



## School of Computing

### COURSE PLAN

Department	Computer Science
Course Title	Advanced DBMS
Course Code	24CSA503
Programme and Section	M.C.A – D
Academic Year	2025-2026
Semester	I
LTP/ hours per week- Credit	L: 03, T: 00 and P: 01, 04 Credits
Course Instructor Details	Mr. Sudharshan Duth P p_sudharshanduth@my.amrita.edu 9739693632



## School of Computing

### Program Outcomes

PO1	<b>Computational Knowledge:</b> Apply knowledge of computing fundamentals, computing specialization, mathematics, and domain knowledge appropriate for the computing specialization to the abstraction and conceptualization of computing models from defined problems and requirements.
PO2	<b>Problem Analysis:</b> Identity, formulates, research literature, and solve complex computing problems reaching substantiated conclusions using fundamental principles of mathematics, computing sciences, and relevant domain disciplines.
PO3	<b>Design /Development of Solutions:</b> Design and evaluate solutions for complex computing problems, and design and evaluate systems, components, or processes that meet specified needs with appropriate consideration for public health and safety, cultural, societal, and environmental considerations.
PO4	<b>Conduct Investigations of Complex Computing Problems:</b> Use research-based knowledge and research methods, including design of experiments, analysis, and interpretation of data, and synthesis of the information to provide valid conclusions.
PO5	<b>Modern Tool Usage:</b> Create, select, adapt and apply appropriate techniques, resources, and modern computing tools to complex computing activities, with an understanding of the limitations.
PO6	<b>Professional Ethics:</b> Understand and commit to professional ethics and cyber regulations, responsibilities, and norms of professional computing practice.
PO7	<b>Life-long Learning:</b> Recognize the need and ability to engage in independent learning for continual development as a computing



## School of Computing

	professional.
PO8	<b>Project management and finance:</b> Demonstrate knowledge and understanding of the computing and management principles and apply these to one's work, as a member and leader in a team, to manage projects and in multidisciplinary environments.
PO9	<b>Communication Efficacy:</b> Communicate effectively with the computing community, and with society at large, about complex computing activities by being able to comprehend and write effective reports, design documentation, make effective presentations, and give and understand clear instructions.
PO10	<b>Societal and Environmental Concern:</b> Understand and assess societal, environmental, health, safety, legal, and cultural issues within local and global contexts and the consequential responsibilities relevant to professional computing practice.
PO11	<b>Individual and Teamwork:</b> Function effectively as an individual and as a member or leader in diverse teams and multidisciplinary environments.
PO12	<b>Innovation and Entrepreneurship:</b> Identify a timely opportunity and use innovation to pursue that opportunity to create value and wealth for the betterment of the individual and society at large.

### Course Outcome

Cos	Description
CO1	Gain confidence in writing SQL and PL/SQL





## School of Computing

CO2	Understand the relevance of transactions and recovery, parallel and distributed databases including for large real-time applications
CO3	Learn the Object-relational Database concepts, and advanced Queries based on these concepts.
CO4	Understand JSON usage and compare it with XML
CO5	Gain knowledge in different other types of databases for handling diverse data and purposes.

### CO-PO Mapping

PO/PSO CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1	2	3	3	2	3		2	3	1		3	2
CO2	1	2	3	3	3		2	1	1		1	2
CO3	2	3	3	2	3		2	3	1		3	2
CO4	2	3	3	2	3		2	3	1		3	2
CO5	1	2	3	3	3		2	1	1		1	2

## School of Computing

### Lesson Plan

Week	Lecture No.	Topics	Keywords	Teaching Aids	Text Book	CO Mapping
1	1	Set Operations and Sub queries	Union, UnionAll, Intersect, Minus, Sub queries- Update, delete and select statements	Blackboard, & Demonstration	TB1, CH3	CO1
	2	Joins	Inner join, left join, right join, full outer join, EXISTS	Presentation & Demonstration	TB1, CH4	CO1
	3		Views, With clause	Presentation & Demonstration	TB1, CH4	CO1
	4		Recursion in SQL	Blackboard, Demonstration	TB1, CH5	CO1
2	5	PL-SQL	Introduction, features, comparison -SQL and PL/SQL, variables and constants	Blackboard, Presentation & Demonstration	TB6	CO1
	6	Conditional and looping statements.	IF, Case, For, while statements	Blackboard, & Demonstration	TB6	CO1
3	7	DB Architecture	1-tier, 2-tier and 3-tier Architecture, Locking	Blackboard, Presentation	TB1, CH5 TB2, CH21	CO1
	8	Transaction	Definition, transaction example	Blackboard, Presentation	TB1, CH17	CO1

## School of Computing

	9	Transaction model and properties	Atomicity, Consistency, Isolation Durability	Blackboard, Presentation	TB1, CH17	CO1
<b>Class test 1</b>						
		Transaction serializability	Serializable and non-serializable schedule,	Blackboard, Presentation	TB1, CH17	CO1
4	10	Types of serializability	conflict serializability, View serializability	Blackboard, Presentation	TB1, CH17	CO1
	11	Concurrency Control	Problems- W -W conflict, R-W conflict,	Blackboard, Presentation	TB1, CH17	CO1
	12	Recovery	Interaction with concurrency control, Transaction rollback, Checkpoints, Restart recovery	Blackboard, Presentation	TB1, CH18	CO1
5	13	Parallel database	Introduction to I/O Parallelism	Blackboard, Presentation	TB5, CH18	CO2
	14	Partitioning techniques	Round, hash and range partitioning	Blackboard, Presentation	TB5, CH18	CO2
	15	Parallelism types	Interquery Parallelism and Intraquery Parallelism	Blackboard, Presentation	TB5, CH18	CO2
6	16	Intraquery Parallelism	Intraoperation and Interoperation Parallelism	Blackboard, Presentation	TB5, CH18	CO2



## School of Computing

	17	Intraoperation Parallelism-	Parallel Sort	Blackboard, Presentation	TB5, CH18	CO2
	18	Intraoperation Parallelism	Parallel Join	Blackboard, Presentation	TB5, CH18	CO2
7	19	Interoperation Parallelism	Pipelined and Independent Parallelism	Blackboard, Presentation	TB5, CH18	CO2
	20	Distributed Databases	Introduction	Blackboard, Presentation	TB5, CH19	CO2
<b>Midterm Examination</b>						
8	21	Object-relational database	Comparison- Relational and object-oriented database	Blackboard, Presentation	TB5, CH22	CO3
	22		Complex Data Types	Blackboard, Presentation	TB5, CH22	CO3
	23		Structured Types	Blackboard, Presentation	TB5, CH22	CO3
9	24	Inheritance in SQL	Type Inheritance	Blackboard, Presentation	TB5, CH22	CO3
	25		Table Inheritance	Blackboard, Presentation	TB5, CH22	CO3
	26	Array	Array declaration in query	Blackboard, Presentation	TB5, CH22	CO3

## School of Computing

	27		Query planning	Blackboard, Presentation	TB1, CH15	CO3
10	28		Evaluation and Optimization Techniques	Blackboard, Presentation	TB1, CH16	CO3
	29	JSON	Features, syntax,	Blackboard, Presentation	TB7	CO4
	30	Datatypes	Object, array, number, Boolean, null	Blackboard, Presentation	TB7	CO4
11	31		Stringfy and parse	Blackboard, Presentation	TB7	CO4
	32	XML Databases	XML Data Model	Blackboard, Presentation	TB1, CH30	CO4
	33	XML Document Schema	Document Type Definition	Blackboard, Presentation	TB1, CH30	CO4
12	34	XML Document Schema	XML Schema	Blackboard, Presentation	TB1, CH30	CO4
	35		XML Querying	Blackboard, Presentation	TB1, CH30	CO4
	36	JSON, XML	Comparison of JSON with XML	Blackboard, Presentation	TB1, CH8	CO4
Alumni Interaction: Manoj R, Data Engineer, Tech Mahindra, Bengaluru. – Tentative						
13	37	Python	Use JSON with Python	Blackboard	WR 1, 2	CO4







## School of Computing

### Lab

Week	Topics
1.	Table Design- Data Definition Language (DDL) commands – Create, Alter, Drop, Primary Key Create table, Insert records, Update, Alter table, Drop column, Other SQL Queries
2.	Create SQL commands to make use of Sub queries and Set operators
3.	Create SQL commands to make use of Exists, Views, With Clause
4.	Implement the concept of Joining tables in SQL Relational, create SQL commands to make use of Arithmetic and logical operators
5.	Create SQL commands – Recursion, Create PL/SQL command for IF, FOR, While, Array concepts.
6.	Create PL/SQL command for implementing Procedure concept
7.	<b>Lab Test 1</b>
8.	Create PL/SQL command for implementing Functions and Triggers concept
9.	Complex types, Table Inheritance, Arrays.
10.	XML queries
11.	XML queries
12.	JSON and XML
13.	JSON with PHP/ Python
14.	<b>Lab Test 2</b>



**MYSURU  
CAMPUS**

## **School of Computing**

### **Textbooks:**

1. Database Systems Concepts, Silberschatz, Abraham, Henry F. Korth, and S.Sudarshan. McGraw-Hill, ISBN 9780078022159, 2019, 7th Edition
2. Fundamentals of Database Systems, RamezElmasri and ShamkantNavathe, 7th Edition, Addison Wesley, 2015
3. Database Systems: The Complete Book, Hector Garcia-Molina, Jeffrey Ullman and Jennifer Widom, Second Edition, Prentice Hall, 2008
4. PostgreSQL Documentation.
5. Database Systems Concepts, Silberschatz, Abraham, Henry F. Korth, and S.Sudarshan. McGraw-Hill, ISBN 9780078022159, 2019, 6th Edition
6. Oracle PL/SQL programming, O'Reilly, Steven Feuerstein, Fifth Edition
7. Introduction to Java scrip object notation, Lindsay Bassett, O'Reilly.

### **Web Reference:**

1. [https://www.w3schools.com/python/python\\_json.asp](https://www.w3schools.com/python/python_json.asp)
2. <https://www.geeksforgeeks.org/working-with-json-data-in-python/>
3. <https://www.geeksforgeeks.org/active-databases/>
4. <https://www.easytechjunkie.com/what-is-an-intelligent-database.htm>
5. <https://asistdl.onlinelibrary.wiley.com/doi/10.1002/bult.2013.1720390511>
6. <https://www.geeksforgeeks.org/applications-of-commercial-deductive-database-systems/>



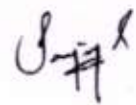

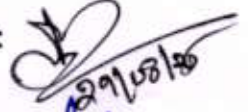
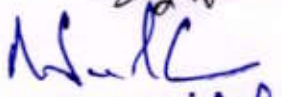


## School of Computing

### Internal Assessment Component:

S. No.	Component Name	Weightage	CO Mapping	Tentative Date of Completion
1	CT1	5	CO1	By 3rd Week
2	Lab Tests 01+ viva	20	CO1, CO2	By 4 <sup>th</sup> Week
3	Lab Tests 02	15	CO3, CO4	By 8 <sup>th</sup> Week
4	Project	10	CO1, CO2, CO3, CO4	End of Semester
5	Midterm Examination	20	CO1, CO2, CO3, CO4, CO5	End of Semester

### Name & Signatures

1. Course Teacher: 
2. Class Representatives:  Rakshitha TC  JANJAY-S
3. Class Advisor: 
4. Program Coordinator: 
5. Chairperson: 

**CHAIRPERSON**  
Department of MCA  
Amrita Vishwa Vidyapeetham  
Mysuru Campus