. To familiarize the students with the different types of databases.

COURSE OUTCOMES:

After completion of the course, Student will be able to

CO1:	Classify the modern and futuristic database applications based on size and complexity
CO2:	Map ER model to Relational model to perform database design effectively
CO3:	Apply queries using normalization criteria and optimize the queries
CO4:	Compare and contrast various indexing strategies in different database systems
CO5:	Appraise how advanced databases differ from traditional databases

COs Vs POs MAPPING:

COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1	3	2	2	-	-	-	-	-	-	-	-	2
CO2	3	2	1	2	-	-	-	-	-	-	-	2
CO3	3	2	2	1	-	-	-	-	-	-	-	2
CO4	3	2	2	1	-	-	-	-	-	-	-	2
CO5	3	2	2	1	2	-	-	-	-	-	-	2

COs Vs PSOs MAPPING:

COs	PSO1	PSO2	PSO3
CO1	2	2	-
CO2	2	3	-
CO3	2	3	-
CO4	2	2	-
CO5	2	2	1

LIST OF EXPERIMENTS:

8. DDL and DML commands
9. Transaction control commands and aggregate functions
10. Joins and Nested Queries
11. Constraints and Views
5. High level programming language extensions (Control structures, Procedures and Functions).
6. Cursors and Triggers
7. Embedded SQL
8. Procedures, Functions and Report
9. Database Design and implementation with any one front end tool (Mini Project)

Sample list of Projects

1. Hospital management
2. Railway ticket reservation
3. Student Mark list processing
4. Employee pay roll processing

5. Inventory control

TOTAL: 30 HOURS

REFERENCES:

1. *Thomas H. Cormen, Charles E. Leiserson, Ronald Rivest, Clifford Stein, Introduction to Algorithms", Fourth Edition, McGraw Hill/ MIT Press, 2022.*
2. *Mark Allen Weiss, "Data Structures and Algorithm Analysis in C++", Pearson Education, 2014*
3. *ReemaThareja, "Data Structures Using C", Oxford University Press, 2011*
4. *Aho, Hopcroft and Ullman, "Data Structures and Algorithms", Pearson Education,2012*
5. *Michael T Goodrich, Roberto Tamassia, David Mount, "Data Structures and Algorithms in C++", 8th Edition, Wiley Publishers, 2014.*
6. *Langsam, Augenstein and Tanenbaum, Data Structures Using C and C++, 2nd Edition, Pearson Education, 2015.*
7. *nptel.ac.in/*